NEW SERVICE DEVELOPMENT IN BANKING: THE ORGANIZATION AND COORDINATION OF VIRTUAL DEVELOPMENT TEAMS

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DECLARATION

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ABSTRACT

New Service Development (NSD) is frequently executed on a project-management basis with the organizational nucleus being the cross-functional team. Radical changes in information technology have led to the emergence of a new type of cross-functional team, the virtual team. Virtual teams comprise an important structural component of many organizations and are particularly important in globally dispersed efforts. This thesis investigates the workings of virtual NSD teams in corporate banking.

The literature indicates that leaders of virtual teams often struggle to achieve effective teamwork. As virtual teams involve geographically dispersed members who rarely meet in person, a key challenge for team leaders is to organize and coordinate. This study develops a conceptual model of the organization and coordination of virtual teamwork grounded both in previous literature and in qualitative multiple case studies. A systematic process was used for conducting case research using purposive sampling and multiple data collection methods. Data was collected from 16 project teams in 8 international banking institutions - Goldman Sachs, Schroders, Barclays, Rothschild, Deutsche Bank, Abbey National, Lloyds TSB and Bank of Scotland.

The findings shed new light on the workings of virtual teams in the NSD context. They suggest that some analysts have exaggerated the potential of flexibility and adaptability in virtual teams. There is little evidence of flexibility and adaptability in the management of high performing teams. High performing teams are distinguished by formalized work processes, centralized decision-making, and standardized communication patterns. It is the physical structure of high performing teams (size and membership especially) which is flexible and adaptive. Yet, the more flexible the physical structure the tighter organization and coordination. Tightly organized and coordinated work processes reduce complexity and ambiguity and so provide stability. These surprising findings contribute to emerging research suggesting that loosely coupled organizational forms need to be underpinned by tight managerial mechanisms. Managers are challenged to implement these mechanisms in the form of formalized, centralized and standardized work processes.

Managerial implications are identified in the context of, but not limited to, NSD. They highlight the limitations of virtual teams and suggest that team leaders evaluate with great care whether to deploy a virtual team as opposed to a traditional co-located work group. In particular, the advantages of flexible physical team configurations may be diminished by the attendant need for rigid managerial mechanisms to organize and coordinate. Unless these mechanisms are skilfully implemented, their rigidity may curb efficiencies related to time and cost and may even hinder creativity and innovation. These potential limitations provide rich possibilities for further research.

CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter summarizes the contents of the thesis. It highlights the research problem, the objectives of the study, and the research question. It refers to the conceptual framework and the method of investigation; provides an overview of the findings; discusses theoretical and managerial implications; refers to the limitations of this study, and defines the key terms used.

1.2 The business problem defined

New service development (NSD) has gained great importance in today's highly competitive banking industry that is characterized by rapid changes, deregulation, and even shorter product life cycles. NSD is frequently executed following a project-management approach, where the organizational nucleus is a product development team. The performance of such development teams can be a critical factor for the success of the organization (Cooper, 1985; Johne and Snelson, 1988b). Consequently, much academic effort is put into making teamwork in NSD more efficient and effective (Henke et al., 1993; Donellon, 1993; Griffin and Hauser, 1996; Hauptman and Hijri, 1999).

Chapters 2 and 3 show that cross-functional teams are important mechanisms used in the development of new services as they allow for lateral decision processes, which cut across the traditional vertical lines of functional authority (Griffin, 1997; Jassawalla and Sashittal, 2001; Lovelace et al., 2001). Radical changes in information technology have led to the emergence of a new type of cross-functional NSD team, the virtual NSD team (Smith and Blanck, 2001). The virtual team can be used to employ geographically and/or organizationally distributed NSD expertise that is not available in a single geographic area without having physically co-locate team members (McDonough III et al., 2001). A virtual NSD team is defined as groups of geographically and/or organizationally dispersed co-workers that co-operate mainly through impersonal communication modes

(Townsend et al., 1998) to accomplish the organizational task of initiating, developing and launching a new product or service (McDonough III, et al., 2001).

Recently, there is evidence of an increased use of virtual NSD teams in banking as well as other industries due to the strong growth in the internationalization of many firms' service development activities (McDonough III et al., 2001). However, the lack of attention devoted by scientific research to the management of virtual NSD teams contrasts sharply with the importance attached to it as a cornerstone of international business success (Moenaert et al., 2000).

The review of previous research indicates that many organizations struggle to achieve effective virtual teamwork (Cummings and Teng, 2003; Leenders et al., 2003; Mohrman et al., 2003; Susman et al., 2003). Virtual teams operate within a highly complex and dynamic environment. The situation facing a virtual team frequently is complex in terms of both the tasks that it must perform and the environment with which it must cope. Managers of virtual teams are particularly challenged, as they have to cope with contextual complexity as well as manage a group of geographically dispersed individuals who rarely meet in person. In particular, managers of virtual teams are challenged to organize and coordinate virtual teamwork to ensure effective inter-team communication, information distribution, and task execution. As virtual teams involve geographically dispersed individuals who rarely meet in person, the key challenge for team managers is to organize and coordinate virtual teamwork for high team performance.

1.3 Objectives of the research and research question

Virtual teamwork is associated with a multitude of challenges that result out of a highly complex and dynamic work environment. To cope with this complex environment, team managers face the challenge of organizing and coordinating to achieve high teamwork effectiveness and team performance. Organization theorists have proposed that organization structure serves both as the means of coping with environmental contingencies and a way of maintaining organizational coordination and control over a broad range of business conditions (Montanarai and Freedman, 1981). The term

'organization structure' embodies a variety of concepts. Structure has been atomized into component parts, referred to as structural dimensions. As discussed in Chapter 3, Dalton et al. (1980) suggest that 'managerial structure' reflects the organization and coordination of a group's complex work processes. Managerial structure refers to policies and activities occurring within the group that prescribe or restrict the behaviour of group members and is reflected, for example, by formalization, centralization, and standardization.

Early theorists argue that effective mechanisms for organizing and coordinating the workflow are reflected by tight managerial structures such as standardized work processes and centralized decision-making (Child, 1972; Galbraith, 1977). More recent theorists challenge this argument asserting that the nature of work and the professionalism of the workers in knowledge-intensive units make tight and mechanistic structures archaic and inefficient (Mintzberg, 1998; Hansen, 2001). This latter school of research emphasizes the knowledge-intensive aspect of today's work, which potentially invalidates industrial-bureaucratic forms of structure (Greenwood et al., 1990; Hinings et al., 1991; Wallace, 1995). Yet, recently a new school of research has emerged suggesting that the adoption and on-going adaptation of novel, flexible and loosely coupled organizational forms such as virtual teams requires tight managerial mechanisms to organize and coordinate (Argyres, 1999; Galunic and Eisenhardt, 2001; Schilling and Steensma, 2001; Kärreman et al., 2002; O'Sullivan, 2003). This emerging research suggests that highly fluid and flexible organizational forms require the mutual adaptation of the workflow through centralized (Ahuja and Carley, 1998), formalized (Maznevski and Chudoba, 2000), and standardized (O'Sullivan, 2003) forms of organizing and coordinating.

The implications for NSD teams operating within a virtual context are conflicting. On one hand, studies on novel and loosely coupled organizational forms suggest that the early formalization of workflows and standardization of interaction patterns are likely to be significant to facilitate teamwork within the highly dynamic and complex virtual context (Maznevski and Chudoba, 2000; O'Sullivan, 2003). On the other hand, research

on co-located, knowledge-intensive units such as NSD teams highlights the role of loose managerial structures and the importance of freedom and flexibility as an essential ingredient to high performance (Mohrman et al., 2003; Cooper, 2003; Cummings and Teng, 2003; Van der Bij et al., 2003). Since research is limited one cannot yet say how the challenge of organizing and coordinating a virtual NSD effort can be optimally approached. That is to say, while there is now a considerable body of research on virtual teams, there have been very few studies concentrating on the organization and coordination of virtual teamwork. To address this issue this study investigates the organization and coordination of virtual teamwork for high team performance in the dynamic context of NSD in corporate banking.

The research question is posited as follows:

"What is the association between the way teamwork is organized and coordinated and the performance of a virtual NSD team?"

1.4 The conceptual framework

This study develops a conceptual model of the organization and coordination of virtual teamwork. The conceptual model is developed in two phases. The first phase develops an initial conceptual model grounded in previous literature. The second phase explores this initial model through qualitative, multiple case studies drawn from a purposive sample of 8 international banks. Eventually, the initial model is revised and forwarded for further research.

The initial conceptual model draws on: (i) organizational structure literature (e.g. Galbraith, 1977; Tushman and Nadler, 1978; Daft and Lengel, 1984, 1986; Cohen and Levinthal, 1990; David et al., 1989; Keller, 1994); (ii) virtual team literature (e.g. DeSanctis and Poole, 1994; Orlikowski and Yates, 1994; Ahuja and Carley, 1998; Elkins, 2000; Majchrzak et al., 2000), and (iii) NPD/NSD literature (e.g. DeBrentani and Cooper, 1992; DeBrentani, 1993; Easingwood and Storey, 1993; Cooper et al., 1994; Edgett,

1994; Drew, 1995; Cooper and Edgett, 1996; Edgett and Snow, 1996; Johne and Storey, 1998; Avlonitis et al., 2001; Vermeulen and Dankbaar, 2002).

Chapter 3 provides the review of the above literature and is organized into three parts. The first part takes a macro-view on NPD/NSD and reviews the literature on NPD and NSD success. Subsequently, the focus narrows on internal organizational factors that affect development success. To facilitate the discussion on these internal organizational factors the McKinsey "7Ss" framework is introduced and the impact of strategy, skill, staff, style, shared values, systems, and structure on new product performance is examined. Thereafter, the chapter takes a micro-view on teamwork in NPD/NSD and discusses the role of the cross-functional team. The discussion highlights the importance of a new type of cross-functional team, the virtual team.

The second part of Chapter 3 discusses the literature on virtual teams in NPD/NSD, showing that research in the area is limited. Subsequently, the literature on virtual teamwork is examined in other research contexts, concluding that a key challenge for managers of virtual teams is to organize and coordinate dispersed teamwork. The third part of Chapter 3 reviews the organizational literature on managerial mechanisms to organize and coordinate. It is asserted that previous scholars have analyzed the organization and coordination of work with reference to so-called 'managerial structure'. The discussion on several group structural dimensions concludes that managerial structure is typically reflected by formalization, centralization and standardization.

Chapter 4 builds on the above review of the literature and develops the initial conceptual model. It examines the organization and coordination of virtual teamwork with reference to managerial structure. Managerial structure is reflected by (a) the formalization of the work process, (b) the centralization of decision-making, and (c) the standardization of communication incidents. Adopting a contingency theory perspective it is proposed that the organization and coordination of virtual teams requires different levels of managerial looseness or tightness under varying levels of task complexity to yield high teamwork effectiveness. It is further proposed that high teamwork effectiveness has a positive

impact on the tangible and intangible dimensions of team performance. Subsequently, the initial conceptual model is explored through qualitative, multiple case studies as explained below.

1.5 Methodology and method of the investigation

In accord with the literature that informs this study a positivist epistemological stance is adopted. As explained in Chapter 5, positivists view social science as an organized method for combining deductive logic with precise empirical observations of individual behaviour in order to discover and confirm a set of probabilistic casual laws that can be used to predict general patterns of human activity (Denzin and Lincoln, 2000). This positivist epistemological stance is premised on an ontological belief in physical realism. That is, the assumption that there exists a physical and social reality in an objective plane which is external to an independent scientist (Denzin and Lincoln, 2000). It is assumed that there is a reality out there to be studied, captured, and understood. However, acknowledging the post-positivist stance it is also accepted that reality can never be fully apprehended only approximated (Guba, 1990).

The research method adopted for this study is exploratory research covering multiple case studies. As explained in Chapter 5, the case study approach is selected for the following reasons: First, a contemporary phenomenon is investigated within its real life context, where the boundaries between phenomenon and context are not clearly evident. Second, the review of extant literature highlights the thin understanding of the nature of virtual team deployment in new service development, confirming the need for more theories in the area, and case studies address theory building rather than theory testing (Wilson and Vlosky, 1997). Third, qualitative methods such as case study facilitate in-depth analysis of complex and ill-researched activities and phenomena (Yin, 1996; Alam, 2002). Last, building on contingency theory this study is particularly interested in the context in which its population operates. While the quantitative researcher usually aims for larger numbers of context-stripped cases and seeks statistical significance, the qualitative researcher works with small samples of people, nested in their context, and studies in-depth sample and context (Miles & Huberman, 1994).

Following the suggestions of Eisenhardt (1989), this study emphasizes methodological rigour and adopts a systematic process of conducting case research. Within this systematic framework, the research follows a multiple case study approach, a purposive sampling procedure, and multiple data collection methods (Eisenhardt 1989; Leonrad-Barton, 1990; Yin, 1996; Perry, 1998). As discussed in Chapter 4 and Chapter 5, the research question was identified, propositions were formulated, and instruments such as interview schedules and interview guides were developed. Also, theoretical sampling and controls were considered. For data collection a total of eight cases were conducted based on 32 in-depth interviews. For data analysis, verbatim interview transcripts were created, inter-coder reliability tests deployed and qualitative data analysis software was utilized.

The sample comprises wholesale banks, investment banks and mortgage banks operating in the UK. Originally, a potential sample of 18 banks was determined using the purposive sampling method (Alam, 2002). Purposive sampling was chosen because random selection of cases is inappropriate for case-study research (Eisenhardt, 1989). Of the 18 banks that were selected initially, 8 banks agreed to participate in the field study, resulting in a purposive sample of 8 cases. These are: Deutsche Bank, NM Rothschild & Sons, Schroders, Bank of Scotland, Abbey National, Lloyds TSB, Barclays Capital, and Goldman Sachs. Within these 8 cases, 16 virtual project teams were studied. That is, in each case one higher performing project team and one lower performing project team was examined. This distinction was introduced for two reasons. First, comparing higher performing with lower performing project teams ensured a fuller understanding of the differentiating factors that help or hinder teamwork effectiveness and team performance. Second, following a qualitative research approach no scales were used to measure variables in degrees. Instead, the variables were examined through emerging data patterns in the higher and lower performing project teams, and, subsequently, these patterns were compared within and across project teams.

1.6 An overview of the findings

The findings show that virtual teams, charged with a complex work task and operating within a highly dynamic environment, require tight organization and coordination. In particular, the findings suggest that the organization and coordination of effective teams is reflected by (a) standardization of communication incidents, (b) formalization of the work process and (c) centralization of decision-making:

(a) Standardization of communication incidents

The findings indicate that high quality of communication between members of a virtual team is the very foundation for effective teamwork. Without ongoing communication, both personal and impersonal, there is no way for attaining high teamwork effectiveness. In virtual teams high quality of inter-team communication can be achieved through highly standardized communication incidents. That is, communication incidents are planned and sequenced through intensive scheduling. This scheduling dictates the frequency of meetings, the group of participants, and the type of communication mode deployed. Unscheduled and unstructured interaction occurs between standardized incidents and is mainly in response to the previous standardized incident or in anticipation of the next one. Further, high quality of inter-team communication derives from frequent personal communication incidents in the form of face-to-face group meetings. Face-to-face meetings are conducted in addition to impersonal communication incidents such as videoconferences and/or teleconferences.

(b) Formalization of the work process

The findings further indicate that the quality of information distribution and the quality of task execution are closely linked to a formalized work process. In effective teams formalization is evident in the form of frequent written directives and written reports that mandate and control the work process. While the team leader circulates daily directives that prescribe task execution, the team members submit written progress reports on a daily or at least weekly basis. The formalized work process with frequent written directives and written reports ensures that information is evenly and timely distributed

throughout the entire team. This is particular important in virtual teams, where the team members are geographically dispersed and impromptu discussions rarely occur.

(c) Centralization of decision-making

The findings further suggest that the quality of information distribution and the quality of task execution are closely linked to centralized decision-making. In effective teams decision-making on major issues tends to be centred on one central authority such as the team leader alone or the team leader and senior management. Typically, the entire team debates collectively about important and complex decisions before suggesting several possible solutions. The final decision on what solution to implement is then made in a centralized manner. Since the leader of a virtual team is not physically present to oversee work execution, she/he has to rely on being informed on emerging problems in an accurate and timely manner. The centralization of decision-making requires team members to contact and inform the team leader on a constant basis. This has the beneficial effect of the leader being continuously supplied with information, which in turn adds to her/his confidence and strategic intelligence.

In addition, the findings show that effective teams display continuously high standardization of communication incidents throughout the NSD process. That is, the majority of teams under investigation planned and sequenced all communication incidents through intensive scheduling. This pattern of standardization was evident for all personal communication incidents (e.g., face-to-face team meetings) and impersonal communication incidents (e.g., video-conferences) and in all project phases. However, in regard to formalization and centralization the findings indicate a differing pattern. This pattern suggests that effective teams display higher formalization and higher centralization in project phases of higher work process complexity. When the work process is perceived as highly complex, uncertainty and ambiguity are high and team members require particularly strong organization and coordination. The tightly structured work process provides coordination, continuity, and long-term stability for the team. It is this sense of predictability and constancy that helps reduce confusion and complexity within the highly dynamic virtual context. Team members know what to expect, which

reduces ambiguity in the process by structuring expectations and making interaction predictable. Conversely, effective teams display lower formalization and lower centralization in project phases of lower work process complexity. When complexity is less team members are more able to rely on their self-organization and require less written directives. Also, when complexity is less the team manager feels less pressure for controlling project progress on a constant basis.

1.7 Contributions to theory and practice

This study develops a conceptual model of the organization and coordination of virtual teamwork in NSD, grounded both in previous literature and in qualitative, multiple case studies. Most importantly, the findings contribute to emerging research showing that the adoption and on-going adaptation of novel, loosely-coupled organizational forms requires tight organization and coordination. These findings shed new light on the dynamics and efficiencies of virtual teams. Proponents of virtual teamwork have exalted the potential flexibility and adaptability of virtual teams (Henry and Hartzler, 1997; Mayer, 1998; Fisher and Fisher, 2000; Jude-York et al., 2000; Lipnack and Stamps, 1997, 2000; Duarte and Snyder, 2001; Willmore, 2001; Gibson and Cohen, 2003; Rad and Levin, 2003). However, the findings of this study provide little evidence for flexibility and adaptability in regard to the organization and coordination of virtual teams. Rather, the managerial structure of effective teams reflects tight and rigid structural designs. It is mainly the physical structure of teams (size and membership especially) that is highly fluid and adaptive to changing contextual conditions. However, the more fluid and adaptive the physical structure becomes the more mechanistic the managerial structure has to be to control for increased work process complexity and to facilitate virtual teamwork.

Some practitioner-oriented literature has suggested that virtual forms of organization, unlike traditional ones, would enjoy greater flexibility and autonomy without the need for hierarchies of authority, centralized control, specialized roles, or bureaucratic stiffness of performance (Henry and Hartzler, 1997; Mayer, 1998; Jude-York et al., 2000; Lipnack and Stamps, 1997, 2000). Tied in with this overarching flexibility, virtual forms of organization are supposed to provide cost and time related efficiencies due to their ability

to capture geographically and/or organizationally distributed expertise without having physically co-locate team members (Jude-York et al., 2000; Duarte and Snyder, 2001; Willmore, 2001; Gibson and Cohen, 2003).

However, the findings of this study suggest that despite the hype surrounding virtuality, managerial work, managing personnel, resources, customers and so on remains very much 'business as usual' and that the problems that typically and persistently preoccupy managers do not simply disappear with the move towards the virtual organization or the virtual team. On the contrary, these problems might get aggregated. It is therefore suggested that potential limitations to the benefits of virtual teams have been overlooked in some of the practitioner-oriented literature. Managers are advised to evaluate carefully whether to deploy a virtual team rather than a traditional co-located work group. The advantage of a highly flexible and fluid physical team configuration might be overshadowed by the resulting need for rigid managerial designs to organize and coordinate. Also, the theoretical efficiencies in time and cost might be impeded by the persisting need for frequent face-to-face interaction.

1.8 Limitations of the study

As explained in Chapter 8, despite great attention given to the validity and reliability of this study several limitations arise. First, due to the exploratory nature of this research, in-depth field interviews were used in a small number of service firms. Therefore, the findings should be considered tentative. Second, although this study is qualitative and descriptive in nature, a considerable amount of prior instrumentation was undertaken and a conceptual framework with propositions was devised. Critics may argue that such preordained theoretical perspectives might bias or limit the findings. However, this study concurs with Eisenhardt (1989), Yin (1996) and Perry (1998) that without prior instrumentation the researcher will get overwhelmed by the staggering volume of rich data, trying to capture everything and lacking the simplicity of overall perspective. Third, this study focuses on a specific type of virtual project team that operates within a particular industry sub-sector. The question arises whether or not the findings are generalizable beyond the narrow context of virtual NSD teams and corporate banking?

Accepting that qualitative research is concerned with analytic generalizations rather than statistical generalizations, it is believed that the findings can be generalized to other virtual project teams to the extent that the team is charged with complex tasks, operates within a highly dynamic environment, and forms part of a large multinational organization. Fourth, by the use of retrospective data this study has relied on managerial perceptions of virtual teamwork. Although this method is common in the extant literature, the problem of bias effect is always present. Additional problems are poor recall and poor inaccurate articulation. Chapter 5 and Chapter 8 discuss the measures undertaken to address these potential limitations. Last, the sample was a non-probability sample. The purposive sampling method was deployed because random selection of cases is inappropriate for case-study research (Eisenhardt, 1989).

1.9 Definition of key terms

For the purpose of this research the following terms have specific meanings:

Corporate Banking: denotes all services and products offered by wholesale banks, mortgage banks, and investment banks to the corporate or institutional customer but not to the personal customer.

Development Phase: the part of the NSD process when the new product is developed and tested in house with customers and operations personnel.

Function: a specialist part within the bank that provides specialist expertise, e.g. marketing, finance, research and development.

Implementation Phase: the part of the NSD process when the idea is converted from concept to reality and is introduced to the market. It may include testing for launch, personnel training, piloting and test marketing.

Initiation Phase: the part of the NSD process when the organization becomes aware of an innovation, and decides to adopt it. It may include idea generation and screening, market assessment and business analysis, as well as concept development and evaluation.

Product and Service: are used interchangeably in a general sense denoting either tangible products or intangible offers in financial services.

Teamwork effectiveness: refers to the effectiveness of virtual teamwork. Teamwork is defined as the joint interaction of team members to execute the work process. Teamwork effectiveness is assessed through the quality of inter-team communication, quality of information distribution, and quality of task execution.

Team Manager: refers to the appointed team leader of a project team. The reader can assume that there exists only one team manager in any mentioned project team, unless stated otherwise.

Team Performance: is distinguished by higher or lower team performance and is assessed through the ultimate project outcome.

Virtual NSD Teams: are groups of geographically and/or organizationally dispersed co-workers that that co-operate mainly through impersonal communication modes to accomplish the organizational task of initiating, developing and launching a new product or service.

Task Complexity: refers to the complexity of the work tasks of the NSD process. Task complexity is assessed through task predictability, problem analyzability and team interdependence.

1.10 Conclusion

This chapter has summarized the contents of the thesis, which investigates the association between the way teamwork is organized and coordinated and the performance of a virtual NSD team.

The following chapters will expand on this short introduction. The thesis is structured to present the context of the study (Chapter 2); to review the literature on new product development and teamwork (Chapter 3); to devise the research question, propositions, and conceptual model (Chapter 4); to discuss the methodology and method (Chapter 5); to present an overview of the case findings (Chapter 6); to discuss the findings, reformulate the propositions, and revise the conceptual model (Chapter 7); to examine the contributions to theory and suggestions for further research (Chapter 8), and to identify the managerial implications as well as the limitations of this study (Chapter 9).

CHAPTER 2

THE CONTEXT: CORPORATE BANKING IN THE UK

2.1 Introduction

This chapter describes in detail the study context. First, an overview of the European banking market is provided, suggesting that the industry's key players are becoming increasingly interrelated. Second, the focus is narrowed on the importance of the UK banking sector with London as Europe's banking capital. Third, the UK market of corporate banking is analyzed. The differences between corporate and personal markets are discussed, corporate financial needs are assessed, and corporate buying behaviour is examined. Thereafter, recent trends in corporate banking are discussed. In particular, the discussion focuses on the role of Information Technology in the areas of distribution, marketing, and cross-functional teamwork. Fourth, the literature on NPD and NSD in banking is examined and the importance is highlighted of continuous incremental service innovation. The chapter concludes suggesting that banks serving the corporate market are global in their NSD activities, rely on dispersed teamwork across organizational divides, and maintain a highly sophisticated technological infrastructure. These factors combined make practices in corporate banking a prime example for the new form of work to be found in the notion of the 'virtual NSD team'.

2.2 The banking sector

2.2.1 Introduction: the current situation

In many European countries the pace of industry change in banking markets is dramatic. Frequently reported trends are: blurring of industry boundaries; deregulation; globalization; pressures from new and existing competitors; rapidly advancing information technologies, and increased customer sophistication. Banks worldwide are becoming increasingly interrelated. The extent of global interrelation becomes particular apparent in times of crisis. From the year 2000 onwards the banking industry worldwide has been hit by falling capital markets, severe corporate scandals, and reduced merger and acquisition activities. As a consequence, major banking institutions have

implemented severe job cuts, some slashing 15-20 per cent of their staff (Saigol, 2002a). In the autumn of 2002 the US Bureau of Labour Statistics stated that Wall Street firms alone have cut 61,000 jobs since employment in the industry peaked in the year 2000 (Silverman, 2002a).

This crisis comes after banks enjoyed several years of record profits. The booming equity markets of the late 1990s combined with heavy activity in mergers and acquisitions led to significant increases in industry revenues. Over the same period banking institutions accelerated change pursuing new types of corporate and business strategies such as industry consolidation; better market segmentation; expanded product offerings, and changed delivery channels. As a consequence, joint ventures and strategic alliances between institutions have proliferated (Smith, 2003; Silverman and Pretzlik, 2004).

European banking faces important challenges. Not only are bad debts rising because of large corporate and sovereign defaults, but revenue growth is slumping. In several countries domestic consolidation has almost run its course, yet cross-border deals have proven difficult to forge. The dramatic slowdown in capital markets activity also increases pressure on European banks to restructure or consolidate their investment banking divisions (Burgess, 2002b; Coggan, 2003). For example, banking in Germany is going through one of its worst crises in modern times, as HVB and Dresdner Bank have shocked investors with their performance (Major and Ratner, 2002; Saigol and Harnischfeger, 2002). For Spanish banks, Latin America has not been the panacea they had hoped, as the days of double-digit profit growth are over for now (Crawford, 2002). In Italy, banks are emerging from a three-year merger spree, which might prove less successful than initially anticipated (Pretzlik, 2002b). For several European banks, life assurance businesses have turned into a poisoned chalice as falling equity markets have undermined solvency ratios. Credit Suisse and Abbey National are amongst those affected (Pretzlik et al., 2002). At the same time, several West European banks are looking to Eastern Europe for expansion opportunities (Wagstyl, 2002).

While the pace of industry change in banking was rapid over the last decade, it is likely to accelerate even more in the years to come. Conducting research in such a rapidly changing industry is both, challenging and rewarding. Challenging, because the highly competitive environment makes data collection often difficult and exhausting. Bankers are reluctant to share sensitive information with outsiders. Rewarding, because banking organizations are at the sharp end of global economic transformations and pursue constant innovation as a key to stay competitive in a fiercely embattled market.

The following section discusses briefly the European banking market before examining the key characteristics of the UK banking sector.

2.2.2 The European banking sector

The European banking sector is confronted with major forces that have changed its competitive dynamics and strategic context. While this thesis concentrates on the UK banking sector, the growing global interdependence of regional banking services has to be emphasized. This global interdependence is painfully illustrated by the global economic slowdown experienced form the year 2000 onwards that affects financial markets worldwide (Bream, 2002; Saigol, 2002a; Croft, 2003a; Pretzlik, 2003a; Silverman and Pretzlik, 2004).

During the Asian crisis of the mid 1990s, major financial players tried to cope with their interdependencies by globalizing their activities: for example, large US banks like Citigroup made inroads into Europe, Japanese banks entered US markets, and European players increased their intercontinental operations by penetrating American and Asian markets (Saigol, 2002d). By 2001, almost one-third of the largest financial services firms in the world had businesses in three or more continents (Flier et al, 2001). Together with globalization many banks pursued a 'universal banking' approach creating 'financial services supermarkets' that would tempt customers with a one-stop outlet for everything from managed funds to travel insurance. In Europe, the advent of the 'Eurozone' encouraged the adoption of the 'mega-banking' model and fostered cross-border consolidation throughout the 1990s up to the year 2001 (Buckley, 2003).

However, in 2003 the banks' initial enthusiasm for consolidation has given way to scepticism. Underlying banks' newly found risk aversion is the acknowledgement that diversification strategies have produced minimal benefits for investors (Silverman and Pretzlik, 2004). In Europe, diversification has produced many ill-fated ventures, particularly where banks' consolidations with insurers are concerned. Indeed, the market risk acquired by banks has recently proved a bigger problem than the credit risk that is their stock in trade (Silverman and Pretzlik, 2004). Since Lloyds TSB of the UK bought Scottish Widows, the life insurer, in 2000, losses on its investment funds have been just as heavy as the group's hits on bad loans in both 2001 and 2002 (Silverman and Pretzlik, 2004). Lloyds TSB, now under new leadership, has since tried to sell Scottish Widows but found no takers at the price it wanted (Bolger, 2003). Equally, Switzerland's Credit Suisse encountered severe difficulties after taking over the Winterthur insurance company in 1997. When combined with the disastrous consequences for earnings of having bought the investment bank Donaldson Lufkin & Jenrette at the top of the market, Credit Suisse found that its acquisitions had created a serious capital risk (Politi and Saigol, 2003). Nor has the argument for diversification been bolstered by the results when insurers have bought banks. Allianz has seen its reputation as one of Germany's finest companies shattered by its takeover of Dresdner Bank. Declining revenues and bad loans at the bank forced the insurer into discounted equity raising in 2003 (Croft, 2003a).

In addition, attempts at cross selling - marketing as many products as possible to a customer - have proved disappointing in many cases. According to a report published by Morgan Stanley: "Investor doubts on bank managements' core competences have risen in recent years . . . the value to shareholders of banks increasing the diversity of the business model - fanning out in both geographic and activity terms - has given way to wholly legitimate concerns on both the risks and value added of diversity as an end in itself" (Morgan Stanley, 2004).

While the pace of mergers and acquisitions in the financial services industry increased considerably in 2003 from the previous year, it mainly involved companies merging with similar companies (Silverman and Pretzlik, 2004). Insurers are combining with insurers:

Manulife with John Hancock; Travelers Property Casualty with the St Paul Companies. Likewise, Citigroup, a market leader in credit cards and sub-prime lending, bought a card portfolio from Sears and a consumer finance unit from Washington Mutual.

In retrospect, globalization and diversification left banks even more exposed to the sudden global economic downturn experienced over the years 2000 to 2003. With global mergers and acquisitions activities the slowest in a decade and deteriorating equity markets, most institutions have now to tackle soaring cost bases by reducing headcount (Saigol, 2002c; Silverman, 2002a; Silverman, 2002 b; Silverman, 2003).

With global banking sector in turmoil, today's landscape looks very different from the regulated market of the mid-1980s. Back then, European banking was characterized by significant governmental involvement and by numerous institutional and regulatory limitations on the domestic, cross-border and cross-sector activities of banking firms. The process of deregulation and harmonization in the banking sector has been a gradual one and has varied considerably between European countries. Many of the numerous regulatory changes had been devised with the following three objectives in mind (Gual, 1999): (i) eliminating restrictions on domestic competition, (ii) changing the scale and scope of financial activities, and (iii) improving the external competitive positions of financial firms.

Such regulatory changes had a major impact on the strategic renewal context of the firms involved. The first objective relates to the process of enhancing domestic competition. This process includes the elimination of restrictions on the entry of new domestic firms and restrictions on mergers and acquisitions. It also includes the removal of limitations to the use of competitive tools such as interest rate controls and the loosening of controls on capital flows that limit foreign competition (Flier, et al. 2001; Guerrera, 2002).

The second objective of regulatory changes comprises indicators on the relaxation of regulations that limit the scale and scope of financial services. These include restrictions

on cross-border establishments and limits on combining banking, insurance and securities activities within a single firm (Gual, 1999).

The third objective of regulatory changes applies to variations in regulations impacting the external competitive position of financial firms. These include solvency regulations, capital adequacy requirements, and reserve and investment coefficients. These measures impact on the cost of doing business and place limits to the free use of deposits and a firm's own funds (Harrison, 2000; Wise and Morrison, 2000).

The forces of regulatory change as well as technological development have enabled firms to offer combinations of all sorts of financial activities quickly in any EU member country (Flier, 2001). Novel technologies, new business models and strategic alliances have replaced often difficult-to-manage mergers and acquisitions by making it easier to offer banking services around the clock to customers located anywhere (Colgate, 2000). Information Technology by itself is no panacea, however, merely enabling the required multi-channel banking strategy (Wise and Morrison, 2000).

From the early 1980s onwards, several non-financial players such as General Electric, Microsoft, Virgin, Tesco, or Vodaphone felt encouraged to enter the financial services sector (Lewis, 1984; Pretzlik, 2002a). These firms are confronted in their home industries with regulatory change and technology development as well, triggering the necessity for their strategic renewal. The confrontation between non-financial players and incumbents in the financial services, each looking for strategic renewal options, give rise to an even more dynamic and interdependent financial services landscape in which the boundaries become less clear (Lewis, 1984; Pretzlik, 2002a).

In 2002, the European banking sector has suffered from a gradual deterioration in investor sentiment. Having given the prospects of economic recovery the benefit of the doubt early in 2002, a series of poor earnings reports and profit warnings forced investors to change their minds by the autumn of 2002. Bank shares, which performed largely in line with equity markets in 2002, have spent most of late 2002 and early 2003 under-

performing. Not only did stocks fall as earnings expectations were slashed, but a sector de-rating brought its price/earnings ratio down by 20 percent (Bream, 2002; Pretzlik, 2002a). Chief among investor concerns was credit quality, as banks suffered fallout from such corporate collapses as Enron and WorldCom and the crisis in Argentina. The over-exposure of banks to equities also undermined confidence and earnings. This had struck the investment banking operations of some European banks and weakened the capital base of their insurance subsidiaries (Pretzlik, 2002b). In 2002, especially German banks have found that their large industrial shareholdings have turned from significant unrealized gains to large unrealized losses (Pretzlik and Major, 2002).

While banks experienced a turbulent market environment throughout 2002 to mid 2003, the situation improved in the second half of 2003. Since the 1980s, European bank revenues have grown by about 8 percent a year. In May 2002, a report published by Schroder Salomon Smith Barney (2002) forecasted a near halving of the growth rate as a result of increased competition; lower nominal interest rates; high product penetration; sluggish nominal gross domestic product growth, and slower capital markets. Yet, in November 2003 earnings reports from Europe's banks produced a clear return on equity for the industry, suggesting that profits not only remained steady throughout the year but also increased by 16 percent from the previous year (Pretzlik, 2003b). One of the main drivers of bank profits are assumed to be the combination of low levels of bad debts, charges for which tend normally to erode profits in weak economic climates, and strong growth from mortgage lending and consumer credit (Pretzlik, 2003b). An additional source of recent earnings has been dealing profits from fixed income securities (Batchelor, 2003).

Despite signs of improving market conditions, the recent recovery is fragile and fraught with risk: The mortgage and consumer credit markets remain a source of concern for lenders as the ratio of personal debt to gross domestic product has risen from just 64 percent in December 1993 to a forecast 86 percent in December 2003 (Croft, 2003b). This could suggest a future rise in bad loans once creditors become unable to meet their interest obligations. This problem could be accelerated through a deteriorating housing

market and increasing interests rates. The UK and Spain are particularly vulnerable to this scenario (Croft, 2003b). Further, the US banking market sends discouraging signs to Europe. In September 2003, a number of US banks and mortgage companies warned that they had difficulties in adjusting to the new interest rate environment, saying that their earnings would be diminished by a weakening mortgage market, especially lower numbers of refinancing (Pretzlik, 2003b). This could also happen to the European banks. Even more difficult is the outlook for bad loans. As the European Central Bank, Bank of England, Bank of International Settlements and other supervisors of the banking system have acknowledged, the industry appears to have been extremely effective in transferring credit risk on to others, especially insurers. However, central banks admit they know very little about this market, especially about who exactly has bought this risk (Batchelor, 2003). From the banking industry's perspective this matters not only because of the implications for the stability of the financial system. It matters because it remains to be seen whether the banks have actually rid themselves of the risk they think they have sold, or whether they hold more than they realize (Smith, 2003). This is particular relevant for the bad-loans ridden markets of the UK, Germany, and France.

Further, European banks are challenged to prepare for the implementation of the so-called Basel II rules on banking capital. This will allow the industry to match its capital levels more closely with the risks undertaken in each of its businesses. It is intended to make the industry more stable and efficient (Bella, 2003). For some banks it will mean large cuts in capital and therefore large jumps in profitability and opportunities for growth; for others the reverse will be true. Analysts believe Basel II could lead to structural changes and merger activity in the industry that were never envisaged by the rules' architects (Beckerling et al., 2003). Although the deadline for implementation is likely to be delayed by a year until the end of 2007, the final accord on the controversial new rules is intended to be agreed on by the end of 2003 (Pretzlik, 2003b). The lobbying remains intense from the large number of banks still demanding changes (Bella, 2003). A large part of the uncertainty centres on how much Basel II's definition of capital will clash with that envisaged by the new international accounting standards which come into force in 2005 (Pretzlik, 2003b).

Overall, the recent developments are driving the European banking sector further into a state of hyper-competition. The future is likely to confront banking institutions with the even more profound challenge of both competing and co-operating in daunting market conditions (Coggan, 2003). The UK Banking sector, with London as Europe's banking capital, is thereby central platform for the ongoing strategic renewal of the world's leading banking firms.

2.2.3 The UK banking sector

With new entrants and the emergence of new groupings of banks, the market is becoming increasingly fragmented, but this trend is countered through banks consolidating into larger units. The UK Banking sector is undergoing fundamental change in all directions. There are more than 400 institutions authorized to take deposits in the UK, and they vary enormously in size and modus operandum (Brobi, 2001). The banking sector in the UK accounts for some 3.7% of total GDP (value added terms, 1998), or more than half the total contribution of the financial services sector (6.1%) (Brobi, 2001). The financial assets of the UK banking sector totalled £3.142bn at end September 2000, with the UK owned banks holding 28% (Brobi, 2001). Of this proportion, the majority is contributed by major UK retail banks with nationwide networks. The total UK owned banks accounted for 45%, up from 36% in 1987, partly due to the conversion of building societies into mortgage banks. This figure also includes investment banks. The total assets of the UK banking sector for 2001 are indicated in Table 2.1 and Table 2.2.

The banking sector consists of UK owned banks and foreign banks operating in the UK. Banks may be categorized in a number of ways. The Bank of England operates with "peer groups" of banks broadly grouped by activity or by country of ownership. The first category comprises commercial banks, mortgage banks, and investment banks. Ownership criteria relate to UK owned banks, US owned banks, EEA owned banks, Japanese owned banks and "other-owned banks". Also performing banking activities are building societies and finance houses. A new category, online banks, has also taken hold in the UK (Canals, 1997).

Table 2.1: Financial assets of the UK banking sector, 2001

Banks	£ billion	% share
UK Banks	1,425	45
Foreign Banks		
- US	*255*	*8*
-Japan	*151*	*5*
- Other EU	*839*	*27*
Total Foreign Banks	1,717	55
Total	**3,142**	**100**

Source: Brobi (2001)

Table 2.2: Number of banks in the UK, 2001

Banks	Number
Authorized Banks	
UK Incorporated	188
UK Owned	111
Foreign Owned*	77
Other	286
Total authorized population	662

* Authorized to provide cross-border services, but without physical location in the UK

Foreign Banks located in UK	
Representative Offices	164
Total foreign banks physically located in UK	481

Source: Brobi (2001)

While many banks offer a full range of banking services, it is sensible to distinguish between four types of banks grouped according to activity: (i) commercial banks; (ii) retail banks; (iii) mortgage banks; and (iv) investment banks. It should be noted that

major institutions such as Citigroup or Barclays offer several of these banking activities within different business divisions.

(i) The term commercial bank is an umbrella term that denotes any bank licensed under the Building Act 1987. The large clearing banks, such as Lloyds TSB, NatWest, or Barclays, all are commercial banks. Other commercial banks include the Bank of Scotland, Clydesdale bank, Yorkshire Bank and the Cooperative Bank. The term commercial bank is often used to refer to banks involved in international trade and corporate banking. However, a more accurate description of these would be 'wholesale banks'. Wholesale banking generally describes the business of commercial banks in their dealings with other banks, large national and international companies, government departments or agencies. Thus, wholesale banking is distinct from retail banking which deals with the personal market and the small-business market (Klein, 1995).

(ii) A retail bank denotes banks that maintain an extensive network of branches to cater for the personal and the small-business market. For example, HSBC, NatWest, or Barclays all are retail banks and offer an extensive range of banking services. Services offered in personal banking include bank accounts, savings accounts, credit cards, and lending to name but a few. Small business banking includes services such as business accounts, managing money, and raising finance. The major retail banks in the UK are embroiled in mergers and takeovers, which result in increasingly larger units. The banks are not only targeting other banks, but have extended their reach to go for the former building societies, now known as mortgage banks (see below). Also, the banks are no longer confining themselves to retail activities, but are increasingly encroaching on areas previously confined to financial advisers, insurance companies and building societies, such as corporate finance, insurance and mortgages (Croft, 2003a). New, more flexible products are seeing the light of day, sponsored by entities such as Virgin. As mentioned previously, retail banks are also facing increasing competition from new entrants such as supermarkets, investment houses offering

deposit facilities, and financial services firms. Last, but not least, banks are expanding their distribution channels to encompass online activities.

(iii) The term mortgage bank denotes building societies that have converted into banks. Abbey National was the first building society to become a bank, converting into a PLC and floating on the London Stock Exchange (LSE). The new mortgage banks include Halifax, Abbey National, Woolwich, Alliance & Leicester, Bradford & Bingley, and Northern Rock. It should be noted that some mortgage banks such as Abbey National serve both the consumer and the corporate market. The current trend is for the mortgage banks to be taken over or merge with commercial banks, yet for them to retain their identity, at least for the time being (Pretzlik et al., 2002). The mortgage banks typically offer higher mortgage rates and lower savings rates. Clients are becoming aware of this, and are increasing their savings in the building societies. Despite the rush to convert building societies into banks there remain almost seventy building societies in the UK, with assets totalling some £160bn (Bream, 2002). The societies between them run some 15m savings accounts. The largest building society is the Nationwide Building society. The building societies are attracting an increasing number of clients, possibly due to their more favourable competitive rates on mortgages and savings accounts (Croft, 2002). According to Adrian Coles, Director General of the Building Societies Association, the building societies have attracted more new savings than the combined mortgage banks achieved in the whole of 2000 (Brobi, 2001).

(iv) An investment bank is the US equivalent of what is called a merchant bank in the UK. According to the Dictionary of Banking (Klein, 1995), the appropriate description of merchant banks is 'acceptance houses' since they are all members of the Accepting House Association and their main functions are dealing with the acceptance and discounting of bills of exchange and finance of international trade. They are also involved in dealing with mergers, acquisitions, share and stock placings, new issues, investment management. Chu (1990) identifies two basic

functions of investment banks: raising capital and giving advice on mergers and acquisitions, all other services being either supportive of or developed from these functions. With regard to the function of raising capital, Hayes et al. (1983) specify three activities: origination and management of new financial issues; underwriting of issued securities, and distribution involving selling securities to ultimate shareholders. As such, the function of merchant banking can be defined as creating and mediating the flow of assets between issuer and investors (Harrison, 2000). Merchant or investment banks overlap with wholesale banks in providing banking services for the corporate sector as well as the public authorities, and in protecting corporate firms from currency and interest risk through treasury dealings.

In the UK, foreign banks are particularly active in the investment-banking sector. 36% of EEA owned banks income was derived from dealing profits (Sep.2000), as was 46% of other owned banks (Brobi, 2001). Members of the London Investment Banking Association (LIBA) include well known names such as Schroders, Salomon Smith Barney, Singer and Friedlander, Morgan Stanley International, Merrill Lynch Europe, Beeson Gregory, Cazenove, Instinet, NM Rothschild & Sons, 3i group, UBS Warburg, Bear, and Stearns. Investment banks have a dominant position in international capital markets. The process of consolidation has increased concentration among the banks, with such high profile deals as the Credit Suisse First Boston acquisition of Donaldson, Lufkin and Jenrette. However, the global economic downturn experienced over the years 2000 to 2003 combined with depressed global equity markets puts investment banks under considerable pressure. With reduced merger and acquisition activity as well as distorted IPO (Initial Public Offering) markets, revenue has been reduced significantly. As revenues continue to be squeezed, investment banks are reducing headcount. For example, even Cazenove, London's oldest and most powerful independent investment bank, reduced 8 percent of its workforce in late 2002 (Saigol, 2002a). This is particular surprising, as Cazenove, unlike its larger rivals, has not had many rounds of job cuts during its 180-year history.

Within the banking sector, this study concentrates on corporate banking, or business-to-business banking, which are banking services geared towards corporations and institutions. That is, the term corporate banking denotes all those activities of wholesale banks, mortgage banks, and investment banks that are targeted at the corporate or institutional customer but not the personal customer.

As discussed in the next section, the distinction between the corporate and personal market is introduced for several reasons: First, the corporate market is considered to be more valuable, and more complex, especially in terms of frequency of personal interaction, value of transactions and frequency of multiple banking relationships, than the personal consumer market. Second, corporate customers have unique needs and, therefore, require more complex products specifically tailored to address the client's banking requirements. As such, corporate banking requires cross-functional teams of specialists for their development; are characterized by the use of new technology in their production and delivery; high customization to clients needs, and frequent contact with clients during new service development. Third, customers in corporate banking are often large, multinational corporations. The internationality of clients requires banks to adopt a global approach towards new service development. That is, banks have to deploy geographically and/or organizationally dispersed expertise to develop the new product or service. In order to coordinate such complex development processes, banks rely heavily on Information Technology (IT) to support shared work across organizational divides; that is 'virtual teamwork' in which organizational functions or processes are seen as more important than organizational location.

2.3 Corporate banking

2.3.1 Differences between corporate and personal markets

Within the banking sector, this study concentrates on corporate banking, or business-to-business banking, which are banking services geared towards corporations and institutions. The term corporate banking denotes all those activities of wholesale banks, mortgage banks, and investment banks that are targeted at the corporate or institutional customer. The corporate market generally consist of fewer customers, often larger

customers which are individually more important to the financial institution than an individual personal customer, have more complex financial requirements, but at the same time have a more complete understanding of the alternatives available. Morris and Fuller (1989) have argued that there are two unique characteristics of business-to-business services: (i) They are people intensive with an emphasis on peoples' capabilities, and (ii) organizations selling such services involve customers with more precise service level expectations, a fairly formal buying process, and longer-term on-going relationships with service providers.

Research suggests that the banking community is lacking somewhat in its understanding of corporate customers' requirements (Harrison, 2000). Banks are failing to recognize the factors that corporate customers perceive as important in the customer-bank relationship. Indeed, banks seem more preoccupied with what they can provide for the customer, rather than what the customer actually desires of them (Nielsen et al., 1998).

Furthermore, it is important to recognize that the requirements of small business differ from those of large corporations. It has been asserted that small businesses have had a notorious bad deal from banks in the past in the UK as well as the rest of Europe (Pretzlik, 2002b). For example, in today's Germany the relationship between banks and their small business customers (the German Mittelstand) is at an all time low. German banks like Commerzbank or Dresdner Bank have to cope with myriads of small business bankruptcies that lead to insolvencies and mounting bad debts (Pretzlik and Major, 2002). The Mittelstand, on the other hand, complains about lack of support from financial institutions in times of crisis (Saigol and Harnischfeger, 2002). In the UK, however, anecdotal evidence suggests that the relationship between banks and small businesses is improving, as the services offered to them are getting more customized and less expensive (Pretzlik, 2002a).

There are some fundamental differences between corporate and consumer markets. The corporate sector is considered to be more valuable, and more complex, especially in terms of frequency of transactions, value of transactions and frequency of multiple

banking relationships, than the more frequently examined consumer market (Tyler and Stanley 1999). The key differences are discussed below:

- Market structure: In general, corporate markets have fewer sellers and, in particular, fewer buyers in any market compared with consumer markets. While corporate customers vary widely in size and requirements, some of them often bigger than their suppliers, corporate banking does not address a mass market. On the contrary, corporate banking involves talking to customers directly. As a result of this, developing closer relationships with customers based on a deeper understanding of their requirements is key to success for investment banks and wholesale banks alike (Zineldin, 1996).

- Balance of power: The fact that corporate banking markets tend to be largely oligopolistic has an impact on the balance of power between buying and supplying firms (Canals, 1997). While the balance of power can vary greatly from one customer and bank to another, and is also a matter of continuous negotiation, the likelihood of corporate customers having some degree of power or influence over the banking institutions they are dealing with is greater than in the consumer market (Harrison, 2000).

- Knowledgeable buyers: Naturally, corporate buyers buy financial products not for personal use but to serve the operations of the firm in some way. As a result of this, corporate buyers tend to place greater concern on the technical aspects and specifications of the product, its performance, service and support (Chan and Ma, 1990). Corporate buyers are in a better position to evaluate such factors, being professionally trained and technically qualified.

- Derived demand: Consumer demand is direct demand. Corporate demand is derived demand, since it is derived from the end-user or consumer demand. Both, the organization, and the provider of financial services need to be aware of the direct

demand situation, which means understanding not only the organization's customers, but also the customers' customers (Zineldin, 1996).

- Interactive relationships: Many corporate transactions take place over an extended time period, involving varying degrees of interaction and meetings. Thus, each corporate purchase is not simply a single transaction, but merely an episode among many in an ongoing relationship between two companies. As a result of the specific conditions shaping the structure of corporate markets, the importance of purchasing and the nature of the transaction, it has been argued that corporate exchanges are more interactive, based on a greater degree of mutual dependence and founded on commitment and trust than consumer exchanges (Stevenson, 1989). The interaction approach sees buyer-seller relationships taking place between two active parties. Thus, the process is not one of action and reaction, as is often the case in consumer markets, but one of interaction (Chu, 1990). This is in contrast to the more traditional view, which analyzes the reactions of an aggregate market to a seller's offering. Either buyer or seller can take the initiative in seeking a partner.

- Network relationships: Companies do not operate in isolation. The network approach takes the view that each company is enmeshed in an even more complex network of relationships. According to Ford et al. (1986), a company can be viewed as ever-widening pattern of interaction, some of which occurs independently of it. For example, Tyler's (1996) research into the marketing of equity securities to institutional investors shows that a network of relationships exists, of both a voluntary and an involuntary nature. Involuntary relationships exist between Government; Parliament; Treasury; the Department of Trade and Industry; the Bank of England; the Stock Exchange, and the Financial Services Authority. Voluntary relationships exist between security houses; salesmen; analysts; institutional investors, and other companies. Securities houses initiate the communication and seek to establish relationships with institutional investors. Each securities house salesperson will initiate, develop, and maintain a relationship between one to eight fund managers. Although the relationship is initiated by the salesperson, it becomes reciprocal.

Securities houses communicate with a number of institutions, but the institutions do not communicate with one another; however they know of each other's existence. The interaction between the securities houses is known as 'network players knowledge', and it is shared. There are also multiple layers of interaction between fund managers, traders, analysts, salespeople and service executives.

In addition to the factors mentioned above, Stevenson (1989) points out that corporate financial services require cross-functional teams of specialists for their development; are characterized by the use of new technology in their production and delivery; high customization to clients needs, and frequent contact with clients during new service development. Larger companies have specific needs and therefore, require more complex products specifically tailored to address the client's banking requirements (this is consistent with the specialization characteristic of business-to-business services identified by Jackson and Cooper, 1988). Also, the complexity of products generally has implications on the level and frequency of contact between the client and the account manager, as well as the number of accounts a corporate account manager can handle. As a result, corporate financial services require closer and more frequent contact with clients, than do consumer financial services. The next section examines the types of corporate financial needs in more detail.

2.3.2 Corporate financial needs

As with customers in the consumer market, corporate customers can vary in terms of type, size and financial requirements. Clients in corporate banking include pension funds, corporations, governments, financial institutions, endowments and foundations, unions and consultants. Naturally, corporate clients can have different financial requirements and expectations of their financial services provider.

Services offered in corporate banking can be divided into four broad service-categories (Zineldin, 1996), some of which overlap. These are: (a) institutional banking services; (b) asset management services; (c) investment banking services; and (d) treasury and cash management services:

a) Institutional banking services address the general banking requirements of the corporate market and include business checking and savings such as cash management and payment management as well as business credit programs. Also, institutional banking services provide investments such as mutual funds, stocks, bonds, annuities, treasuries, commercial paper, and options.

b) Asset management services offer investment solutions to corporations and institutions. Investment opportunities include active and structured equities, fixed income, currency, cash management, and direct and fund-of-funds strategies in alternative asset classes such as hedge funds and private equity.

c) Investment banking services provide financial advisory and capital raising services to corporations, financial institutions and governments. As such, investment banks help corporations borrow or lend money in the wholesale financial markets. The activities of investment banking may be divided into two categories: Financial Advisory and Underwriting. Financial Advisory includes advisory assignments with respect to mergers and acquisitions, divestitures, corporate defence activities, restructurings and spin-offs. Underwriting includes public offerings and private placements of equity and debt securities.

d) Treasury and cash management services handle end-to-end transactions between issuers, intermediaries, and investors. Services include custody, clearing, global agency and trust as well as depositary receipts services.

In a study of small businesses, Schlesinger et al. (1987) notes three particular financial services requirements: lending rates, accessibility of borrowing and the ranges of services on offer. The price of the service offered was also found to be an important requirement in work undertaken by Buerger and Ulrich (1986). It is perhaps not surprising that small businesses focus predominantly on price, since they are more dependent on banks as a source of funding than larger corporations and, hence, more sensitive to interest rate fluctuations. Indeed, in contrast to small business, Turnbull and Gibbs (1989) found that

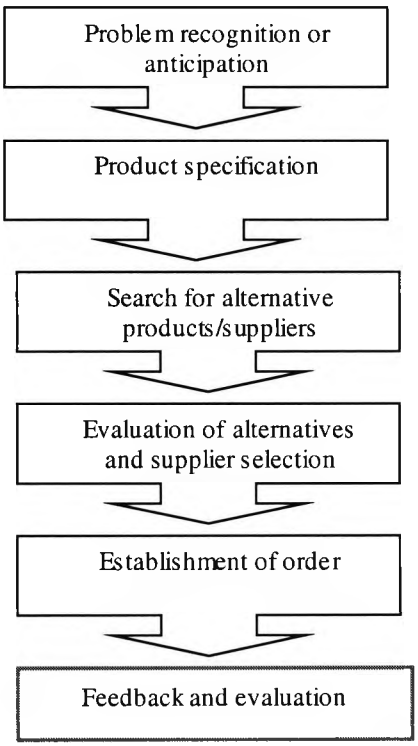
price was not such an important factor for large corporations, as the size of larger organizations places them in a better position with regard to bargaining on price. In addition to this, larger corporations also have access to other sources of funding, such as private investors, making them less dependent on banks and other financial institutions. The main considerations of larger corporations would appear to rest with the quality of service provided and the knowledge of staff (Chan and Ma, 1990). On the other hand, recent corporate scandals suggest that some corporations demand more than just harmonious relationships from the banks they are doing business with (Saigol, 2002c). For example, corporations like Enron, WorldCom, Tyco, or Global Crossing expected banking analysts to give overconfident business evaluation to boost the company stock. Only then they were willing to engage banks in seemingly lucrative business deals (Spiegel, 2002).

2.3.3 Corporate buying behaviour

Purchasing operates at the interface between a company and its supply market environment. From the banker's point of view, there are a number of strategic implications for the corporate buying process (Zineldin, 1996). First, the financial institution must be able to anticipate customers' needs. Second, the seller needs to be able to help define and meet the buyer's information needs. Third, the supplier must examine the sequence of decisions taken by the buyer and understand how they translate to the final decision. From the buyer's perspective, organizations may have a number of purchasing objectives including availability, where and when needed; product quality consistent with specifications; lowest price consistent with product availability and product quality; service to maximize the value of the product in use, and good long-term supplier relations (Harrison, 2000).

A popular model of industrial buying behaviour was developed by Robinson et al. (1967). The model identifies eight distinct stages that industrial organizations go through in the purchase decision process. Figure 2.1 presents an adaptation of those eight stages, focusing predominantly on the stages of significance to corporations in the selection and evaluation of financial services and financial institutions (Cowling and Newman, 1995).

Figure 2.1: The buying process in corporate financial services



Source: Cowling and Newman, 1995

- Problem recognition or anticipation: The first stage in the process occurs when the company realizes or anticipates a need for a financial service or a product or advice from a financial institution.

- Product specification: Having realized the need for a product or service, the company then decides on product specifications. For example, if the company is seeking to borrow from a bank it will need to specify the amount required and the term of the loan and decide on fixed or variable rates of interest. Such factors will need to be discussed with the lender. For some forms of lending, firms may be required to put up collateral as security.

- Search for alternative products/suppliers: At this stage the company must review the list of potential suppliers. Depending on the nature of the product, the company may

be faced with many or just a few alternative sources. The size of the organization will also have an impact on the potential number of sources available. Research has shown that large companies are more likely to have relationships with several banks compared with small firms, which are more likely to use just one bank (Zineldin, 1996). This limits the choice of potential products and suppliers for small firms and may place the small firm in poorer position with regard to bargaining for better deals.

- Evaluation of alternatives and supplier selection: In this stage, corporate companies will evaluate both the products on offer and the financial institutions according to a number of criteria deemed important to them. From the point of view from financial institutions it is important that they understand what their corporate customers are looking for and can provide it. A study conducted by Nielsen et al. (1998) of small, medium, and large Australian firms concluded that the following four factors are generally considered to be the most important in the selection of a bank: the ability to provide a long-term relationship; competitive prices; efficiency in daily operations, and willingness to accommodate the firm's credit needs. Each of these criteria was selected as one of the top choices by at least one-third of the firms surveyed.

- Establishment of order/transaction routine: Having selected a suitable financial service provider, both parties need to establish a routine to conduct the transaction (Harrison, 2000). Until this point, the corporate customer and the financial institution are likely to have been engaged in detailed and lengthy discussions, possibly over an extended time period. From this point onwards, the interaction between the two parties is likely to become routinized. For example, if the customer requires a loan, the transaction routine will simply involve the regular payment of instalments as agreed by the two parties. Provided the company has no further requirements during the loan term, and does not default on payments, repayments are likely to be made automatically with limited contact.

- Feedback and evaluation: Evaluation can occur at several points in the decision-making process. One of the key points is post-purchase, but the true evaluation is

unlikely to be conducted until post-consumption, which may be some time, even years, after purchase. Evaluation of the continued service will also take place at discrete episodes during the relationship when the customer and financial institutions come into contact. Indeed, the worst-case scenario for any relationship-manager is the default of a large corporate client due to dissatisfaction with the service received (Zineldin, 1996).

2.3.4 Trends in corporate banking

Having discussed the key characteristics of corporate banking services, this section examines recent market trends. After banks in the UK enjoyed decades operating with an informal cartel, the industry is undergoing rapid change. For the last fifteen years banking organizations are seen to be at the sharp end of global economic transformations including processes of deregulation and the emergence of 'universal' banking; industry-wide mergers and acquisitions; changes in the nature of consumerism; the growth and deployment of new theories of change management such as Business Process Re-engineering (BPR), and the development and widespread implementation of new technological infrastructures. In the following these trends and their impact on new service development (NSD) in corporate banking are discussed. In particular, the discussion will elaborate on the impact of Information Technologies (IT) on NSD in financial services.

2.3.4.1 Regulatory changes

Beginning with the stock market liberalization in October1986 and followed by the Building Societies Act and the Financial Services Act, both also introduced in 1986, there have been sharp discontinuities in the regulatory environment of the UK banking sector. When combined with technological innovations, competitive pressures and free-market commitment of successive governments, these regulatory changes have left a legacy that includes a trend towards globalization and a blurring of traditional industry boundaries (Doggett and Hepple, 1995).

Prior to deregulation, new product development in banks was by dictum (Reidenbach and Moak, 1986). The depository Institution Deregulation Committee, essentially dictated to bankers what new depository products they could offer. So the risk of innovation was minimized and companies followed a copycat strategy of 'follow the leader' (Reidenbach and Grubbs, 1987). Deregulation changed all that. It has reduced the barriers to competition in domestic markets and has opened national markets to foreign competition. It has also reduced prices, interest rates and profit margins, and has led to the globalization of financial markets. The result was a change in the positioning of a number of financial firms and in mergers and acquisitions that were used as growth strategies. Bankers started venturing into non-traditional banking areas such as discount brokerage, insurance, and real estate (Brobi, 2001). Also, commercial non-financial-services firms, local or foreign, are now able to engage in a limited amount of banking. These firms had a competitive advantage since they were specialized in certain areas and did not have to worry about carrying some of the less profitable product lines of the full-service banks (Buckley, 2002). They concentrated on niche markets and customized products to customer needs. Deregulation has caused the boundaries between industries to blur and, as a result, financial service providers evolved into multi-faceted, multi-industry financial organizations (Flier et al., 2001; Laing et al., 2002).

The problem with deregulation is that it proceeded at an uneven pace across industry and geographic areas (Canals, 1997). This uneven spread has created temporary competitive advantages for some financial institutions, although in future these institutions may be forced to drop lines of business or abandon markets in which they do not have real competitive advantage once their privileged position is gone. In this environment, NSD emerged as a way to create a sustainable competitive advantage and many new products appeared in the market within a short time period (Johne and Pavlidis, 1996). The challenge for banks now is to select new products that fit their capabilities relative to the competition they can expect to face. NSD has already become more flexible and is based on company/product fit, and on a high proliferation of products (Avlonitis and Papastathopoulou, 2000, 2001). However, many of the products developed prove

unsuccessful and further rationalization of NPD practices is needed in the rapidly changing financial services landscape (Cooper et al., 1994).

2.3.4.2 Universal banking

Banks in the UK have responded to the decline in their interest income by seeking higher-risk borrowers, initially in terms of funding less-developed country (LDC) debt and, more recently, by lending to property companies and funding leveraged buy-outs (Pretzlik, 2003b). In many cases this has resulted in a mis-pricing of risk, which has necessitated the rebuilding of the capital bases of some banks and the accommodation of increased regulation, both of which have raised bank 'own cost of funds' and further eroded the ability of banks to compete for traditional deposits. The other response has involved increasing off-balance sheet business and fee income by diversifying into underwriting, brokering, market making, insurance and fund management (Bream, 2002). In other words, there has been a tendency to adopt a universal banking model.

However, attempts at cross selling - marketing as many products as possible to a customer - have proved disappointing in many cases (Silverman and Pretzlik, 2004). Also, many financial service providers do not have special skills in most products offered (Doggett 1997) with consequences on the level of quality of the service provided. That is why specialized providers develop special skills in certain services that serve specific customer needs and target niche markets. These organizations target mostly the more profitable small and medium size corporate markets and seek to develop long-term, mutually beneficial relationships with customers. Products are mostly tailored to fit customer needs since the demand for tailored made products is now also emerging in the small to medium-size corporate market (Canals, 1997).

2.3.4.3 Mergers and acquisitions

Mergers and/or acquisitions feature prominently in any growth strategy. Contrary to organic growth, M&As afford opportunities for results to be realized within a relatively short space of time. But the M&A process itself can be long-winded: a suitable partner has to be found, initial overtures have to be made - due diligence and business valuation

processes follow (Saigol, 2002d). There is no guarantee that the process will succeed. It is not only a question of making an acceptable offer for the target. All sorts of other factors come into play: legal and regulatory issues; curbs on monopolistic tendencies; nationalistic feelings; personality clashes; product compatibility; technological divergences, to mention but a few (Brobi, 2001). Factors that may work in favour include government incentives; the benefits of consolidation; cost cutting; rationalization; an expanded product range; sharing of facilities and enlarged profits for shareholders. However, despite heavy cross-border M&A activities between European banks throughout the 1990s up to the year 2001, many institutions now acknowledge that diversification and consolidation strategies have produced minimal benefits for investors (Silverman and Pretzlik, 2004).

In the UK, the banking scene has changed radically as a result of mergers and acquisitions during the last few years (Saigol, 2002d). Some banks have changed their identify altogether, other banks have retained their brand name. Midland has been absorbed into HSBC; Woolwich has been taken over by Barclays, the Royal Bank of Scotland acquired NatWest, Halifax went to the Bank of Scotland, and the Clydesdale and Yorkshire banks were taken over earlier by the National Australia Bank Group, but are still operating under their own names. Midland, one of the big UK high street banks, disappeared from the scene in 1992 when it was taken over by HSBC. The large Midland branch network continued to be operated under the HSBC brand. Midland started life in Birmingham in 1836 and had since expanded through mergers and amalgamations. HSBC has also expanded into the Euro-zone with the acquisition of Safra Holdings SA (Luxembourg) and CCF (Credit Commerciale de France), a large French bank.

Prime example for the merger-spree in the UK is also The Royal Bank of Scotland, which acquired NatWest and its subsidiaries in March 2000. Following this acquisition, the Group disposed of Gartmore and the venture capital investment portfolio of NatWest Equity Partners. The takeover created one of the largest banks in Europe. In addition, Coutts Bank, an investment bank specializing in private wealth management, was

acquired. Today, the Group is strong in consumer and corporate banking, private and offshore banking, motor insurance and even supermarket banking.

Mergers and acquisitions have not always been between banks and financial institutions with similar products and services, with the result that financial conglomerates are emerging (Harrison, 2000). The commercial banks have been most active in merging with/acquiring entities with new products and services, such as asset management (Brobi, 2001). This creates the problem of product integration, both in selling and developing products. Questions that need to be addressed are; what are the products the M&A target is offering, and how do they fit in with the product lines of the acquiring vehicle. Do they add to its competitiveness? Has the target got a satisfactory distribution network, and what is its customer base, and purchasing power? Are there any existing orders, and what is the relationship to suppliers? Also, the entire product lines of current and future products need to be reviewed in order to identify overlapping or exhausted product segments. As such, an evaluation of the two merging organizations has to be thorough in order to identify threats and opportunities for new product/service development (Johne and Pavilidis, 1996).

2.3.4.4 Change in corporate buying behaviour

As mentioned earlier, both buyers and sellers are typically interactive participants in the relationship. Traditionally, relationships in corporate banking are frequently long term, close and involving a complex pattern of interactions both between companies and within each company. For example, research by consultants in the middle market (Doggett & Hepple 1991, 1992, 1994) shows that 90% of companies have effectively been with their bank for a period of 3 years or more. However, defection among established customers is a growing and worrying trend in both consumer and corporate markets (Lewis, 1991; Colgate and Hedge, 2001). Due to increased competition, the markets are becoming more fluid, as corporations and individuals switch from one principal bank to another and use more than one bank. Particularly worrying is the fact that most switching businesses are the kind of corporate customers that banks actively seek and presumably would wish to retain (Colgate and Lang, 2001). Until recently, banks believed that only the higher-risk

customers switched, either to obtain increased borrowing or to make a fresh start elsewhere. Believing they were high risk, the banks were not unhappy to let them go. Yet, a survey (Doggett and Hepple, 1994) suggests that 90 percent of switchers are either medium or low-credit risk. In fact, the switching activity of high-risk businesses have more than halved in recent years. The trend towards lower-risk customers leaving may suggest that banks are providing greater support for their higher-risk customers in return for higher margins. On the other hand, it may be that higher-risk customers are finding it harder to switch as competitors show a preference for lower-risk customers.

Also, switching would appear to be less of an issue among the larger corporate customers, since nearly three-quarters of them are multi-banked anyway and use an average of 10 banks. Colgate and Alexander (1998) point out that switching is done less in terms of the relationships, but more to increase or reduce the emphasis of transactions with the various banks. The trend of corporate customers switching banks presents a major challenge for financial service providers to offer an ever customized and high quality service. In this context, customized new service development can help in satisfying different customer needs (Alexander and Colgate, 1998).

2.3.4.5 Business process redesign

Financial institutions are accelerating change by seeking radical improvements in processes such as credit approval, new product developments, claims processing, and insurance underwriting. The development of new core competences through Business Process Redesign (BPR) may increase the chance of success through supporting market reposition and improved customer service (Morall, 1994). Drew (1996) considers BPR to be an approach to radical improvement, which adopts a process perspective and is driven by customer needs. It is cross-functional by nature, and may also cut across business units and corporate boundaries. BPR may be supported by information technology and, on occasion, implement revolutionary forms of technology. However, the primary focus is on streamlining and redesign of work and organizations to achieve major improvements in process performance and value-added. As such, BPR may be concerned with both, service and process innovation. Service innovation is concerned with the choice of new

services and their development (Johne and Davies, 1999); process innovation is concerned with improving internal capabilities (Johne, 1996). Hammer and Champy (1993) describe diverse objectives for re-engineering, including cycle-time reduction, service quality improvement and cost cutting. Processes that are reengineered in financial services include services such as mortgage application processing, depositary services, commercial credit approval, certificate of deposit issuance, disability claims processing and credit card services (Drew, 1996). In corporate banking, managerial processes include new business acquisition and strategic planning.

In a study of financial institutions Drew (1996) found that the greatest success achieved with BPR was in service improvement followed by reduction in cycle times and reduction in head-count. However, Brobi (2001) suggests that although the successes of BPR have promoted widely, failure and disappointment are frequent. Some estimated 50 to 70 percent of re-engineering projects in the financial service sector do not achieve their objectives. Drew (1996) also found that barriers to successful BPR include 'the usual suspects' such as stress; middle-management resistance; lack of senior management commitment, and lack of skills and knowledge.

2.3.4.6 Technological infrastructure

The organizational changes, referred to above, involve concurrent changes in the banks organizational form, their working culture and, in particular, their technologies. Financial institutions have long been in the forefront of the deployment of distributed computer systems. Banks have been exploring the use of information technology (IT) to support decision-making, quality control and customer services as part of a long-term strategy to transform its business process in order to address increased national and international competitive challenges (Hughes et al., 2001).

To meet the commercial and organizational challenges of the deregulated and increasingly globalized financial services sector banks embarked on a series of technological changes. The changes created a technological infrastructure that enables both product and process innovation. As mentioned previously, product innovation is

concerned with the development and creation of new products or services. Process innovation relates to the design of new production processes relevant for producing new products or new services. The main areas in which IT leads to process and service innovation are distribution, marketing, and teamwork.

2.3.4.6.1 IT and distribution

Financial institutions' initial investments in IT in the 1960s involved linking mainframe computers to branch back-office terminals (Canals, 1997). This had the effect of computerizing and centralizing consumer credit and debit records as well as automating book keeping and accounting procedures. The introduction of computerized paperless payment systems such as BACS (Bankers Automated Clearing System) in the UK and the development of EFTPOS (Electronic Funds Transfer at Point of Sale) systems have also curtailed the use of expensive paper-based money transmission services (Colgate, 1998). Another significant use of IT has been to establish new delivery channels. ATMs have been the single most visible introduction of IT. Particularly within the last ten years the adoption rate of this IT application, as a method of delivering services to customers within the UK, has been huge (Colgate, 1998).

Relevant to the corporate banking customer are web-based technologies that have opened up new delivery and interaction channels. The new wave of online technology is having a significant impact on the provision of banking products and services to customers. However, the initial enthusiasm for web-based technology is being replaced by a more sober and realistic assessment of the Internet's potential. It has been asserted that online services are unlikely to sweep away traditional channels of delivery, or that anyone who sets up a stand-alone eBanking facility is going to ride on the crest of a lucrative wave (Harris, 2001). As knowledge about web–based capabilities spreads wider, the banks are adapting the use of the Internet to suit their needs, with innovative applications. It was initially believed that as the products and services of banks were largely paper-based, much of the physical infrastructure of the banks could be done away with, and replaced by Internet-based business (Martinson, 1995). The cost of setting up an Internet based bank has been estimated by KPMG to be around US$6m, or some four times less than a

physical bank, and transaction unit costs are low (Brobi, 2001). But banks have come to realize that the bricks-and-mortar approach is not going to go away, and that a combination of 'bricks and clicks' is likely to give the best results (Wise and Morrison, 2000).

The consensus is that the Internet reduces unit costs per transaction in relation to branch network supplied services. With an increasing number of both corporate and personal clients accessing their accounts online and performing transactions, the burden on branch networks is likely to ease. Cross-selling of services is another promising Internet potential (Harrison, 2000). In addition, a website also gives the banks the opportunity to market new products and services, and to present their brand in a unique way. Access to websites also affords clients an opportunity to compare products between suppliers (Wise and Morrison, 2000). The Internet does increase cross border competition since it enables banks to deliver products without a physical presence in a particular location or country, but equally, it proves a useful source of new international clients (Flier, 2001).

2.3.4.6.2 IT and marketing

The traditional customer relations management (CRM) model is being modified through IT. In the traditional relationship between the bank and its customers, bank employees were acting as the intermediary between the bank's products and the customers. IT applications such as the Internet have added an extra dimension to this relationship (Colgate, 2000). The new electronic channels can be added on to existing CRM models, enabling the banks to offer new products to all clients on an instant basis.

Other examples of IT in customer relations management are Marketing Information System Technologies (MIST). MIST is information technology within the database marketing system (Colgate, 1998). Examples of MIST are customer databases, decision support systems and artificial intelligence. MIST provides a set of procedures and methods for the regular planned analysis and presentation of information for use in making marketing decisions. In contrast to other easily imitable IT applications, MIST has the opportunity to provide banks with a competitive advantage that is relatively

difficult to duplicate, because it is not the technology that is difficult to copy but the information contained within the MIST (Colgate, 1998). This information is proprietorial to each organization.

Banks employ database marketing for a number of reasons. Bolisani and Scarso (1999) in their analysis of MIST reveal that without databases customer-relationship banking is almost impossible. The customer database aids staff by giving them ready access to information that they need to solve customer problems and cultivate that relationship effectively by cross selling. Complete and accurate information on the customer can enable the bank to reduce the risk in transacting with the customer by establishing whether or not the customer is likely to default on a loan, for example. In addition, the electronic customer database allows investment and wholesale banks to monitor clients according to the value and nature of their transactions and their level of activity in buying banking services. These banks electronically combine different segmentation criteria to increase their effectiveness in identifying segments.

2.3.4.6.3 IT and teamwork

The aforementioned trends in banking such as globalization and universal banking combined with heavy activity in mergers and acquisitions result in banking organizations of enormous size and diversity. The major banking institutions employ tens of thousands of people, having a presence in every continent and offering products and services across the whole spectrum of financial services. In order to coordinate the activities of such complex organizations, banks are using Information Communication Technology (ICT) to support shared work across organizational divides; that is 'virtual teamwork' in which organizational functions or processes are seen as more important than organizational location (Harris, 2001). Most teamwork in corporate banking involves cross-functional and global work groups, where the team members are geographically or organizationally dispersed (Canals, 1997). Coordinating such teams, who rarely meet in person, requires a broad technological infrastructure that allows for rapid exchange of information and knowledge. Virtual teams provide an efficient platform for these groups by using advanced ICTs to facilitate their complex communications processes (Townsend et al.,

1998). ICTs deployed in corporate banking include devices such as voicemail, Internet, Intranet, e-mail, collaborative software, videoconferencing and teleconferencing (Colgate, 2000).

Townsend et al. (1998) define 'virtual teams' as groups of geographically and/or organizationally dispersed co-workers, who are assembled using a combination of telecommunications and information technologies to accomplish an organizational task. Virtual teams rarely meet in a face-to-face setting. They may be set up as temporary structures, existing only to accomplish a specific task, or may be more permanent structures, used to address ongoing issues, such as strategic planning. Further, membership is often fluid, evolving according to changing task requirements (Lipnack and Stamps, 2000). Virtual teams are established in the various specialized centres of the bank and are designed to replace the more traditional hierarchical administrative work organization. The organizational objective is to replace the permanence of administrative structures with the flexibility of task oriented teams which bring skills and expertise together as and when required, and promote the development among workers and managers of a new variety of skills, competencies, and responsibilities (Hughes et al, 2001).

In new service development, for example, virtual teams are used to employ geographically and/or organizationally distributed NSD expertise that is not available in a single geographic area without having physically co-locate team members (McDonough III et al., 2001). Virtual NSD teams consist of networks of organizational units linked by ICT, which flexibly coordinate their development activities, and combine their skills and resources in order to achieve new service success. It is claimed that this can be accomplished without the traditional hierarchical modes of central direction or supervision. Virtual teams form and reform as problems arise thereby providing a flexibility of response that changes according to circumstances and development needs (Moenaert et al., 2000).

While ICT facilitates organizational communication and cooperation, the motivation for banks to move from traditional teams to virtual teams derives primarily from four specific factors (Colgate, 2000; Smith and Blank, 2001): (a) the increasing prevalence of flat horizontal structures; (b) the emergence of an environment that requires inter-organizational cooperation; (c) the increasing globalization of corporate activity, and (d) increased customer participation.

First, organizational flattening pushes decision authority to lower levels in the organization, reducing the need for several layers of management. With fewer layers of centralized, hierarchical management structure, banks become increasingly characterized by structurally and geographically distributed human resources (Zhu et al., 2002). This kind of environment occasions the need to reconstitute the benefits of the large, resource rich organization within the context of the new flattened organization through the use of virtual networks (Townsend et al., 1998).

Second, in corporate banking there is a trend for strategic alliances and strategic cooperation between firms. In the past, banks have been vertically integrated to maintain control of all organizational processes. However, diversification and specialization have made direct management of far-flung processes unwieldy. Thus, banks have opted for strategic partnering and/or outsourcing which allows them efficient span of control while retrieving the skill and knowledge of third parties such as consultants and associates. These cooperative groups of organizations become increasingly interdependent, with the need to coordinate their activities through IT and ICT (Zhu et al., 2002).

Third, increased globalization has radically altered the working environment of banks. Multinational banks require high levels of cooperation and collaboration across broad geographical boundaries. Turning these networks of collaborators into fully connected virtual teams has the potential to increase both, the efficiency and quality of cross-departmental and cross-organizational communications (Cascio, 2000).

Fourth, corporate customers become increasingly involved in the development of banking services. In financial services, clients play a dual role - that of a customer and also that of a co-producer of the offering. In other words, clients not only receive and consume the service offering, but also serve as participants in its innovation, production, and delivery (Martin et al., 1999). This requires close cooperation between customer and bank in dynamic work situations that evolve according to customer requirements. The hallmark of successful banks has been their ability to flexibly respond to customer's needs as quickly as possible. Virtual teams enable this organizational flexibility because they integrate the customer in the teamwork through the power of ICT, allowing banks to accommodate increased dynamism in their customer relationship (Colgate and Alexander, 1998; Colgate and Lang, 2001).

In sum, ICT-enabled virtual teams can provide a potent response to the challenges associated with today's globalized banking institutions and to the resulting geographical dispersion of essential employees (Colgate, 2000; Smith and Blank, 2001). Virtual teams also address new workforce demographics, where talent may be located anywhere in the world, and where employees demand increasing technological sophistication and personal flexibility (Townsend et al., 1998). With virtual teams, banking institutions can build teams with optimum membership while retaining the advantages of flat organizational structure (Zhu et al., 2002). Additionally, firms benefit from virtual teams through access to previously unavailable expertise, enhanced cross-functional interaction, and closer relationships with customers (Colgate and Alexander, 1998; Townsend et al., 1998; Zhu et al., 2002; Colgate and Lang, 2001).

2.3.5 Corporate banking: the future

Investment and wholesale banks in the UK banks may not have had the same focus of attention from regulators as their US counterparts, but investors are watching their performance just as closely (Spiegel, 2002). In 2002, European merger and acquisition activity fell to 6,593 deals with a value of $337bn, compared with 9,660 deals worth $432bn for the same period in 2001 (Croft, 2003a). The collapse in volumes has triggered aggressive staff cuts at all the European banks (Maharg-Bravo, 2002). However, it has

become fashionable to believe that banks are in a much stronger position to withstand financial shocks than in previous financial crises: their capital bases are stronger, their earnings are more plentiful and more secure, and their businesses and risks more diversified (Ratner, 2003; Smith, 2003; Silverman and Pretzlik, 2004).

Once banks have their cost-base under control, the real challenge of growing revenue in a falling market will start, separating the winners from the losers and forcing consolidation among the weaker banks. In an effort to squeeze out more revenues, several banks have started aligning their product and coverage groups more closely to gain more business from their corporate clients (Burgess, 2002; Silverman and Pretzlik, 2002). Some, including Dresdner Kleinwort Wasserstein, have merged their debt and equity activities (Pretzlik and Major, 2002). Others, such as BNP Paribas, France's biggest bank, and Allianz are looking at ways to increase their distribution outside their dominant home markets (Saigol, 2002e). Joint ventures are being seen as an alternative to a full-blown merger (Pretzlik, 2002a). Most European investment banks have also started being more ruthless with their corporate loan books, weeding out and ultimately dropping unprofitable clients (Saigol, 2002b; Silverman, 2003).

In sum, the future of corporate banking is likely to stay highly competitive. Coggan (2003) predicts that the future for complex corporate banking services will centre on creating long-term relationships with lower-risk customers, especially in the profitable middle market, and on increasing service customization in order to fight foreign and domestic competition.

2.4 Corporate banking and NSD

2.4.1 Introduction: financial services and innovation

While the literature on new product development (NPD) and new service development (NSD) is discussed in Chapter 3, this section is concerned with product/service innovation in financial services. The product is usually the basis on which customer satisfaction is created. As such, it is a vital component in the strategic planning of most organizations. Indeed, for many organizations it is the most direct link to their customers.

The product provides the basis for competition, it enables the company to generate income and it mirrors the strategic direction of the company. The effective management of the product is recognized as being fundamental to the long-term success of the organization. While many consumer financial services have deployed a systematic new product development process for decades, Edgett (1996) claimed that corporate financial services have not placed similar importance on product development. As a consequence, he argued that the majority of prior research examined development practices in the consumer market. In consumer financial services, products and services tend to be more standardized and geared towards a mass-market. However, the increase in competitive pressure has also forced banks serving the corporate market to focus attention more closely on the product and service delivered as a means of creating and sustaining competitive advantage.

Recently, wholesale and investment banks have become increasingly concerned with a number of issues surrounding product strategy, including: the process and procedures involved in the development of new financial services; the factors which contribute towards successful adoption of the new product; how to manage the product over its life to protect it from competition; how to use branding to differentiate the product; when to withdraw an unprofitable product from the range, and how to best implement the withdrawal process with minimal adverse effects for institution and client. In the following the characteristics of NSD in corporate financial services are examined and the literature on successful innovation is reviewed. However, before addressing the literature on product/service innovation in financial services, it is necessary to first clarify the difference between 'product' and 'service'.

2.4.2 Services versus products

The literature on new product development rarely distinguishes between 'services' and 'products'. In fact, the term 'new product development' is often used in research that actually investigates a new service offering. One reason for this lack of distinction is that the development process for products is often similar to that for services. Another reason is that it is sometimes difficult to draw a line where a product ends and a service begins.

In many cases, the boundaries between service and product offerings are blurred. Nevertheless, it is possible to establish some differences. The debate over the differences that exist between goods and services is extensive and started when Reagan (1963) tried to classify services. Various typologies have been used to classify services along certain dimensions such as equipment-based versus people-based (Thomas 1978; Kotler 1991); the degree of contact they need (Parasuraman et al., 1985); whether they need discrete versus continuous relationships (Lovelock 1983), and according to relationships between the service employee and the customer (Mills and Margulies 1980). Later, Martin and Horne (1992) went beyond products and services in their narrow definition and distinguished two types of offerings: offerings that are tangible and concrete as products, and offerings that are intangible and abstract as services. As Berry (1980) points out, most market offerings are a combination of tangible and intangible elements. This debate over what differentiates products from services led to the development of four characteristics that are now commonly cited as the distinguishing characteristics of services: intangibility, inseparability, heterogeneity and perishability.

- Intangibility: Services are essentially intangible. It is often not possible to taste, feel, see, hear or smell services before they are purchased. Opinions and attitudes may be sought beforehand, a repeat purchase may rely upon previous experience, the customer may be given something tangible to represent the service, but ultimately the purchase of a service is the purchase of something intangible. In addition, Cowell (1987) notes that services create processes and experiences and not physical entities and, therefore, they are often easy to develop and modify. As a result, companies tend to introduce new or changed services relatively quickly, at times proliferating the market with many similar services. However, although intangibility makes services easy to develop, in reality it also makes them highly complex entities where successful market launch may be difficult to achieve (Easingwood 1986).

- Inseparability: Services often cannot be separated from the service provider. A corollary of this is that creating or performing the service may occur at the same time as full or partial consumption of it. Products are purchased, sold and consumed,

whereas services are sold and then produced and consumed. The inseparability of the creation and performance of services in financial services applies in particular to advisory and consultative services. In this context, different functional specialties must become actively involved in conceptualizing, designing and marketing a new service if it is to be operationally efficient and responsive to customer needs and expectations (Booms and Bitner, 1981; Langeard and Eiglier, 1983; Lovelock, 1983).

- Heterogeneity: It is often difficult to achieve standardization in the output of certain services. The standard of a service in terms of conformity to what may be prescribed by the service provider may depend on who delivers the service or when it is delivered. So, even though standard systems may be used to handle a service or quote in a loan application, each 'unit' of service may differ from other 'units'. This is in particular true for corporate financial services, where each offering is customized to some extent. The degree of heterogeneity of financial services depends on whether the service is people or equipment-based (Berry, 1980), on the extent to which the company controls for variations in the system (Levitt, 1976) and on how active the customers' role is in producing and/or consuming the service (Cowell, 1987).

- Perishability: Services are perishable and cannot be stored. For example, consultative services are not produced in advance, but created immediately when required. In addition, considerable fluctuating demand patterns apply to some corporate financial services, such as advice on IPOs or acquisitions and mergers, which aggravate this perishability feature even more. This leads to high costs of supporting unused capital and human resources, and add to opportunity costs associated with unmet demand. Levitt (1976) argues that companies can reduce costs by substituting capital for labour and by introducing technology and planned work systems to the service process. Also, key marketing decisions in service organizations relate to what service levels they will provide and how they will respond in times of low and excessive usage; for example through differential pricing, and special promotions (Cowell, 1987).

It has been claimed that the special characteristics of services are not exclusive to services and that concentrating on the physical similarities and differences between products and services is likely to be limiting from an operational viewpoint because customers do not choose between alternative offerings on the basis of physical features alone (Johne and Pavlidis, 1996). In regard to new service development can be said that service firms tend to adhere to less complex development processes with fewer steps and faster development times. Apart from minor process and cycle time related disparities, however, the development of products does not differ significantly from that of services (Avlonitis et al., 2001).

There are some industries where it is possible to clearly differentiate a product from a service. For example, in the automobile industry a car is clearly a product, whereas an after-sales car repair is clearly a service. In the personal computer industry, the computer is the product while the call-support is the service. In financial services, however, the distinction between the two is less obvious. For example, offerings such a business loan, investment stocks or research reports show characteristics of both, service and product. Indeed, many offerings in financial services are hybrids, combining product with service elements and blurring the traditional lines of distinction. As such, this study follows the example of past research in financial services and does not explicitly distinguish between service and product offerings (Easingwood and Mahajan, 1989; Easingwood and Percival, 1990; Cooper and De Brentani, 1991; Johne and Pavlidis, 1996; Avlonitis et al., 2001).

2.4.3 Characteristics of NSD in corporate financial services

Developing successful financial services is very difficult for today's businesses since they operate in a rapidly changing, highly competitive market environment. However, due to increased competition, introducing new products, either radical or incremental, has grown to be very important for banks in order to retain their market share and keep pace with competition. The evidence suggests that research on new product development and innovation in financial services has lagged behind investigation in manufacturing sectors. A structured process for NPD was first described by Booz, Allen & Hamilton (1982).

Modification of this for banks was proposed by Bowers (1986). Other models were presented by Scheuing and Johnson (1989) and Donnelly et al. (1985). Stage-gate systems for NPD/NSD in financial services were described by Cooper and de Brentani (1991).

Barras (1990) points to differences in innovation processes in financial service industries. Radical process innovation may drive incremental and radical product innovation in a "reverse product cycle". In manufacturing, product innovation typically precedes process innovation. Also, several authors mentioned above have commented on the ease of copying new financial products and the difficulty of achieving sustainable competitive advantages using product strategy.

Easingwood and Arnott (1991) discussed the potential performance impact of improving NPD/NSD. Johne (1993) considered the measurement of innovation success using internal and market measures. In addition, the characteristics of successful new products and supporting organizational factors were investigated by Cooper and de Brentani (1991) and Easingwood and Storey (1991). Several writers have commented on the lack of use of market research in NPD/NSD and the absence of test-marketing (Reidenbach and Moak, 1986; Davison et al., 1989; de Brentani, 1993; Mohammed-Salleh and Easingwood, 1993). These writers and others (Edgett, 1993) have also observed that many financial institutions neither have an organized approach to NSD nor employ screening methodologies.

Much of the aforementioned research examined practices in NSD across the whole spectrum of financial services including banks, insurance firms, trust companies, and other financial institutions such as leasing, reinsurance, and mutuals. Other research has concentrated specifically on consumer financial services, where offerings tend to be standardized and mass-marketed. However, research focusing on the development of new products and services in corporate banking is limited. Yet, in corporate banking the offerings and their development are distinct. In contrast to consumer banking, corporate banking tends to develop highly customized products and services, designed to the needs

of one particular client. The development process of such customized offerings features four specific characteristics: (a) product/service innovation tends to be incremental rather than radical; (b) the development process tends to be less structured and less systematic; (c) the development process tends to be relatively fast, and (d) the customer plays an active role in the development process. These four characteristics are discussed in the following.

2.4.3.1 Focus on incremental and continuous innovation

It has been asserted that only ten percent of all the products and services developed in financial services are truly radically innovative and new-to-the-world (Harrison, 2000). In fact, most of what is generally referred to as new product activity tends to be directed at improving and modifying existing products. Major innovations are new both to the financial institution and the market. Consequently, they tend to be rare, carry high risks, but at the same time hold the potential to generate high returns. McGoldrick and Greenland (1994) identify three different types of innovations. 'Continuous, incremental innovation' involve a gradual change, such as paying the insurance company by direct debit rather than paying the representative in the home, and they have the least disrupting influence on established patterns of behaviour. 'Dynamically continuous innovations' have some disrupting influence on established patterns of behaviour. This type of change has been witnessed in the move from cash payment to cheque payment to debit card payment methods. 'Discontinuous innovations' have the greatest impact on behaviour, requiring the establishment of new patterns of behaviour. Such innovations have been in the area of home banking and in the use of credit cards. For example, Barclays' Nectar reward programme, launched in late 2002, allows customers to collect reward points from a variety of household retailers every time they use their Barclays Credit Card to pay for the purchase. This, of course, intends to change consumer behaviour towards the more frequent use of the card.

While truly radical innovation is rare in consumer banking, it is even more erratic in corporate banking. There are many reasons why banks focus on incremental innovation, 'reformulated products' as defined by Yoon and Lilien (1988) or 'sustaining innovations'

as defined by Martin (1998), rather than radical innovation. Firstly, new products are easily copied and banks do not wish to invest a lot of money in something that will provide a competitive advantage for only a short period of time. Secondly, the rapid product obsolescence means shorter windows of opportunity; hence there is a need for rapid product innovation (Crawford, 1992), which is rarely possible in the case of radical new product developments. Likewise, the very nature of the market, characterized by high competition and switching customers, leads to the need for more rapid (incremental) product developments. Thirdly, Hodgson (1984) suggests that most bankers, due to their corporate culture, tend to focus on risk, or rather, on risk-avoidance and developing incremental products reduces risk. Fourthly, banks are reluctant to pursue radical new product development because it has been shown that when the product is very new to the firm (in terms of new capabilities needed, new competitive environments or different marketing approaches), it tends to have a lower success rate (DeBrentani and Ragot, 1996). Finally, newness of innovation influences customer choice more in services than in products. That is because corporate customers perceive greater risks in adopting new services than new products as a result of lack of information to evaluate quality (Shostack, 1984).

Having stressed that radical innovation has historically been rare in corporate banking, incremental and continuous innovation has been frequent. Banks develop a magnitude of new offerings on a constant basis, as most services and products need to be redesigned and customized to the particular requirements of a single corporate client. This innovation is incremental as well as continuous and takes place in particular in the consultative sectors of corporate banking such as asset management and investment banking.

Brown and Eisenhardt (1997) have highlighted the advantage of continuous innovation, which allows for quick changes to the offering as well as low cost probes to investigate new opportunities. Infrequent, large innovations, on the other hand, may lead to difficulties in adjusting mid-projects to sudden changes in technology, markets and competition.

2.4.3.2 Less systematic NSD process

The development of any financial service is usually the outcome of an iterative process, involving several people, often from different departments within the organization and including individuals from outside the organization such as clients and consultants. A structured and systematic process can contribute significantly to the success of a financial institution in the development of new financial services. Reidenbach and Morak (1986) bear testimony to this in their research, noting that top-performing banks have a more structured and formal new product development process than average or below average performers. However, Reidenbach and Moak (1986) and Reidenbach and Grubs (1987) also note that many banks are not aware of innovations as a development factor and do not organize innovation activities in a systematic way.

In the literature, a substantial number of NSD process frameworks have been proposed suggesting anything between three to more than twenty development stages. Some of these frameworks have been developed specifically with services in mind. Yet, most of these frameworks are variations on a similar theme. For example, a classical development process for services would involve about eight development stages (Harrison, 2000), including: generation of ideas for a new product; screening of ideas; concept development and testing; marketing strategy and development; business analysis; product development; market testing, and commercialization and launch. Such a structured process tends to be deployed mainly in service developments that are fairly standardized and targeted towards a mass-market. For example, institutions in consumer financial services tend to deploy a fairly systematic development process for standardized offerings such as credit cards, loans, and insurances (Burton, 1994).

In corporate banking, however, offerings tend to be customized to the particular requirements of a single corporate client and the development process tends to be shorter and less systematic. For example, Edgett (1996) examined new product development process for corporate financial services and concluded that many institutions are not developing new products via systematic development processes. His results suggest that the vast majority of institutions follow a loosely structured ad-hoc approach where the

development process is confined to few, broadly defined development phases. These results are in accordance with earlier studies that have shown that service suppliers do not, in general, use sophisticated and formal development procedures (Bowers 1989; Scheuing and Johnson, 1986; Martin and Horne, 1993). In addition, Edgett (1996) found evidence that the majority of managers in charge of corporate financial NSD evaluate their own quality of NSD execution as poor.

2.4.3.3 Faster new service development

Due to the tendency of banks to develop incremental new services and due to the fact that competition is becoming more time-based (Willis, 1998), development time has become important in new service development in order to secure competitive advantage (Drew, 1995). In particular, Kessler and Chakrabati (1996) have found that innovation speed is most important in highly competitive and rapidly changing markets with short product life cycles, such as the market of commercial banking. The benefits for developer companies from fast new service development have been the subject of many studies and include greater new product revenues; enhanced profits; greater market share; reduced time-to-break-even; improved competitive advantage; a better corporate image and reputation, as well as quick response to rapidly changing markets and technologies (Takushi and Nonaka, 1986; Cooper and Kleinschmidt, 1994; Drew, 1995; Kessler and Chakrabati, 1996).

2.4.3.4 Customer involvement in NSD

Lastly, the importance of the customer's role in the development of a service has been highlighted in the literature (von Hippel 1986, 1989; Zirger and Maidique, 1990). Such a role has been shown to be different from the one played in the development of a tangible product (Johne and Storey, 1998) and also more complex. Martin et al. (1999) analyze the complexity of the customer's role in services and conclude that it is due to the dual role played by customers in service consumption. In product offerings, clients play a singular role - that of a customer. In contrast, in services, clients play a dual role - that of a customer and also that of a co-producer of the offering. In other words, clients not only

receive and consume the service offering, but also serve as participants in its innovation, production, and delivery.

Customer involvement in NSD becomes particular relevant in corporate banking. As mentioned previously, the trend in corporate banking is towards customization. Services are increasingly tailored to suit specific customer needs since all banks are trying to strengthen their relationships with corporate customers. In a recent study, Alam (2002) found evidence of heavy user involvement in the development of new services and products in corporate financial services. The author suggests five objectives of user involvement in NSD. First, user involvement may facilitate the development of a better and differentiated new service that matches customers needs and wants. Second, developers may be able to reduce the overall service development time by involving users. Third, user involvement may facilitate user education about the use and attributes of a new service. Fourth, involvement of users may allow a firm to use them as innovators for the rapid diffusion of services. Last, user involvement may strengthen the relationship between bank and customer, which in turn may help in winning customers' long-term loyalty. Alam (2002) also suggests that user involvement is particularly important in the idea generation and idea screening stage, as it is in these early stages of NSD that customers formulate their requirements, expectations and areas of dissatisfaction.

2.4.4 Success factors for NSD in corporate financial services

In financial services, the rate of success of new offerings is stated as frequently low (Harrison, 2000). In some financial services sectors, the failure rate is as high as 50% at launch (Cooper and Edgett, 1996). Some of the specific factors that account for new service failure are that financial services are integrated, intangible and variable processes, difficult to conceptualize, often complex, dynamic, and are at risk from competition of substitutes and near-substitutes (DeBretani, 1993a). While service failure is particularly high in the consumer market, where offerings are developed for and targeted at a mass audience, anecdotal evidence suggests that the rate for success is somewhat better for corporate financial services. In corporate banking most service developments arise out of

the articulated needs of one corporate customer and the service is designed in close cooperation with that customer. Hence the argument, chances for successful NSD in corporate financial services are higher.

The great majority of new product success/failure investigations undertaken over the past decades have focused on manufactured or physical goods. Studies undertaken in the financial services sector have proliferated only in the last ten years. Much of this research investigated NSD success determinants across the whole spectrum of financial services including banks, building societies, insurances, and financial institutions. Unfortunately, research often examined consumer services simultaneously with business-to-business services without making a clear distinction between the two. In some cases, a clear definition of the type of services investigated was not provided at all. This is particularly cumbersome since offerings developed for the consumer market differ significantly from those developed for the corporate market. As stressed throughout this chapter, financial services for the corporate market tend to be highly customized offerings. Compared with consumer financial services, NSD in the corporate market tends to be characterized by more incremental and continuous innovation; less systematic NSD processes; faster new service development, and closer customer involvement. As such, one might expect that not only the service characteristics differ for consumer and corporate financial services, but also the determinants for service development success.

As mentioned above, however, the majority of previous studies of new service success have looked at the whole of financial services without making a distinction between corporate and consumer markets or between financial services sectors (DeBrentani and Cooper, 1992; DeBrentani, 1993a; Easingwood and Storey, 1993; Cooper et al., 1994; Edgett, 1994; Drew, 1995; Cooper and Edgett, 1996; Edgett and Snow, 1996; Avlonitis et al., 2001; Vermeulen and Dankbaar, 2002). Some studies have focused exclusively on consumer financial services (Easingwood and Storey, 1991; Storey and Easingwood, 1995, 1999; Avlonitis and Papastathopoulou, 2000, 2001; Harborne and Johne, 2002). However, studies on NSD success in corporate financial services are quite rare (DeBrentani and Cooper, 1992; Edgett, 1996; Johne and Pavlidis, 1996).

In one of the first key studies, involving the whole spectrum of financial services, Cooper et al. (1993) obtained data on 173 new financial services and identified three performance dimensions: (a) financial performance dependent on marketing synergy, a market driven new product success, effective marketing communication, customer service, managerial and financial synergies, and a solid launch preparation; (b) relationship enhancement dependent on a market-driven new product success, well planned launch preparation, high product responsiveness, and a significant product advantage over competitive products; and (c) market development also dependent on a market driven new product success, effective marketing communication, and innovative technology.

In another study, Cooper and Edgett (1996) examined 600 new financial product case histories. The authors draw the quintessence of critical success factors in product development, specifically what differentiates winning new financial services from losers. They identify the following ten critical success factors:

- Adopt a high-quality, systematic, and visible new product process.
- Build go/kill decision points into the process to focus resources.
- Focus on quality of execution throughout the new product process.
- Do solid up-front homework before the project proceeds into development.
- Incorporate the voice of the customer into every facet of the project.
- Plan for a high-quality launch effort.
- Seek synergies to attack from a position of strength.
- Develop unique, superior products.
- Be sure to have product-market fit.
- Deliver the new product with customer-defined service expertise.

In particular, the authors stress that most firms had far too many projects under way for the limited resources available. As a result, resources and people were thinly stretched, projects took too long, key tasks often were late or left undone, and many projects suffered from sloppy work and too much corner cutting. To succeed at new product development, the authors suggest that firms must become better focused, concentrating money and resources on the really good projects and eliminating the mediocre ones. As

such, they recommend a stage-gate process, where the gates are the go/kill decision-points resulting in the desired funnel effect. They advise that would-be projects are subjected to an increasingly rigorous set of criteria at successive gates, where mediocre projects are culled and resources reallocated to the meritorious ones.

In a more recent study, Avlonitis et al. (2001) suggest that that the performance outcome of a new service is the result of the development process followed, which, in turn, is influenced by the innovativeness of the new service. Investigating 132 new financial services, the authors examine the development process through three blocks of variables, namely new service development activities (e.g., the "what" component), process formality (e.g., the "how" component) and cross-functional involvement (e.g., the "who" component). The authors conclude that, with regard to financial performance, an almost inverted U-shaped relationship exists with the degree of service innovativeness. That is, the most and the least innovative new services are relatively less successful in terms of financial performance compared to the moderately innovative types of new delivery processes and service modifications. On the other hand, the most innovative new services make the strongest contribution on non-financial performance such as company image, building loyalty among existing customers, and attracting new customers.

Studies that have looked at NSD success factors explicitly in the area of corporate financial services are surprisingly rare. DeBrentani and Cooper (1992) examined 106 new industrial financial service products, about half commercial successes, the other half failures, from 37 institutions in corporate financial services. The products covered a broad range of offerings including loans, leases, swaps, pension plans, and insurances. The authors conclude that key factors in new service success are similar to those for physical products such as product/market fit; quality of execution of launch and marketing activities; product/company fit; service expertise, and product advantage.

Edgett (1996) investigated 82 institutions in corporate financial services and concluded that most institutions do not have a sophisticated NSD process. However, his results show that some institutions do have more complete processes with higher quality of

execution than others, and that this group has a higher percentage of successful new products. The author suggests that successful developers are distinct through three NSD process-related factors. Firstly, a rigorous new product process that is carefully planned and executed, especially in the early pre-systems stages. Secondly, early upfront marketing activity in order to identify potential ideas and to formulate sharp product definitions before the more expensive system development begins. Thirdly, rigorous quality control to ensure consistent standards in the execution process.

Finally, Johne and Pavlidis (1996) investigated success factors in corporate financial services in the highly competitive derivatives market. Examining how first-mover banks apply their marketing expertise, the authors concluded that highly active innovators take a more sophisticated, market-based approach to identifying innovation opportunities. Also, highly active innovators recognize the importance of the role of marketing in encouraging functional specialists to work together for the purpose of identifying follow-on development opportunities. Furthermore, highly active innovators do not take a formula-based approach to the development of new derivatives, rather they rely on marketing expertise to identify and capitalize on business opportunities.

In sum, much research examined factors for NSD success across the whole spectrum of financial services without making a distinction between consumer and corporate markets. The findings suggest that success factors in new service development are similar to those for the development of manufactured products. Reoccurring themes for development success are product/market fit; service expertise; product advantage over competitive products; and quality of execution of the launch and other marketing activities in the project (De Brentani; 1993, Cooper et al.; 1993; Cooper and Edgett, 1996). In addition, compared with the development of tangible products, developers in financial services focus on continuous-incremental rather than radical innovation, pursue faster new service development with fewer development stages, and refrain from well-structured development processes (De Brentani and Cooper, 1992; Easingwood and Storey, 1993; Drew, 1995; Edgett and Snow, 1996; Vermeulen and Dankbaar, 2002). Yet, several authors conclude that those few developers who have a more complete process with a

higher quality of execution also enjoy a higher chance of development success (Edgett, 1996; Johne and Pavlidis, 1996). Studies on corporate financial services are rare. Previous research suggest that offerings in corporate financial services tend be more complex, more customized and require closer customer involvement than those developed for the more frequently examined consumer market (Edgett, 1996; Alam, 2002).

2.5 Rationale for study context

Throughout this chapter it was established that banks are in need of continuous service innovation; are global in their development activities; rely on dispersed teamwork across organizational divides, and maintain the sophisticated technological infrastructure required for virtual teamwork. This makes the industry ideal for the examination of virtual project teams in complex NSD. In essence, new service development is about change. The pace of industry change in banking is rapid. Frequently reported trends are: blurring of industry boundaries; deregulation; globalization; pressures from new and existing competitors; rapidly advancing information technologies, and increased customer sophistication. Within banking this study concentrates on the corporate sector for several reasons:

First, the corporate sector is considered to be a lot more valuable, and more complex, especially in terms of frequency of personal interaction, value of transactions and frequency of multiple banking relationships, than the more frequently examined consumer market. Corporate customers have specific needs and, therefore, require more complex products specifically tailored to address the client's banking requirements. As such, corporate financial services require cross-functional teams of specialists for their development, are characterized by the use of new technology in their production and delivery, high customization to clients needs, and frequent contact with clients during new service development.

Second, customers in corporate banking are often large, multinational corporations. The internationality of clients requires banks to adopt a global approach in their service

offerings. That is, banks have to deploy geographically and/or organizationally dispersed expertise to address the sophisticated banking requirements of their clients. In order to coordinate such complex organizational processes, banks rely heavily on Information Technology (IT) and Information Communication Technology (ICT) to support shared work across organizational divides; that is 'virtual teamwork' in which organizational functions or processes are seen as more important than organizational location. Additional reasons for banks to move from traditional teams to virtual teams are the increasing prevalence of flat horizontal structures and the emergence of collaborative arrangements with third parties such as suppliers and competitors.

Third, one area of activity in corporate banking where virtual teams are deployed is new service development. In NSD virtual teams are used to employ geographically and/or organizationally distributed NSD expertise that is not available in a single geographic area without having to physically co-locate team members. Virtual NSD teams consist of networks of organizational units linked by IT and ICT, who flexibly coordinate their development activities, and combine their skills and resources in order to achieve new service success.

Fourth, developing successful financial services is difficult for banks since they operate in a rapidly changing, highly competitive market environment. Some of the specific factors that account for new service failure are that financial services are integrated; intangible and variable processes; difficult to conceptualize; often complex; dynamic, and are at risk from competition of substitutes and near-substitutes. However, due to increased competition, introducing new products, either radical or incremental, has grown to be very important for banks in order to retain their market share and keep pace with their competitors.

In sum, corporate banking is a particular suitable arena in which to study virtual NSD teams. Banks targeting the corporate market are seen to be at the sharp end of global economic transformations including processes of deregulation and the emergence of global interdependence; the emergence of flexible working patterns and cross-functional

teamwork; the need for close customer relations; the growing importance of continuous innovation as well as successful new service development, and the development and widespread implementation of new technological infrastructures. The overall effect of these multifarious changes has combined to make practices in corporate banking a prime example of the new form of work to be found in the notion of the 'virtual NSD team'.

2.6 Conclusion

This chapter has described the study context. It provided an overview of the European banking market and examined the importance of the UK banking sector. Also, it analyzed the UK market of corporate banking; discussed the differences between corporate and personal markets; assessed corporate financial needs, and examined recent trends in corporate banking. Last, the literature on NPD and NSD in banking was examined and the importance of continuous incremental service innovation was highlighted. The chapter concluded that banks serving the corporate market are global in their NSD activities, rely on dispersed teamwork across organizational divides, and maintain a highly sophisticated technological infrastructure. These factors combined make practices in corporate banking a prime example for the new form of work to be found in the notion of the 'virtual NSD team'.

The next chapter will review the literature on NPD/NSD and teamwork with an emphasis on the managerial challenges of virtual teamwork.

CHAPTER 3
NEW PRODUCT DEVELOPMENT AND TEAMWORK: THE LITERATURE

3.1 Introduction

The present chapter reviews the literature on managing new product and service development, discusses the use of cross-functional teams in new service development, and analyzes the need to investigate the organization and coordination of virtual teamwork in NSD. As such, this chapter is organized into three parts:

In the first part, the chapter takes a macro-view on NPD/NSD. Here, the chapter highlights the findings that categorize the types of new products and new services developed by companies and then reviews the literature on NPD and NSD success. Subsequently, the chapter narrows its focus on internal organizational factors that affect development success. To facilitate the discussion on these internal organizational factors the McKinsey "7Ss" framework is introduced and the impact of strategy, skill, staff, style, shared values, systems, and structure on new product performance is examined. Thereafter, the chapter takes a micro-view on teamwork in NPD/NSD and discusses the role of the cross-functional team. The discussion highlights the importance of a new type of cross-functional team, the virtual team.

In the second part, the chapter examines the literature on virtual teams in NPD/NSD showing that research in the area is limited. Subsequently, the literature on virtual teams in other research contexts is examined concluding that a key challenge for managers of virtual teams is to organize and coordinate dispersed teamwork.

In the third part, the chapter reviews the organizational literature on managerial mechanisms to organize and coordinate project teams, before stating the focus of this study – the organization and coordination of virtual teams for high performance in NSD.

3.2 New product development

3.2.1 Introduction: new product development

There is a long history of studies tracking product development and management practices. Issues in new product development practices were first investigated by Booz, Allen and Hamilton in 1968, with the effort repeated in 1982. Their study of 1968 reported that almost one-third of all product development projects commercialized by firms were failures, with this rate essentially independent from industry. Most of the commercialization failures occurred because the idea or its timing was wrong. This report also introduced the product development mortality curve, which showed that, on average, 58 ideas were considered for every successful new product commercialized. The report also suggested a common six-stage process for product development. Although parts of this process were slightly modified by each firm to cater to the needs of the industry, product type, and corporate culture, the basis process consists of exploration, screening, business analysis, development, testing, and commercialization. Booz, Allen and Hamilton concluded that heavy attention should be focused on the first three stages of the process to minimize failure.

In 1982, the authors repeated their study and recommended that adding a seventh step to the front of the process delineated in their 1968 publication. This step has the NPD process beginning with identifying the new product strategy, then moving into exploration. The authors again found, in this round of research, that most firms used multiple organizational structures to guide NPD programs, with the structure used tied to product-specific requirements. In addition they found that since the previous study more management attention and financial resources were being given to the early steps in the NPD process, firms were becoming more efficient at product development, and needed only seven new product ideas to generate one success in the marketplace. However, the average success rate had not improved, even with the operational improvements that had been made.

Over the years since 1982, the results in the publications of Booz, Allen and Hamilton have been widely referenced in academic research. In addition, a series of research

studies had started to provide periodically information about the process and changes in product development and innovation management. For example, in 1993, Page found that an overwhelming majority of organizations had introduced the use of multi-disciplinary product development teams. Formal measurement of NPD programs had increased to 76% of the sample, from 66% in 1982. However, even with these improvements, the average efficiency and success rate were unchanged over the previous decade. The mortality rate of products proceeding through development had increased slightly, as one successful product resulted from eleven new product ideas or concepts.

From 1990 onwards, several themes consistently emerged. First, although NPD processes are relatively recent phenomena they are seen as being necessary to effective NPD (Cooper, 1990a; Cooper, 1990b; Dwyer and Mellor, 1991a; Griffin and Page, 1993; Griffin, 1997; Dyer and Song, 1998; Cooper, 1999; Calantone et al., 2003; Lee and O'Connor, 2003). Over the years the focus on the NPD process has moved from defining an appropriate process, to defining implementation, to better managing the up-front portion, to measuring the process better, to continue improving the process. Organizationally, there are two consistent themes. First, virtually every study claims that effectively implementing multi-functional teams is crucial to NPD success. Second, the studies consistently relate that NPD is needed into the firm's organization through multiple structures within each firm, and that no one structure seems to be associated with consistently higher performance (Griffin, 1997).

Another consisting finding for producing successful NPD is the need for tangible and visible management support, especially in terms of providing adequate funding and resources and explicit, consistent strategies. This includes having a rational process at firms for allocating resources across projects a well-thought-out strategy for both NPD at the firm level and the project level. Finally, recent studies suggest best practices may be somewhat context-specific, and some efforts are made to better define best practices within context rather than aggregate (Cooper, 1999).

In the following this section will review the literature on managing new product and service developments. It will also address the multifarious factors that affect new product development success. However, before referring to the literature in detail, at first a very basic question is addressed: what actually *is* a new product?

3.2.2 Categorizing new product and new service developments

Many researchers have tried to define what is a 'new' product in order to categorize new products. One of the earliest definitions of 'new' was provided by Ansoff (1957) in the matrix he developed showing the different growth vectors available to a company including diversification. He categorizes new products according to the degree of market newness, and the degree of technological newness. This led to a classification of four types of new products: improved products, market extensions, product line extensions and innovative diversification. Later, Yoon and Lilien (1985) distinguished two main classes of new products, original and reformulated whereas Wheelright and Sasser (1989) followed a 'mapping' approach of generic product developments and separated new products in two categories: core and leveraged. Leveraged products include four groups of products: enhanced, hybrid, customized and cost-reduced. However, this concept is more useful for mature industries with long product life cycle cycles and consequently would not be applicable in rapidly changing markets with short product life cycles like the one investigated in this study.

In services, Heany (1983) drawing on the work of Lovelock (1982) posits different categories of service development, ranging from style changes right through to major innovations. DeBrentani (1993a) uses the level of service customization and customer contact to classify services. That is, because services directed to the business market are usually more highly customized since industrial clients tend to be larger, service relationships more extensive and longer term, and services more complex and user specified (Jackson and Cooper 1988; Morris and Fuller 1989).

The new product or service categories identified by researchers overlap with the wide-ranging product development categories advocated by Booz, Allen and Hamilton (1982).

New product lines or new-to-the-world products are technological breakthroughs, often relying on technologies never before used in the industry and refer to those products named as original by Yoon and Lilien (1988). In contrast, reformulated products represent all the other categories identified by Booz, Allen and Hamilton (1982) including product line extensions, improvements, cost reductions and repositionings. Table 3.1 presents the different types of new products identified by Booz, Allen and Hamilton (1982) and defines each type.

Table 3.1: Types of new products

NEW PRODUCT CATEGORIES	
New-to-the-World products	New products that create an entirely new market
	First of their kind
New product lines	New products that, for the first time, allow a company to enter an established market
	Not new to the market, new to the company
Additions to existing product lines	New products that supplement a company's established product lines
	Not new to the market, new to the company and fits into existing product lines
Improvements & revisions to existing products	New products that provide improved performance or greater perceived value, and replace existing products.
	New and improved type
Repositioning	Existing products targeted to new markets, or market segments.
	Retargeting of the product
Cost reductions	New products that provide similar performance at lower costs.

Source: Booz, Allen and Hamilton (1982) and Cooper (1990b)

Although Booz, Allen and Hamilton refer to all four types of products as "new", it is evident that some are newer to the supplying company than others. To address this problem, many analysts have divided product development simply into 'old new product development', representing product improvements, and 'new product development', representing products that pose greater development challenges to the supplying company. This distinction was made originally by Kraushar (1985), and has subsequently been built on in many studies of product development (Danneels and Kleinschmidt, 2001; Garcia and Calantone, 2002; Micheal et al., 2003). Furthermore, Johne (1995) finds that the first four categories of new products identified by Booz, Allen and Hamilton (1982) are typified by varying forms of newness in terms of their operational newness to the supplier, and also in terms of the newness of the customer base to the supplier. Based on those two dimensions of newness, he identifies four types of product development as shown in Table 3.2 below.

Table 3.2: Main types of product development

	Newness of the customer base (from the viewpoint of the supplier)	
	Low	**High**
High **Operational newness (from the viewpoint of the supplier)** **Low**	**Radical product development**: aimed at the existing customer base 'new product lines'	**New style product development:** aimed at a new customer base 'new to the world products'
	Routine product development: aimed at the existing customer base 'improvements and revisions'	**Extended product development:** aimed at a new customer base 'additions to existing lines'

Source: Johne (1995) based on Booz, Allen and Hamilton (1982) and Cardoza et al. (1993)

Also, Johne (1993, 1996) refines the Booz, Allen and Hamilton (1982) analysis by arguing that the other two types of new products, cost reductions and repositionings, are possible for all the first four types of new product development and therefore they are not distinct types of product development. He refers to cost reductions as 'process' development and to repositionings as 'product augmentation development'.

Based on this categorization of types of new product developments, Johne (1993) also looked at the business development components for services and suggested that they consist of four types of development (as shown in Table 3.3). Within each of these four types, development may be as radical as 'new to the world', or simply incremental in the sense of 'product improvements', as defined in the Booz, Allen and Hamilton (1982) schema. Johne's schema relates to the focus of new service development – product, market, service surround or process.

Table 3.3: Johne's (1993) schema of development typology for services.

Product Development	The development of core attributes of a product
Market Development	To more closely target specific market segments, e.g. by positioning the product to more closely meet segment needs.
Product Augmentation	To alter the product "surround" development, e.g. billing, pre and post sales support, delivery.
Process Development	In the case of goods this is usually to improve cost but process is so integral to services that process development can effectively produce a new service product.

Source: Johne (1993)

This categorization is very important for financial service development. Johne (1993) suggests that services are particularly open to product augmentation development and Easingwood and Storey (1993) highlight the importance of appropriate service support for success in consumer financial services. Products in this market become very complex

due to customization and, therefore, product augmentation development is very common. Augmentation can take the form of a special mix of services that is added to a core product already on offer to another market segment. Alternatively, it can be translated into a few products put together to form a more sophisticated offer that is appropriate for satisfying a complex need of corporate customers.

In services, product augmentation is particularly important because it involves the process by which customers evaluate, purchase and consume the service. Various researchers have noted the importance of this type of development in enhancing the service experience in financial services (consumer or business) and in differentiating between successful and unsuccessful new services (Easingwood and Storey 1993; Storey and Easingwood 1995; Johne and Pavlidis 1996; Danneels and Kleinschmidt, 2001; Garcia and Calantone, 2002).

Product augmentation development complements core product development in services. The 'basic service package' as referred to by Gronroos (1990) is complemented by augmentation so that an appropriate 'offer' is placed on the market. Gronroos (1990) and Storey and Easingwood (1995) refer to this wider output as the 'augmented service offer'. Therefore, product development and product augmentation development make up offer development. Offer innovation development is a relatively new expression and has been mainly used by Mathur (1992), Mathur and Kenyon (1997) and also Johne (1993), Johne and Pavlidis (1996), and Johne and Davies (1999) who have all examined offer innovation in the financial services industry.

As it is evident, offer development comprises a variety of actions taken by the developer to enhance the core product. So, it is appropriate to study such actions from the developer's viewpoint. From this point of view two dimensions determine the newness of the offer: the newness of the product attributes and the newness of the augmentation provided. These two dimensions and the four types of offer development that can be pursued are analyzed by Johne and Storey (1998) and are presented in Table 3.4. The underlying conclusion is that the offer improvement poses less challenge and risk to a

supplier than new-to-the-world offers. Johne and Storey (1998) note that in technology driven companies greatest emphasis is often placed on core product attributes, whereas marketing-driven companies emphasize product augmentation development. Especially, in business-to-business financial services (the type of services concentrated on in this study), the augmented part of the offer plays a critical role in satisfying customer needs.

Table 3.4: Growth vectors served by offer development variants

	Newness of the product attributes (to supplier)	
	Low	**High**
Low	**Aim:** Market Penetration **Via: Offer Improvement** e.g. improved core attributes and/or improved augmentation	**Aim:** Product Development **Via predominantly: Product Development** e.g. new product variants such as new derivatives in banking
Newness of the product augmentation (to supplier) **High**	**Aim:** Market Development: **Via predominantly:** Product Augmentation Development e.g. First Direct, Direct Line	**Aim:** Diversification **Via New-To-The World Offers** e.g. a new business: - - overnight delivery (DHL) - distance education (O.U) - temporary managers

Source: Johne and Storey (1998) based on Ansoff (1987)

3.2.3 New product/service development success

New product development success has been studied using several methodologies. Case studies of the development of specific new products constitute the earliest research (Morison, 1966; Rosenbloom, 1976). This early research provided detailed descriptions of each phase of the development process, but lacked statistical validity of a large, systematic sample study. Thus researchers began to study larger samples, usually focusing on groups of either successful or unsuccessful products.

One of the earliest studies of new product success was Myers' and Marquis (1969) landmark study of 567 product and process innovations. These innovations had been developed by 121 firms representing five manufacturing industries. Their most important finding, the importance of identifying and understanding the user's needs, has been confirmed by numerous researchers in subsequent studies. New products were more successful if they were designed to satisfy a perceived need than if they were developed simply to take advantage of a new technology.

Another key finding of the Myers and Marquis study was the importance of organizational communication, both internal and external. According to their study, information generated and diffused internally represented a major portion of the information required to develop the innovations. This finding suggests the need for strong interfaces between the functional groups particularly between R&D and marketing.

Other researchers have focused on product failure as the unit of analysis. Explaining the failure of new products has been the focus of several studies including the Conference Board Study of new US products (Hopkins, 1980) and Cooper's (1975) examination of 114 Canadian industrial product failures from 66 industrial firms. These two studies identified the principal cause of failure as ineffective product marketing and poor market research. They also identified other marketing problems such as inadequate assessment of market potential, poor understanding of competitor's strengths and weaknesses, and inaccurate product pricing. Apart from these studies' focus on failure, a common denominator of success also emerged from this stream of research. Successful innovation

was found to be strongly influenced by the firm's understanding of its customers' needs and its effectiveness in marketing.

Notwithstanding the important insights generated by these studies, as Zirger and Maidique (1990) point out, conclusions reached by the isolated study of success or failure must be viewed as tentative. A study that focuses on only successful or only unsuccessful new products will provide a list of influencing factors characteristic of the type of products in the sample. Nonetheless, if several of the influencing factors are common to both the success and failure samples, this approach will not provide a means to differentiate successful from unsuccessful product development (Zirger and Maidique, 1990).

Therefore, studies of either success or failures may not provide a full understanding of the differences in the product development success processes. For example, if a factor is present in a success group and not in a failure group while all other study variables are constant, one can then suggest that this factor differentiates successful product development from an unsuccessful effort. Such concerns about methodology led researchers to use an approach that directly compared product successes and product failures.

Since the literature on more or less success in new product development is extensive, and success measurement has been shown to be multidimensional, many dimensions of success have been identified by researchers. Griffin and Page (1993) have reviewed the success measures used by companies and researchers and have identified seventy-five different measures of new product performance and success/failure culled from the new product literature and a survey of a limited number of practitioners. Subsequent expert opinion by group consensus and factor analysis identified four dimensions of success measures: (i) customer acceptance measures; (ii) financial performance measures; (iii) product-level measures, and (iv) firm-level measures. Hart (1993) and Page (1993) conclude that there are two basic types of success measures, financial and non-financial. Each of these types is made up of different sub-types of measures. Montoya-Weiss and

Calantone (1994) provide a summary of all the measures that have been used in assessing new product performance. The authors review 47 studies of success and failure both in products and services and come up with 18 different performance factors that are grouped under four basic categories: (i) market environment; (ii) new product strategy; (iii) development process execution, and (iv) the organization.

Although companies concentrate heavily on financial performance or sales level measures when evaluating their new products, they are increasingly looking at other, non-financial methods of measuring performance (e.g. level of customer acceptance, product quality and on-time development). Companies combine measures in order to find out whether or not the new product has satisfied customer's needs while simultaneously producing financial results for the firm. Research by Griffin and Page (1996) and Cooper (1999) found that, although not used much, these non-financial criteria are considered by managers to be the most useful.

Griffin and Page (1996) have analyzed further success measures according to the type of new products developed and the project strategy followed by each developer organization. They postulate that for incremental new product development (additions to existing lines and product improvements and the one most frequently found in commercial banking), the most useful success measures are creating customer satisfaction and acceptance, meeting profit goals, bringing products to market rapidly, developing high quality products, increasing market share and establishing competitive advantage. In particular, customer satisfaction is a recommended project-level measure that appears under every project strategy type investigated and which 44% of the firms surveyed in Griffin and Page (1993) say they would like to use to measure success. However, only 10% of firms actually used customer satisfaction because it is costly to obtain customer data.

3.2.4 Internal organizational factors affecting NPD success

The previous discussion suggests that a myriad of possible factors or variables exist that can be associated with successful versus unsuccessful new products. To identify these variables, researchers have analyzed the environment in which new products are developed and launched. Two kinds of environment have been identified, namely the firm's external, or exogenous environment (e.g. the nature of the marketplace at which the new product is targeted) and the firm's internal, or endogenous environment comprising internal organizational factors under the control of management as well as the nature of the new project itself. However, several authors concluded that external variables do not play an overly critical role in deciding new product success. For example, Cooper (1979) found that external environmental factors such as the marketplace, the firm (resource base), and the nature of the venture were notable for their lack of impact on new product success. The author calls this lack of influence of external environmental descriptors a "provocative finding, particularly in view of the inferred importance of these descriptors in the literature on screening and descriptive models". Likewise, Dougherty (1990) stresses the minor role of external environmental factors and points out to the dominant position of controllable endogenous variables in the determination of new product outcomes.

Indeed, much prior research suggests that internal organizational variables are the key drivers for new product success. Johne and Snelson (1988b) point out that internal factors do account for success or lack of it in the case of individual projects or for program success. However, the authors also stress that NPD success will be determined, at least partly, by external factors over which managers have little or no control, for example, a sudden downturn in economic activity or an unexpected competitive reaction that may cause sales of a product to be much lower than expected. Nevertheless, even accepting that managers have limited control over external factors, they can increase the chances of launching products successfully by ensuring that all relevant internal organizational variables are controlled for accordingly. For a schematic presentation of major studies (from the year 1974 to 2003) that have assessed internal organizational factors impacting on NPD/NSD success, please refer to Appendix I.

In order to structure a discussion on the internal organizational factors that affect new product development success, it is helpful to refer to the McKinsey '7Ss' model. Popularized by Peters and Waterman in 1982, it was originally devised for organizational analysis. However, previous research has applied the postulated factors at the project level and within the context of new product development (Johne and Snelson, 1988b; Barclay and Benson, 1990).

The '7Ss' are defined as follows (Peters and Waterman, 1982):

The Hard Ss	**The Soft Ss**
***Strategy*:** the plan leading to the allocation of resources	***Staff*:** type, quantity and quality of functional specialists available in an organization
***Structure*:** the characteristics of the organization chart	***Style*:** the type of leadership style prevailing in an organization
	***Skills*:** the distinctive capabilities of key personnel
	***Shared Values*:** the goals shared by organizational members
	***Systems*:** the nature of proceduralized co-ordination and control mechanisms in place

By referring to the Hard Ss, it is intended to convey these organizational aspects as being easier to understand. The Soft Ss are not so easy to define. For example, Staff refers not to the numbers of staff, or staff in a line sense, but to the characteristics of the people who make up the organization. The Soft Ss, because of their nature are rarely defined within the organization. Barclay and Benson (1990) note that the '7Ss' are strongly interlinked, as the model simplifies the various aspects of the organization. Naturally, the model abridges the various aspects of the organization, being only an analytical tool to help

make sense of the complexity of organizations. Nevertheless, it is a very helpful scheme to address most of the internal organizational factors under control of management that might impact on the innovation process. In the following each of the '7Ss' is briefly addressed and their relevance to successful NPD is discussed.

3.2.4.1 Strategy

It has been asserted that a well-defined new product strategy, itself driven by the corporate strategy and objectives, should be at the core of any company's approach to new product development. The new product strategy should provide guidelines for decision making throughout the NPD process. Essentially, the purpose of developing a new product strategy is to define the strategic role new products will play in fulfilling corporate objectives (Cooper, 1979). Indeed, in a study of product innovation strategies Cooper (1985) concluded that new product performance and strategy are closely linked. Cooper classified five different strategic scenarios:

- Technology driven: involving high technology, innovative and based on state of the art developments; these strategies are technologically driven with a non-market orientation
- Balanced: where new products are technologically sophisticated and innovative, combined with a strong degree of product fit, focus and market orientation
- Technologically deficient: where new products are of low technology, 'me too' low risk efforts relying on mature technologies
- Low budget conservative: with low R&D spending
- High budget, diverse: a high R&D budget with an unfocused and diverse approach to new product development

Cooper analyzed these strategies in terms of their performance and effect of the chances of new product success. He concluded that the technology deficient strategy and the high budget, diverse strategy showed the worst performance by far. Technologically driven strategies as well as low budget, conservative strategies generated moderate to positive results, while the strongest performance was achieved through the balanced strategy approach.

Strategy is often regarded as the domain of senior management, but it is often the case that technological and marketing specialists have a much clearer view of technical and marketing developments than their senior managers (Englund and Graham, 1999). Furthermore, it is important to emphasize that the overall product innovation strategy of a business may well have different product development components (Lee and O'Connor, 2003). Booz, Allen and Hamilton's (1982) study found that successful businesses often assign specific strategic roles for individual new product developments. For example, one product may be designated to defend market presence, while another may seek to establish a new competitive edge, or even to develop a new market. As Johne and Snelson (1988a) note, different performance variables can usefully be formulated according to the strategic role assigned to particular product developments.

3.2.4.2 Skill

The skills required for new product development do vary throughout the process. For example, Crawford (1983) suggests six key areas requiring varying skills, namely idea generation, idea screening and evaluation, market appraisal, technology development and launch. To draw these skills together a large amount of teamwork is needed, along with co-ordination and communication skills. Johne and Snelson (1988b) suggest to distinguish between skill for new product planning purposes; for idea generation purposes; for screening purposes; for technical development purposes; for marketing development proposes, and for launch purposes:

For new product planning purposes, one of the most popular techniques is portfolio planning where the need for a new product is identified. However, as Cooper (1990b) points out portfolio planning alone does not generate adequate information for new product planning purposes, as it does not identify which market areas offer the best opportunities to develop these.

For idea generation purposes, good marketing skills have to go beyond basic market research techniques (Hayes and Abernarthy, 1980). As Cooper (1984) suggests,

successful innovators have to ensure that there is an interplay and balance of highly skilled marketing inputs and highly skilled technical inputs.

For screening purposes, many studies show that managers use screening models such as checklists and scoring models (DeBretani, 1989; Calantone et al., 1995; Bonner et al., 2002). Marketing criteria tend to take a secondary role to financial considerations and to the level of corporate, production, and technical synergy achieved with the new product proposal (Johne and Snelson, 1988a). However, Cooper (1985) demonstrates that the screening decision should concentrate on such factors as the new product's advantage and superiority, the economic advantage to the end-user and the growth of the market to which it is being targeted.

For technical development purposes some authors found that efficiency is promoted by multiple and/or competing developments. For example, large innovative companies tend to have parallel prototype programs, so that if one possible technical solution proves to be less appropriate, another can be deployed (Keizer et al., 2002; Calantone et al., 2003).

Lastly, for marketing development purposes and for launch purposes, companies tend to deploy traditional marketing techniques based on market forecasting and product testing. However, as Calantone et al. (1999) and Keizer et al. (2002) point out, with truly innovative new products, there is usually no extant market demand from which to gather information and to formulate a new product idea. The marketer has to adopt a more creative approach that often involves the interpretation of wider socio-economic and industrial trends to identify potential applications for new products (Thieme et al., 2003). Consequently, the successful launch of radical new products requires the identification of innovative customers who provide a bridgehead market from which further penetration is developed (Ozer, 1999).

3.2.4.3 Staff

As Markham (1998) suggests, the project staff involved in new product development will, to a certain extent, be determined by the skills required. The nature and characteristics are a different matter. There are certain key staff roles that need to be fulfilled. The presence of a key individual, a champion and leader, is a factor found to be important in the chances of new product success.

Kirton (1976) has identified preferences for two distinct cognitive styles among people in general. Through a detailed questionnaire he was able to class people as exhibiting a preference for either innovative or adaptive behaviours. The NPD though is not so simple as having innovative behaviour at the concept stage and adaptive requirements at the end. Throughout the whole NPD there is a need for a mixture of innovative and adaptive working styles. Daft (1978) in his work on management teams demonstrated that some people are much more suited to routine work, whereas others thrive on creativity. Creative people, so called planters or shapers, may not be suited to the painstaking tasks of detailed finishing work, a task much better suited for completers or finishers. The right mix of people in a team is an essential part of successful innovation, in order to achieve the factors associated with success. For example, a creative scientist is needed to originate the idea, and an entrepreneur and project manager is needed to promote and co-ordinate the development of the product.

Lynn et al. (1999) as well as Howell and Shea (2001) highlight the importance of champions for keeping product innovation ideas alive and thriving. Both studies conclude that in scanning the environment for new ideas, the most effective source of information is the champion's personal network of people inside and outside the organization. Also, from the perspective of division managers, champions make a positive contribution to project performance over time, reinforcing the crucial role that champions play in new product development process. On the other hand, Markham and Griffin (1998) as well as Markham (1998) found that champions do not seem to play an overly important role in development projects. Both studies assert that, from the perspective of the team members, champions do not make particular positive contributions to project performance.

However champions appear to have a strong influence on other team member's behaviour and to hold a more positive view of the project than the rest of the team.

Furthermore, Barclay and Benson (1990) note that in their case study companies they found little evidence of teams being formed on any other than a functional or skill basis. Yet, the authors stress the need to consider psychological qualities of individuals who work in the innovative process. Their attitude and the mix of the people involved will be critical to such factors as teamwork, even if the best structure and systems are available.

3.2.4.4 Style

An organization's socio-cultural behaviour is as important as its structural configuration. The style that exists within an organization will be strongly influenced by its management. Many studies have shown that a crucial factor in successful new product development is management support at the project level (Bart, 1991; McDonough and Barczack, 1991; Brown and Eisenhardt, 1995; Johne and Davies, 1999; McDonough 2000; Sethi et al., 2001; Bonner et al., 2002).

The popular NPD literature provides examples where executives took an active role in the management of innovations. In general, this literature concludes that the type of leadership style in NPD projects contributes to success. Empirical evidence is limited, however. Most of the empirical findings demonstrate a simple covariance between leadership style of a project and better project performance, but do not offer much detail about what management actually does or should be doing, thus the specific style needed to succeed (Johne and Snelson, 1988b; Takeouchi and Nonaka, 1986, Bart, 1991; Sethi et al., 2001). The few studies, which are more specific about the actual details of management support, provide conflicting evidence. There are two different research streams to leadership in NPD. The first stream of research argues for a loose leadership style or flexibility. In essence, its supporters argue for managers to let project members get on with the development activities and not to get involved in a hands-on way in order to prevent over-meddling and project micro-managing. The second stream of research

argues for a tight leadership style or control. Its supporters posit that managers need to provide definition and control.

The first stream of research suggests that NPD success is associated with a leadership style characterized by 'looseness' or flexibility. Bart (1991) posits that for the past 30 years, the conventional wisdom has been somewhat uniform in its recommendations for dealing with the problems of tight control and the lack of product innovation in big firms. The thrust of these recommendations emphasizes the need for flexibility: loosening up, freeing up and 'letting go' of the firm's entrepreneurial initiatives (Burns and Stalker, 1961). According to Bart, this has been generally been taken to mean an organization characterized by decentralization, reduced formality of operations and a 'hands-off' management approach. The argument put forward by this school of thought is therefore as follows: If firms wish to increase their degree of innovativeness (or rate of new product output), they need to find ways of becoming less centralized, less formal and less strict in the enforcement of company rules.

The second stream of research posits that NPD success is associated with a project leadership style characterized by 'tightness' or control. There are forces present that compel large diversified firms to provide definition and control to their operations (Bart, 1991). Managers must ensure that new product initiatives are being implemented as planned. New products must be managed to control for tests, deadlines, and environmental changes (Bonner et al., 2002). For example, Quinn (1985) found that management isolation from a project and a preoccupation with short-term business performance is a characteristic of failed innovation. Sethi et al. (2001) suggest that management's close monitoring of the NPD project can provide a signal of the importance of a given project, which in turn is expected to affect the team's motivation level and aid in garnering resources from individuals or units outside the team. Bart (1991) argues that the implications of 'too loose control' are striking. If control is 'too loose' the signals from the corporate office become blurred as to where subordinates should spend their time, effort, resources, and attention. Subordinate managers, therefore, do not give new products the effort required because there is a lack of corporate

definition and focus. Bart found in his study that 'low' new product output seems to occur when the degree of presidential control is 'too loose'. He adds that a possible lesson for low new product situations, then, might be that higher quantities of new products will result once presidents give clearer mandates and take more of a personal interest in them.

In sum, project management style has been depicted as a key factor in successful innovation efforts in firms and much research stresses the importance of an open flexible company attitude (Takeuchi and Nonaka, 1986; Bart, 1991; Thwaites, 1992; Johne and Pavlidis, 1996; Harris and Lambert 1998; Johne and Davies, 1999; Sethi et al., 2001; Harborne and Johne, 2002). There is a common understanding in the literature that a blend of participative and autocratic management styles achieves the best results. This does not need to involve project or team managers making all the key decisions, as an over-involvement can cause delays and upset the innovation process (Sethi et al., 2001). However, it does mean that managers need to find a healthy balance between keeping 'too tight' and 'too loose' control over the innovation process (Thwaites, 1992).

3.2.4.5 Shared Values

Shared values is probably the hardest 'S' to measure. It has been defined by Peters and Waterman (1982) as "the significant meanings or guiding concepts that an organization imbues in its members". Barclay and Benson (1990) point out that this definition is very similar to those given for an organization's culture. Culture or shared values changes require a significant amount of time, effort and commitment from senior managers. A common characteristic for all levels, and at all stages in the development process, is recognition of the need to change. For example, Abernathy and Wayne (1974) report that neither R&D nor marketing can successfully follow an innovative program if the rest of the organization's work is concerned with cost minimization. Many studies have cited the part played by key individuals in product development, people such as product managers, technical champions, executive champions, and the like (Bart, 1991; McKee 1992; McDonough III, 1993; Lynn et al.; 1999; Howell and Shea, 2001). The implication is, as Johne and Snelson (1988a) note, that without managers' strong personal commitment to

and enthusiastic support for an innovation, many new product developments would not have materialized. Likewise, Booz, Allen and Hamilton (1982) report that successful innovators have an operating philosophy that incorporates a commitment to growth through new product development. The authors stress that the work of new product task groups and individuals can be nullified if other areas of an organization do not accept the significance and validity of their effort. More recently, Van der Bij et al. (2003) found that individual commitment to the firm is very important to facilitate knowledge dissemination in innovation as well as organizational crises and risk-taking behaviour. The authors urge management to find new ways to control and improve individual commitment. On a different note, Dyer and Son (1998) assert that teamwork and harmony are worthy objectives, but a healthy dose of conflict also plays an important role in fostering innovation. The authors note that in their pursuit of teamwork and harmony, companies run the risk of suppressing the creative tension that brings vitality to new-product development efforts. Dyer and Son conclude that managers may help to create an environment conducive to NPD success by assessing their firms' strategies, emphasizing integrative conflict-handling behaviours, and employing formalization of organizational procedures.

3.2.4.6 Systems

Johne and Snelson (1988b) define systems as the managerial mechanisms for organizing and coordinating the NPD project. Systems incorporate all the procedures, formal and informal, that make the innovation process work (Jelinek and Schoonhofen, 1990). In the extant literature such procedures to organize and coordinate have often been analyzed with reference to formalization (Johne, 1984), centralization (Moenart and Souder, 1990), and standardization (Olson et al., 1995).

The type of organization and coordination suited for achieving best performance in the product innovation process has long been the subject of conjecture. The debate centres on the tensions between the necessity to formalize and standardize innovation tasks within the firm for efficiency and the advantages of keeping the process open and flexible to promote creativity. Formalization and standardization of the NPD process to ensure

efficiency can have the disadvantages of stifling creativity and constraining innovation (Olson et al., 1995). However, leaving innovation to develop in an unfocused way may increase the cost and complexity of the process (Jelinek and Schoonhofen, 1990).

At the project level of analysis, a number of theories have been offered by researchers to explain the effect of systems on NPD performance. Thus, for instance, there is a widespread belief that decentralized and informal mechanisms to organize and coordinate facilitate innovativeness by encouraging new ideas. Formalization is generally thought to be an impediment to effective integration (Gupta and Wilemon, 1990), yet may actually improve integration in certain cases by reducing role conflicts and clearly defining the desires of top management (Calantone et al., 1995). Centralization also can work to improve or hinder interaction at the interface (Moenart and Souder, 1990), although, like formalization, it is generally thought to be associated with lower inter-functional interaction. In general, more successful developers tend to be loosely structured, possessing a clear strategic focus to innovation (Johne, 1984).

However, research examining associations between NPD performance and systems has come under criticism because of extreme variances in the finding of many studies (Subramanian and Nilakanta, 1996). In a bid to explain variations in results, a number of sub-theories have been proposed (Daft, 1978; Daft et al. 1980; Damanpour et al., 1989; Swanson; 1994). Subramanian and Nilakanta (1996) note that a common thread running through these sub-theories is that all innovations are not similar; therefore, systems will have different impacts on different types of innovations. Thus, for instance, Daft (1978) suggests that higher formalization and higher centralization facilitates the adoption of managerial innovations. Conversely, lower formalization and lower centralization is believed to facilitate the adoption of technical innovations. Damanpour (1992) found that high levels of standardization promote the adoption of technical innovations rather than managerial innovations.

Systems also play an important role in controlling development processes and outputs. Two main types of control mechanisms for managing NPD projects have been identified

and include process controls and output controls. Process control is exercised to the extent that managers attempt to influence the means used to achieve desired ends by specifying and monitoring the behaviour and/or activities to be pursued (Bonner et al., 2003). That is, management might specify particular processes, procedures, or activities for the team to follow, and subsequently monitor their adherence to those specifications over the course of the project (Wheelwright and Clark, 1992).

One prominent example for process control systems are 'stage gate systems' popularized by Cooper (1990c; 1994; 1999). Stage-gate systems divide the innovation process into a predetermined set of stages, themselves composed of a group of prescribed, related, and often parallel activities. The entrance to each stage is a gate; these gates control the process, much like quality control checkpoints control the production process. Each gate is characterized by a set of deliverables or inputs, a set of exit criteria, and an output. The inputs are the deliverables that the project leader must bring to the gate. The criteria are the items upon which the project will be judged, the hurdles that the project must pass at that gate to have the gate opened to the next stage. The outputs are the decisions at the gate, typically a Go/ Kill/Hold/Recycle decision, and the approval of an action plan for the next stage.

Over the years stage gate systems have enjoyed increasing popularity with practitioners in NPD (Cooper, 1999) and have been introduced to development activities in many industries including financial services (Cooper and Edgett, 1996). However, despite their popularity, process control systems are no panacea for product success. For example, Might (1984) examined the effectiveness of process control systems based on a study of 103 development projects. He found that, simply because a control system worked well on one project, this did not mean it worked well on another. The author notes that recognition by project managers of the interactions between control methods and situational conditions has a crucial impact on the success of the product.

In addition to process control project managers may exercise output control by establishing specific goals for the project team to attain on one or more outcome

dimensions (Jaworski, 1988; Page, 1993). Such management-initiated performance goals may include a completion deadline, an expense budget, cost or performance criteria to be met by the new product, sales objectives, or profit goals (Jaworski, 1988). The literature further suggests that there is substantial variation across NPD projects in both the types and specificity of controls imposed by management (Page, 1993; Griffin, 1997). In some instances, management may outline a general direction for the project but provide few specific guidelines concerning either the processes to be followed or the goals to be accomplished. In such cases, the development team is given substantial flexibility to determine its own objectives and procedures. Indeed, Bonner et al. (2003) note that a fundamental issue facing managers is how to exercise adequate control over NPD project teams that by their nature require some degree of flexibility, creative freedom and participative decision processes.

While some degree of freedom and flexibility seems to be an essential ingredient to the relative speed and success of cross-functional NPD teams, it is not without risks. These teams are not only free to develop innovative new products and services that fit changing customer needs and desires, they are also free to wander off-strategy; pursue design options that exceed the firm's competencies or resources; engage in endless partisan debate, and run behind schedule or over budget; all of which might go on for months before drawing the attention of higher-level managers (Bonner et al., 2003). At an individual project level, then, traditional formal diagnostic controls may play a role in management's attempt to keep NPD teams on an appropriate strategic track and to avoid unwelcome surprises. But too much or the wrong type of formal control may constrain the team's creativity, impede their progress, and injure their ultimate performance (Brown and Eisenhardt, 1997).

The need for formal systems for organizing, coordinating and controlling on the one hand and the need for flexibility on the other led researchers to conclude that successful project teams in NPD strike a healthy balance between rigidity and flexibility. For example, in a study of experienced product innovators and less experienced product innovators, Johne (1984) shows how experienced innovators apply largely informal non-standardized

procedures in the initiation phase of the innovation process. In this, the task of idea generation, screening and concept development are carried out in a flexible way, promoting creative problem solving and feedback. However, once the product position is established, more formal and rigid controls are exercised as the development reaches the pre-launch and launch stages. Here tight coordination and control are necessary in order to time the launch into the marketplace successfully. The author concludes that during the early stages of the innovation process control mechanisms should be loose. As the development progresses and more capital is allocated, tighter controls are needed to avoid costly changes, to meet launch dates, and to prevent designers continuing to 'perfection'.

In relation to the above discussion, the literature on systems in NPD suggests the following:

- Innovative ideas have a greater chance of eventual new product success when decision-making is centralized (Stefflre, 1985).
- Innovative ideas have a greater chance of eventual new product success when there are fewer participants in the decision system (Stefflre, 1985; Cooper, 1994).
- Innovative ideas have a greater chance of eventual new product success when there are fewer opposing fractions within the firm (Stefflre, 1985; Cooper, 1994).
- A key factor that facilitates innovation is organizational flexibility (Johne, 1984; Bart, 1991; Cordero, 1991; Karagozoglu and Brown, 1993).
- A key factor that facilitates innovation is the concentration of power in an organization (Pearson, 1988).

3.2.4.7 Structure

Johne and Snelson (1988b) define structure as the type of formal organization structures used to implement product development activities. A long tradition of research on innovation has consistently viewed organic organization structures with informal-flexible features as the appropriate format for corporations to foster organizational innovation (Larson and Gobeli, 1986; Iwamura and Jog, 1991; Karagozoglu and Brown, 1993; Adams et al., 1998; Song et al., 1998; Danneels and Kleinschmidt, 2001). However, despite the known remunerations of flat hierarchies and cross-functional integration for

successful NPD, many firms still tend to be organized hierarchically and by function (Griffin and Hauser, 1996). Yet, functional organizations do not encourage or value co-operation across functions, nor do they lead to harmonious operations across functions where conflicts are resolved early and people work together. Griffin and Hauser (1996) note that in functional organizations performance standards across NPD groups often conflict, as do responsibility designations for many of the cross-functional task and reward systems. The authors stress that, in hierarchical firms, information and decision-making is functionally centralized rather than distributed to persons who have the knowledge to resolve cross-functional issues.

The need for an organization structure to foster cross-functional integration is one reason for the prevalence of strategic business units. Over the last decade researchers and practitioners alike have proposed several types of strategic business units to overcome the rigidity of functional and stratified organization structures. In the literature three types of strategic business units have been championed as most conducive for successful NPD, namely a) coordinating groups, b) matrix organizations and c) cross-functional teams.

(a) *Coordinating groups:* Permanent coordinating groups consist of personnel who have a balanced perspective, which enables them to work effectively with several specialists groups over a long period of time to both facilitate and monitor progress. In case-based research, Lorsch and Lawrence (1965) found that coordinating groups produce higher firm-level performance (in terms of marketplace success and profits) where the uncertainty in at least one of the two dimensions (market or technology) is extremely high. The authors found that these groups integrate by providing a means by which conflicts are resolved and decisions are made, mediating the differences in organizational responsibilities between the two groups. Griffin and Hauser (1996) note that coordinating groups achieve higher market success and profits levels by overcoming language and organizational responsibility barriers, allowing better decisions to be made, and resolving conflicts. Their stability can reduce uncertainty in extremely unpredictable environments.

(b) *Matrix organizations:* A number of firms have implemented matrix organizations in an attempt to maintain functional specialization while improving cross-functional integration (Babcock, 1991). Functional specialists reside in functional groups and report to a functional manager. They retain the ability to stay connected to the new frontiers of the technical area. The matrix structure allows organizations to adapt to the needs of a project by flexibly manipulating group composition and expertise (Cannon-Bowers et al., 1990). Case studies provide some evidence of the cost and effectiveness of matrix structures. For example, Larson and Gobeli (1986) found that firms using matrix organizations had product-market development success rates about twice the success rate found in functional organizations. However, Griffin and Hauser (1996) note that in organizations with matrix structures, personnel may find it difficult to balance time spent in a functional group with time spent on projects. Individuals may infer different priorities from their functional and cross-functional managers, which can result in confusion.

(c) *Cross-functional teams:* In 1965, Marquis and Straight were the first to advocate placing all functional contributors on the same product-development project under a single leader. Since then, other researchers have advocated similar solutions to managing NPD with the most prominent form being the cross-functional team. A cross-functional team is composed of members representing different functions with relevant input into a new product design (Hauptman and Hijri, 1999). Typically, these teams include representatives from design engineering, manufacturing and marketing among other functions. Pulling some of the organization into cross-functional teams avoids the confusion of placing the entire organization into a matrix structure just to obtain the cross-functional integration required for some tasks. Much prior evidence suggests that cross-functional NPD teams lead to higher marketplace success and shorter times to market, decreasing the barriers of functionally specialized thought-worlds, languages, and organizational responsibilities, and providing a forum in which information is utilized better, decisions are made more effectively, and conflicts are resolved (Henke et al., 1993; Donellon, 1993; Griffin and Hauser, 1996; Hauptman and Hijri, 1999). As this research concentrates on the virtual form of the

cross-functional NSD team, there is the need to discuss this popular structural approach in greater detail.

3.2.5 The cross-functional NPD/NSD team

The extant literature suggests that cross-functional teams have become an important tool used in the development of new products (Griffin, 1997; Jassawalla and Sashittal, 2001; Lovelace et al., 2001; Olson et al., 2001). Product development by its very nature involves uncertainty about potential market response and about new technology in the product design and/or its production (Johne and Snelson, 1988a). Added to this uncertainty is the increasing complexity associated with more sophisticated products and the often confounding rapidly changing conditions in the dynamic competitive environment of today's marketplace (Henke at al., 1993). Under this array of conditions the ability of the typical hierarchical structure to make decisions, resolve conflicts across functional areas, and coordinate the product development process of a number of different new products becomes difficult to achieve (Beyerlein and Johnson, 1994; Lipnack and Stamps, 2000). The answer to overcome these debilitating conditions comes in the form of lateral decision processes, which cut across the traditional vertical lines of functional authority (Turoff et al., 1993). While there are a variety of lateral relations, one of the more useful in product development situations where joint efforts across multiple functional departments are required, is the cross-functional team (Henke at al., 1993).

3.2.5.1 Success factors of cross-functional NPD teams

The generalized benefit of the laterally designed cross-functional project team is that it decentralizes decision-making and reduces the hierarchical information overloads at higher levels of the structure (Lovelace et al, 2000). While this benefit alone makes the cross-functional project team worthwhile there are other benefits that contribute to its attractiveness. Rather than letting each functional area in isolation do its 'own thing' and then pass the activity to the next department in a serial decision-making process, a cross-functional NPD team brings together a carefully selected array of specialists who conjointly and simultaneously develop the new product. This has the effect of speeding up the development process (Wheelwright and Clark, 1992; Van Engelen et al., 2001).

Given the pervasive use of cross-functional NPD teams, it is hardly surprising that considerable attention has been devoted to understanding cross-functional teams and how to manage them most effectively. One stream of research on cross-functional NPD teams has examined the relationship between the use of cross-functional teams and various measures of performance (Ancona and Caldwell, 1992a; Griffin 1997; McDonough III and Griffin, 1997). This research has yielded inconsistent results. Ancona and Cladwell (1992b), for example, found that the functional diversity of cross-functional teams was negatively related to performance. They concluded that simply changing the structure of teams (e.g., combining representatives of diverse function and tenure) will not improve performance. Other researchers found that the functional diversity of teams may help to speed up product development (Zirger and Hartley, 1996), particularly in the early stages of product development, but may not contribute to innovativeness and team performance (Griffin, 1997). Still other research suggests innovation strategy may moderate the relationship between cross-functional team use and performance at the firm level (McDonough III and Griffin, 1997). Taken together, these results suggest the need to take into account moderating factors when examining the relationship between NPD performance and the use of cross-functional teams.

A second stream of research has investigated the relationship between NPD success and the characteristics of cross-functional teams, as opposed to simply their use (Thamhain, 1990; Pinto et al., 1993; Bowen and Clark., 1994, Hershock et al., 1994; Hitt et al., 1996). Several relatively distinct areas of focus can be identified within this literature. One group of studies has focused on stage-setting variables, which means variables that play an antecedent role in the product development process, including setting project goals (Pinto et al., 1993; Bowen and Clark, 1994), empowering project team members (Donnellon, 1993; Hershock et al., 1994), and managing the human resources of the team (McDonough III and Leifer, 1986; Cooper and Kleinschmidt, 1987a; Zirger and Madique, 1990). A second area of research has focused on individuals who are crucial to the product development process. These individuals can be classified as 'enablers' and include leaders, managers, and champions (McDonough III and Leifer, 1986; Ancona and Caldwell, 1992a; Brown and Eisenhardt, 1995). A third area of research has investigated

the relationship between stage setters and enablers and team behaviours, including cooperation, commitment, ownership, and mutual respect (Thamhain, 1990; Pinto et al. 1993). However, the results of these studies are conflicting as some found that the involvement of multiple functions in NPD has a positive effect on performance (Souder, 1987; Dougherty, 1992a; McDonough and Griffin, 1997), whereas others found a less clear-cut relationship between the use of cross-functional teams and performance (Clark and Fujimoto, 1991; Ancona and Caldwell, 1992b; Olson et al., 2001).

McDonough III (2000) suggests that the conflicting results in cross-functional team research may stem from the organizational context within teams operate, including the size of the firm and the industry. Cross-functional teams may simply work in particular circumstances but not in others. Alternatively, they may work well in a variety of contexts, but the firm's internal infrastructure may cause them to fail. Henke et al. (1993) note that even those companies that acknowledged the importance of cross-functional teams found that implementing effective organizational systems, structures, practices, and procedures is an extremely difficult task and one that is not always performed successfully.

3.2.5.2 Potential barriers to cross-functional team effectiveness

There are two primary potential barriers to team effectiveness: independent frames of reference of the team members and organizational politics (Hitt et al., 1996). Individuals within a distinct specialization (functional area) often have common educational backgrounds and work experiences. The types of problems they face and the criteria they use to evaluate and solve those problems are also often similar (Henke et al., 1993). As a result, these individuals have developed cognitive models that closely resemble one another. They have similar cognitive biases, use similar heuristics, and likely have common tacit knowledge (Hitt et al., 1996). Conversely, members of new product design and development teams who come from different functions may have different frames of reference (Dougherty, 1990; Hitt et al., 1993; Olson et al., 2001). These individuals employ their functionally focused cognitive models in the development of criteria for particular product designs and in their decision processes to complete the tasks of the

cross-functional team. Thus while a true advantage of cross-functional teams is the diverse input from the multiple functional areas, the distinct frames of reference may create difficulty in achieving effective integration (Hitt et al., 1996).

Another potential barrier to the effectiveness of a cross-functional team is organizational politics. Ancona and Caldwell (1992a) suggest that functionally diverse teams are more visible throughout the organization, which opens them up to the political and goal conflicts that exist among different units. The teams, then, can become forums to play out conflicts between these units, and team performance can suffer. Ancona and Caldwell (1992a) also suggest that teams sometimes stake out claims on physical surroundings or functional boundaries. As they develop specific goals that are incompatible with other unit's goals, inter-group conflict can ensue.

In addition, Griffin and Hauser (1996) suggest that one potential long-term flaw with cross-functional NPD teams is that, by removing specialists from their functional groups, these specialists interact less with colleagues in their own technical or market-based discipline. If the project duration is too long, the expertise and knowledge base of the team members erodes, especially when the technology base or market structure is changing rapidly. Research also implies that cross-functional teams do not solve all of product development's marketing/R&D integration problems. In particular, teams do not, in and of themselves, reduce technical or market uncertainty (Hershock et al., 1994). Other mechanisms, such as technical problem solving, experimentation, market research, and testing must be used to reduce uncertainties. Also, teams do not overcome personality differences and physical separation (Sethi et al., 2001). They don't necessarily increase the amount of information available, even though they encourage better utilization of information already available among developers (Sethi et al., 2001).

All in all, much prior research suggests that simply employing cross-functional teams does not ensure that the tasks of product development are actually accomplished. Organizations also have to observe that keys to successfully using teams for product development include how they manage team selection; training; performance evaluation;

motivation; project sponsorship; the role of management, and, above all, effective cross-functional communication.

3.2.5.3 Communication as a facilitating factor for cross-functional integration

A cross-functional team places emphasis on integrating the various specialties needed for successful new product design and development. To achieve the necessary integration and the potential synergy available in a cross-functional team requires effective communication (Hitt et al., 1996; Van der Bij et al., 2003). Such communication has been shown to be both necessary for marketing and technical synergy and related to new product success (Moenaert and Souder, 1990). In fact, Brown and Eisenhardt (1995) argue that internal communication within the cross-functional team affects the productivity of that team, as well as the speed with which it accomplishes its tasks. The authors suggest that both team productivity and cycle time affect the financial success of new products introduced to the market. While communication between the functions is important for most new product development, effective internal communication in cross-functional teams is particularly critical if they are to achieve synergy that is available among the functions (Zirger and Maidique, 1990).

Ancona and Caldwell (1992b) also argue that the amount and content of external communication affect the success of cross-functional new product development teams. While they found that most individuals on a team communicated with outsiders who had similar functional backgrounds, they maintain that a greater number of different functions represented on the new product development team contributed to its success. They conclude that teams with more functions represented have greater external communication and more product development success. These findings suggest that cross-functional new product design and development teams should be composed of members representing multiple diverse functions (to infuse more external information into the process) and must promote effective internal communications among team members (Keller, 1994; Brown and Eisenhardt, 1995; Van der Bij et al., 2003).

In summary, much previous research suggests that effective communication (internal and external) is necessary for cross-functional teams to maximize the potential synergy among the functions involved in the new product development success. However, considering the importance of communication as well as the many other variables that constitute high cross-functional team performance one might ask how complex cross-functional teamwork will become when put into a virtual context?

3.2.5.4 Co-located cross-functional NPD teams

The majority of research on cross-functional NPD teams has focused on teams that are co-located, which means teams that comprise individuals who work together in the same physical location. While researchers rarely identify the type of cross-functional team being investigated, a few researchers have specifically looked at the importance of co-locating a NPD project team. They have found, for example, that the proximity of team members is significantly related to co-operation, which may be the result of the frequency and nature of interaction brought about by physically co-locating them (Pinto et al., 1993; Kahn and McDonough, 1997).

One of the early studies in this area concludes that the frequency of communication between a central research laboratory and a foreign subsidiary declines exponentially with distance. The geographically nearest units communicated ten times more with the central research laboratory than the more distant units (Hough, 1972). Seminal research by Allen (1985) showed that the probability of two R&D professionals communicating with each other strongly depends on the distance separating those professionals. Thus, Allen found a strong likelihood of weekly communication between two engineers or scientists who are located 30 or more metres from each other. He concluded, "for weekly contact, it is only within the first thirty metres that separation has any real effect on the probability of communication" (1985, p. 240). Likewise, in a study of 150 researchers belonging to the same company, Tomlin (1981) concluded that the likelihood of communication between two researchers working at different locations, and working in different departments and on different projects, was less than 0.2%. If two people worked

on the same project, the likelihood increased to 23%. If they worked in the same department the likelihood of communication was 15%.

In addition, the physical proximity of team members enhances team members' feelings of commitment as well as trust and communications (Ross-Flanigan and Mercer, 1998). These findings suggest that physical proximity is an important issue to consider when investigating cross-functional NPD teams. While the physical proximity of team members can reinforce social similarity, shared values and expectations (Fulk, 1993), distance between project team members (of as little as 10 metres) can lead to significant declines in communication (Fulk and De Sanctis, 1995). It has been argued that if team members cannot be co-located they may as well be miles apart (Kahn and McDonough, 1997), since even a small degree of dispersion among team members will negatively affect the degree of trust and degree of cooperation between them (Hollingshead et al., 1993).

Indeed, one can conclude that team members co-located on the same floor engage in different behaviours than team members in the same building but on different floors, in different parts of the same country, or in different parts of the world (McDonough III et al., 2001). As such, findings from research on co-located, cross-functional NPD teams are not readily transferable to teams that are cross-functional *as well as* geographically and/or organizationally dispersed (Kayworth and Leidner, 2002).

Dispersed NPD/NSD teams have flourished in recent years due to radical changes in Information Technology and the strong growth in the internationalization of many firms' service development activities (McDonough III, et al., 2001). Sophisticated technological infrastructures enable organizations to unite people from all over the world in so-called 'virtual NPD teams'. Virtual NPD teams are used to employ geographically and/or organizationally distributed expertise that is not available in a single geographic area without having physically co-locate team members. Despite the widespread deployment of virtual NPD teams, research on the dynamics and efficiencies of such teams is limited. The next section will examine the literature on virtual teams in detail.

3.3 Virtual teams

3.3.1 Definition of virtual teams

The crucial question emerges what exactly distinguishes a virtual team from a traditional, co-located team? More so than a co-located work group, the virtual team often has membership representing a number of different geographic locations within the organization, and may also include contingent workers from outside the organization (Townsend et al., 1998). Virtual team members are challenged to adapt to the telecommunications and informational technologies that link its members. Virtual team members have to learn to use effectively new telecommunications systems in an environment where team managers, clients, and co-workers are rarely physically present.

While the terms 'virtual' and 'global' teams have come into increasingly common usage, there is still lack of an agreed definition for each. Maznevski and Chudoba (2000), for example, define the term 'global virtual teams' as "groups that are identified by their organization and members as a team; are responsible for making and/or implementing decisions important to the organization's global strategy; use technology-supported communications substantially more than face-to-face communications, and work and live in different countries". However, McDonough III et al. (2001) distinguish between 'virtual teams' and 'global virtual teams'. The authors define 'virtual teams' as "teams comprised of individuals who have a moderate level of physical proximity and are culturally similar". On the other hand, 'global virtual teams' are defined as "teams that are comprised of individuals who work and live in different countries and are culturally diverse".

Lipnack and Stamps (1997) define a virtual team as "a group of people who interact through interdependent tasks guided by common purpose" and work "across space, time, organizational boundaries with links strengthened by webs of communication technologies". Some authors reserve the term 'virtual' for teams that never meet face-to-face (Jarvenpaa et al., 1998; Canney and Ward, 1999), but most refer to a virtual relationship as one that is at least mostly conducted over technology (Geber, 1995; Townsend et al., 1998; Young, 1998; Mohrman et al., 2003; Cummings and Teng, 2003).

Smith and Blanck (2002) reject the term 'virtual' altogether and prefer 'dispersed teams', which they define as teams spread around a metropolitan area or across the globe. The authors argue that the term 'virtual' is vague and has become faddish, stating: "The term *virtual* means almost but not quite. Teams are all about performance and dispersed teams fail to perform as well as co-located ones. By calling them virtual, one implies they are not actual teams, and this is likely to weaken performance expectations".

However, in conducting the fieldwork for this study it was found that the term 'virtual team' was readily understood by practitioners and frequently used in the industry. For example, Mitchel Lenson, COO of Deutsche Bank, remarked poignantly: "I hate that term, it sounds like dot.com bullshit. However, there is nothing else that better describes how we organize ourselves. Yes, I hate to admit it, but we have plenty of virtual teams here". Also, the term 'virtual' implies the deployment of various forms of information and communication technology, which is central to the type of team under investigation.

As such, this study uses the term 'virtual team' and defines virtual NPD/NSD teams as groups of geographically and/or organizationally dispersed co-workers that that co-operate mainly through impersonal communication modes (Townsend et al., 1998) to accomplish the organizational task of initiating, developing and launching a new product or service (McDonough III et al., 2001). It should be noted, however, that the emphasis here is on the word *mainly*, as it is expected that virtual teams meet face-to-face at certain points in time.

3.3.2 Virtual NPD/NSD teams

So what happens to the previously discussed cross-functional team advantage, when fundamental group structures begin to change? Recapturing the benefits of the team system will require organizations to manage team members who are no longer located together and who may come from different organizations and cultural backgrounds. Field research suggests that for many financial service organizations virtual teams are already a reality. Institutions such as Goldman Sachs, Citibank and Deutsche Bank report the increasing use of virtual teams for a wide range of business activities including

NPD/NSD. Indeed, according to a September 2001 issue of *Computerworld*, 88% of companies surveyed stated they expected to increase their use of virtual teams in the future. More often than not the use of virtual teams is less a question of preference than of necessity when team members are geographically and organizationally dispersed and face-to-face meetings become a rare luxury. Fortunately, the period of radical group structural change has been accompanied by an equally radical change in information technology and teams can now be effectively reconstituted from formerly dispersed members. That is, virtual teams can be used to employ geographically and/or organizationally distributed NPD/NSD expertise that is not available in a single geographic area without having physically co-locate team members.

To date, however, research on virtual NPD/NSD teams is limited. Indeed, Moenaert et al. (2000) note that the lack of attention devoted by scientific research to the management of virtual NPD teams contrasts sharply with the importance attached to it as a cornerstone of international business success. One of the first studies on the subject is McDonough's III et al. (2001) more general investigation into the differences between global, virtual, and co-located NPD teams. The authors examine how these three types of teams differ in terms of usage, challenges and performance. The study maintains that the use of global and virtual teams is rapidly increasing and that, by the year 2001, approximately one out of every five NPD teams are likely to be virtual. The findings also note that global and virtual teams generally face greater behavioural and project management challenges than traditional co-located teams. The authors conclude that despite considerable industry attention and interest, there is much not yet understood about how to effectively collaborate virtually to facilitate NPD.

Further studies on virtual teams in NPD/NSD only emerged recently. These can be divided into two groups: those focused on how knowledge is developed and shared in NPD/NSD teams, and those more focused on the use of Information Communication Technology (ICTs) for virtual collaboration. In the former group are the works of Mohrman et al. (2003), Cummings and Teng (2003), and Leenders et al. (2003).

For example, Mohrman et al. conducted an impressively large (n=2400) survey of scientists and engineers in 10 firms, focusing on knowledge work behaviours. The authors show that the use of cross-functional teams and IT quality are important determinants of organizational performance, but not sufficient. A critical intervening variable is the knowledge work behaviours of the scientists and engineers: a willingness to try new approaches; using systematic processes to make decisions; knowledge-sharing, and tracking impact of their work on business performance. Mohrman et al. assert that future research on predictors of NPD performance need to include how the knowledge work process is managed and practiced.

Cummings and Teng (2003) focus on knowledge transfer between organizations, although their findings are relevant to knowledge transfer within the same organization, e.g., functions represented on NPD teams. Cummings and Teng define transfer success as commitment, satisfaction and ownership by recipients of the transferred knowledge. Consistent with other studies, they found that knowledge that is embedded in a source organization's routines and practices transfers less successfully than non-embedded knowledge. However, contrary to other studies, they found that more articulated (coded) knowledge transfers less successfully than less articulated knowledge. The explanation is that a source's knowledge articulation (e.g., codification) reflects norms and values that may be inconsistent with those of recipients. Cummings and Teng suggest that a company should recognize that the development of knowledge repositories, portals connecting with external databases, and alerts about recent developments in the field will be of only limited value for knowledge transference. Instead, supplementing these activities with mechanisms for connecting people to people through web conferences; communities of practice; discussion boards; chat rooms; instant messaging, and expertise identifiers are needed for knowledge to be effectively transferred.

Last in this group, Leenders et al. (2003) examine the effect of frequency of communication and communication centralization on NPD creativity. They find that creativity is fostered with moderate levels of communication (neither too much or too little) and low centralization in knowledge sharing. This suggests, for the practitioner,

that knowledge sharing in NPD need not and should not be continuous; nor should the team leader be the heavyweight centralized repository for knowledge if creativity is the objective. Instead, team leaders need to shift from a heavyweight role to one of process facilitation, monitoring knowledge-sharing enough to know when the optimal frequency and degree of decentralization are achieved.

These three studies together then suggest that knowledge-sharing for NPD must have a clear process for sharing and absorbing not just any knowledge, but new knowledge; not just codified knowledge, but highly articulated knowledge; and not just frequently communicated knowledge filtered through the team leader, but knowledge communicated in moderation and independently of the team leader.

The second group of research focuses on the use of Information Communication Technology (ICTs) for virtual collaboration in NPD/NSD. These include empirical research by Moenaert et al. (2000), O'Sullivan (2003) and Susman et al. (2003). In addition there are two important practitioner-oriented papers by Smith and Blank (2002) and Cooper (2003). Moenaert et al. (2000) examine communication flows in international product innovation teams in four European multinational corporations. The authors suggest five requirements that determine the effectiveness and efficiency of communication in such teams: network transparency, knowledge codification, knowledge credibility, communication cost, and secrecy. To cope with these communication requirements, organizations may create firm level capabilities (parallel structures, cross-functional and inter-unit climate, communication infrastructure, goal congruence) and team level capabilities (core team, team leadership, formalization, procedural justice). These findings suggest several consequences for the management of international product innovation projects. First, the innovating firm must balance centralization and decentralization, employ formal as well as informal strategies, and integrate ad-hoc and permanent strategies. Second, it highlights the critical role of the project leader. The authors note: "Given the fact that companies often select the most available person, rather than the best person for the job, the allocation of lightweight project leaders may create heavyweight problems in international teams". Third, the innovating firm must also

actively manage the communication flows with external parties. Failure to do so may result in flawed specifications, and a limited understanding about product design and market strategies.

O'Sullivan (2003) studied a large aerospace company, AeroCo, that spent several weeks interacting face-to-face with its suppliers during the initial NPD phases prior to virtual collaboration. O'Sullivan concluded from his observation that virtual collaboration was facilitated because AeroCo, during the initial collocation period, worked closely with its suppliers to develop a common set of highly standardized work standards and interfaces shared with other suppliers that allowed each supplier to complete some work independently. AeroCo also set up a process in which demonstrated adherence to these standards was a prerequisite to being able to collaborate virtually with the suppliers after they returned to their own companies. O'Sullivan's (2003) study provokes the question can this norm-setting and knowledge-sharing be effectively done virtually or must the suppliers be face-to-face initially?

In another study Susman et al. (2003) address the question that, even if ICTs are designed to support knowledge sharing for innovation, any ICT is likely to initially be misaligned with the organization in which it is implemented. Based on in-depth interviews with two companies attempting to introduce ICT, Susman et al. propose that misalignments are not objectively observable phenomena. There is no absolute metric or scale for determining that a ICT is misaligned with an organization, task or team structure. Instead, misalignment is a psychologically derived construct such that different participants may experience misalignments differently. Susman et al. then propose that teams may have different abilities to reconcile members' differing interpretations of the misalignment. Given that individuals interpret, and teams reconcile, misalignments differently, Susman et al. suggest that the actual misalignment between ICT and the organization may be less important for successful virtual collaboration than the team's ability to reconcile their differences in interpretations about misalignments. That is, the success of virtual collaboration rests on the ability of the team to reconcile their differing interpretations of misalignments as they proceed through the NPD process. Thus, assessing the team's

ability to identify these differences and form a common and richer understanding because of these differences will contribute to the team's success.

Last, there are two studies on the use of Information Communication Technology (ICTs) for virtual collaboration in NPD/NSD that are oriented towards practitioners. In their article, Smith and Blank (2002) note that an effective virtual NPD team depends on open, effective communication, which in turn depends on trust among members. As trust is the foundation, but also the very quality that is most difficult to build at a distance, the authors suggest that the virtual NPD team has to get together face-to-face several times during the project and especially during the early project stages. Another complication is that differences in culture tend to grow as the team spreads over greater distances, encountering different time zones, languages, ethnic groups, and thus corresponding values. The authors stress that leaders of virtual teams must be sensitive to cultural discrepancies and provide opportunities for people from various cultures to communicate in a variety of ways. Otherwise, team members will just retreat into their shells or go along passively with what others want, which destroys team energy, creativity, and trust.

Cooper (2003) addresses in her article the question of how to design ICTs so that they contribute to knowledge sharing for innovation. She describes a number of problems that NPD teams have experienced in using ICTs for innovation. From these experiences, she identifies a number of requirements that ICTs should meet if they are to support knowledge sharing for innovation, including providing context, timing, connectivity, and multiple levels of abstraction. She evaluates current ICTs and knowledge management tools and generally judges them to provide inadequate support, often having negative impacts on the NPD user.

In sum, the above discussion on virtual teams in NPD/NSD indicates that the use of virtual teams in NPD/NSD is rapidly increasing and that virtual teams generally face greater behavioural and project management challenges than traditional co-located teams: First, virtual teams are challenged to ensure the effective sharing and transferring of knowledge. Hereby the exchange of tacit knowledge as well as poorly articulated

knowledge is particularly difficult. Second, attaining high levels of creativity in virtual teams requires knowledge to be distributed evenly throughout the team avoiding that knowledge remains centralized on the team manger. Third, the virtual team must balance centralization and decentralization, employ formal as well as informal strategies, and integrate ad-hoc and permanent strategies. At the same time, however, effective virtual NPD teams have shown to develop a common set of highly standardized work processes at least at the early stages of development. Fourth, effective virtual NPD teamwork depends on open, effective communication, which in turn depends on trust among members. Last, current ICTs and knowledge management tools provide inadequate support for NPD. However, the success of virtual collaboration rests less on the quality or sophistication of ICTs but more on the team's capability to recognize and resolve differences in their psychological and social dynamics.

The above findings are echoed by the growing body of NPD-unrelated research examining the dynamics and efficiencies of virtual teamwork. This literature, not related to the context of NPD/NSD, is discussed below.

3.3.3 Virtual teamwork

The following discussion concentrates on virtual teamwork in a more general sense and is not confined to the context of NPD. While work teams were used in the US as early as the 1960s, the widespread use of teams and quality circles began in the Total Quality Management movement of the 1980s. In the late 1980s and early 1990s, many companies implemented self-managing or empowered work teams. To cut bureaucracy, reduce cycle time, and improve service, line-level employees took on decision-making and problem-solving responsibilities traditionally reserved for management. By the mid-1990s, increasing numbers of companies such as Goodyear, Motorola, Texas Instruments, Citibank and General Electric had begun exporting the team concept to their foreign affiliates in Asia, Europe, and Latin America to integrate global human resource practices (Kirkman et al., 2001). Now, due to communication technology improvements and continued globalization, virtual teams have increased rapidly worldwide. Due to employee travel restrictions resulting from the 2001–2003 recession and the events of

September 11, 2001, virtual teaming is likely to increase exponentially (Kirkman et al., 2002). This increase is suggested to parallel that of telecommuters, or employees who work from remote locations and communicate electronically (Pearlson and Saunders, 2001). In the US, two out of three Fortune 500 companies currently employ telecommuters (Cascio, 2000). The United States Labour Department reported that 19 million people worked from home online or from another location in 2001, (Pearlson and Saunders, 2001) and the Gartner Group estimated that by 2002 over 100 million people worldwide will be working outside traditional offices (Elkins, 2000)

Proponents of virtual teamwork argue that virtual teams provide a potent response to the challenges associated with today's downsized and lean organizations and to the resulting geographical dispersion of essential employees (Henry and Hartzler, 1997; Mayer, 1998; Fisher and Fisher, 2000; Jude-York et al., 2000; Lipnack and Stamps, 1997, 2000; Duarte and Snyder, 2001; Willmore, 2002; Gibson and Cohen, 2003; Rad and Levin, 2003). Virtual teams not only address new workforce demographics, where the best employees may be located anywhere in the world, but also provide increased flexibility for respective team members. In addition, firms are said to benefit from virtual teams through the access to previously unavailable expertise, enhanced cross-functional interaction, and the use of systems that improve the quality of virtual teamwork. Sceptics argue that the term 'virtual team' is simply a new expression for an old idea and that organizations have deployed such teams for decades. What is worse, virtual teams display the usual problems associated with cross-functional teamwork such as low individual commitment and role ambiguity, only these problems are aggravated in a virtual team due to the geographic dispersion of team members and the lack of direct face-to-face contact. The literature on virtual teams favours both positions.

Within the literature on virtual teams, two lines of research have emerged over time: (a) research investigating differences between personal and impersonal communications, and (b) multidimensional research examining the use of communications among members of a distributed organizational group over time. In addition, a mass of practitioner-oriented

literature has emerged discussing, but not empirically testing, the managerial aspects of virtual teamwork.

The first line of research focused on the communication modes of virtual teams. That is, how different types of information communication technologies (ICT) facilitate teamwork and impact on team performance. The results of this research were often equivocal and even conflicting. For example, early studies in the field were controlled or quasi-experimental in nature and compared face-to-face with ICT configurations to mediate communication. In some studies face-to-face groups performed better than ICT-mediated groups (Smith and Vanecek, 1990; Hightower and Sayeed, 1996;), in others worse (Ocker et al., 1995); in others there was no difference on quality-related outcomes (Valacich et al., 1993). Furthermore, these relationships changed and evolved over time (Hollingshead et al., 1993). Although task type was often proposed to moderate the relationship between a medium and its effect on performance (O'Connor and Calvin, 1997), there did not seem to be a consistent pattern of task types for which ICT was better or worse. Some studies concluded that a combination of media including face-to-face outperformed one without face-to-face (Ocker et al, 1998; Bolisani and Scarso, 1999). The few studies that crossed organizational or significant geographic boundaries found that these boundaries affected the context in which communication took place and the communication itself (Turoff et al., 1993). Internationally distributed teams were examined focusing on the role of trust in global teams that never met in person (Jarvenpaa et al., 1998; Jarvenpaa and Leidner, 1998). Both studies found that trust, which was critical to the team's ability to manage decision processes, could be built swiftly; however this trust was very fragile.

The second line of research examined the communications use among members of a distributed organizational group over time. All of these multidimensional field studies demonstrated that context and time helped explain most of the relationships that appeared conflicting or equivocal when studied individually. For example, DeSanctis and Jackson (1994) showed that the benefits from using more complex ICT increased as the task became more complex; Hind and Kiseler (1995) observed that lateral and extra-

departmental communication used telephone rather than e-mail or voicemail, increasing collaboration, and Zack (1993) found the more shared a group's interpretive context was, the more members were able to communicate using seemingly less rich ICTs. Using adaptive structuration theory several authors suggested that the implementation and use of ICT are not deterministic, rather ICTs are structured by users in their contexts of use (DeSanctis and Poole, 1994; Orlikowski and Yates, 1994; Orlikowski et al., 1995; Rice and Gattiker, 1999; Majchrzak et al., 2000; Susman et al., 2003).

Structuration theory perspective suggests that the ICT adaptation process evolves over time, sometimes gradually, sometimes discontinuously, in response to interruptions (Tyre and Orlikowski, 1994) or intentional management policy (Orlikowski at al., 1995) and is constrained by existing structures of the organization and its associated tasks and group characteristics (DeSanctis and Poole, 1994). In a longitudinal case study Majchrzak et al. (2000) examined organizational, environmental, group, and communications structures of a single virtual team and concluded that team structures evolved over time in response to changing task and process elements. Likewise, in a study on three global virtual teams Maznevski and Chudoba (2000) found that effective teams continuously align their communications structure, fitting their communication patterns to the task and generating a deep rhythm of face-to-face communication interspersed among periods of remote communication.

As empirical research is limited, solid managerial implications in regards to virtual team management are primarily to be found in practitioner-oriented literature. This literature suggests that the imperative for moving from traditional face-to-face teams to virtual teams derives primarily from the increasing prevalence of flat or horizontal organizational structures (Townsend et al., 1998). The emergence of the flat or horizontal organization is largely a response to intensifying competitive operating environments brought about by increased global competition and recent advancements in both information and transportation technologies (Lipnack and Stamps, 1999). Organizational flattening pushes decision authority to lower levels in the organization, reducing the need for several layers of management. With fewer layers of centralized, hierarchical

management structure, organizations become increasingly characterized by structurally and geographically distributed human resources (Elkins, 2000). While the organization may retain the collective talent it requires, there is a reduction in the opportunity for linkages between remaining employees (e.g., personnel and offices close enough to facilitate traditional interaction). This kind of environment occasions the need to reconstitute the benefits of the large, resource rich organization within the context of the new flattened organization (Chase, 1999).

A second reason for the deployment of virtual teams is a shift from traditional competitive business environments toward strategic cooperation among a synergistic group of firms that may not only coexist, but also actually nurture each other (Geber, 1995). In the past, firms were vertically integrated to maintain more control of processes from the acquisition of raw materials to the manufacture of the final product. However, diversification and specialization have made direct management of far-flung processes unwieldy. Thus, firms have responded to this problem by eliminating their superfluous processes to concentrate on their core, value-added processes (Boudreau et al., 1998). Strategic partnering and/or outsourcing allows efficient span of control while maintaining larger economies of scale for the cooperative organizational group. Although this segmentation enables more efficient management of each individual process, it often fails to provide an overarching structure by which these specialized organizations can compete within a large global market (Cuotu, 1998). These cooperative groups of organizations become increasingly interdependent, with the success of each individual organization enhancing the success of the cooperative organizational system.

A third factor encouraging the development of virtual teams is the continued shift from manufacturing and production jobs to service and knowledge work. Production processes, by their very nature, are often more structured and defined. Service activities often require cooperation of team members in dynamic work situations that evolve according to customer requirements. The hallmark of successful service firms has been their ability to flexibly respond to the customer's needs as quickly as possible (Alexander, 2000). This requisite flexibility fuels the movement from highly structured organizational forms to

more ad hoc forms. Virtual teams enable this organizational flexibility because they integrate the effectiveness of traditional teamwork with the power of advanced communication and information technologies, allowing them to accommodate increased dynamism in both team membership and task structure (Kirkman et al., 2001).

Lastly, the increasing importance of global trade and corporate activity has radically altered the working environment of many organizations. Whereas in the past, multinational operations were solely the domain of the world's largest corporations, technological advances in both communications and logistics have enabled smaller firms to compete in the global marketplace. Regardless of firm size, multinational operations require high levels of cooperation and collaboration across broad geographical boundaries (Kirkman et al., 2002). Turning these networks of collaborators into fully connected virtual teams has the potential to increase both the efficiency and quality of communications in this challenging environment.

However, developing effective virtual teams goes well beyond the technical problem of linking team members together. More so than a traditional workgroup, the virtual team will probably have membership representing a number of different geographic locations within the organization, and may also include contingent workers from outside the organization (Pearlson and Saunders, 2001). Virtual team members are challenged to adapt to the telecommunication and informational technologies that link its members (Cascio, 2000). In addition, virtual team members have to learn to use effectively new telecommunications systems in an environment where an important client or co-worker is rarely physically present (Townsend et al., 1998). Further, the virtual team's role transcends traditional fixed functional roles, requiring virtual team members to be prepared to adapt to a changing variety of assignments and tasks during the life of any particular team (Lipnack and Stamps, 1999).

All of the above factors affect the environment in which the individual members of virtual teams must learn to operate. That is, the context in which virtual teams operate is likely to be more complex and more dynamic than that of traditional teams (Kayworth

and Leidner, 2002). This increased complexity and dynamism requires virtual teams to be particularly adaptable and flexible. At the same time, team mangers face the problem of imposing managerial organization and coordination within such a complex work environment. Since communication media may differ in their ability to convey 'social presence', information-rich nonverbal cues, such as facial expressions, voice inflections, and gestures, may be lost or distorted through ICT that lack the social presence inherent to face-to-face environments (Keller, 1994; Warkentin et al., 1997). The severity of this information loss will be determined by the richness of the technology being used. Moreover, important social/contextual information, such as members' social status or level of expertise, may be lost or distorted in virtual team environments characterized by high levels of anonymity (Dubrovsky et al., 1991). Also, the ability to develop relational links among team members may be hindered, which may negatively affect such outcomes as creativity, morale, decision-making quality, and process loss (Walther and Burgoon, 1992). Finally, the lack of a social context may alter or hinder the process through which team members develop trust (Jarvenpaa et al., 1998). As a result, virtual team interaction and teamwork may appear out of context and without focus (Warkentin et al., 1997; Kayworth and Leidner, 2002), resulting in lost meanings, distortion, and misinterpretation of information. Therefore, leaders of virtual teams are particularly challenged to overcome these intricate conditions through effectively organizing and coordinating the team's interaction processes (Pearlson and Saunders, 2001).

In sum, practitioner-oriented literature suggests that virtual teams provide a potent response to the challenges associated with today's downsized and lean organizations, and to the resulting geographical dispersion of essential employees. However, virtual teamwork is associated with a multitude of challenges that result out of a highly complex and dynamic work environment. For team leaders the question emerges how to organize and coordinate virtual teamwork to ensure effective inter-team communication, effective information distribution, and effective task execution? As team leader and team members are rarely physically present, there is the need for impersonal managerial mechanisms to organize and coordinate the work process. For decades organization theorists have proposed that proceduralized co-ordination and control mechanisms reflected by

formalization, centralization and standardization serve both as the means of coping with environmental contingencies and a way of maintaining impersonal organizational coordination and control over a broad range of business conditions (Montanarai and Freedman, 1981). The next section discusses managerial mechanisms for organizing and coordinating project teams.

3.4 Organizing and coordinating project teams

One key challenge for leaders of virtual teams is to coordinate and organize the work process in a team where the team members are rarely physically present. Organization theorists have proposed that organization structure serves both as the means of coping with environmental contingencies and a way of maintaining organizational coordination and control over a broad range of business conditions (Montanarai and Freedman, 1981). The term 'organization structure' embodies a variety of concepts. Structure has been atomized into component parts, referred to as structural dimensions. While the extant literature identifies many dimensions that reflect organization structure, Campbell et al. (1974) suggest a useful distinction between 'structural' and 'structuring' characteristics of an organization. The 'structural' qualities of an organization are its physical characteristics reflected, for example, by size, span of control, and flat/tall hierarchy. In contrast, the 'structuring' refers to policies and activities that prescribe or restrict the behaviour of organization members and are reflected, for example, by formalization, centralization, and standardization.

In the extant literature, several authors introduced similar distinctions to analyze the 'structural' and the 'structuring' dimensions of organization structure and distinguished between 'formal' and 'informal' structure (Pugh, 1979), 'structure' and 'systems' (Peters and Waterman, 1982), or 'physical structure' and 'managerial structure' (Dalton et al., 1980). At the project level of analysis the 'structural dimensions' translate into the anatomical configuration of a project team, while the 'structuring dimensions' reflect the organization and coordination of the work process in a project team.

3.4.1 The argument for loose structures for organizing and coordinating

Early theorists argue that tight structures provide effective mechanisms to organize and coordinate the workflow in organizational units (Child, 1972; Galbraith, 1977). Yet, more recent theorists challenge this argument asserting that the nature of work and the professionalism of the workers in knowledge-intensive units make tight and mechanistic structures archaic and inefficient (Mintzberg, 1998; Hansen, 2001). This latter line of research emphasizes the knowledge-intensive aspect of today's work, which potentially invalidates industrial-bureaucratic forms of structure reflected, for example, by tall hierarchies, standardized work processes, and centralized decision-making (Greenwood et al., 1990; Hinings et al., 1991; Wallace, 1995).

Knowledge-intensive firms claim to produce qualified products and/or services, and even generate new and unique knowledge. Typically, the literature suggests that the concept of knowledge-intensive work applies to organizational settings that share the following common denominators (Kärreman et al., 2002): (1) Personnel are highly qualified and have professional backgrounds (e.g. academic or other comparable pre-employment training and education); (2) products and services are complex and/or non-standard, and (3) product, market, and personnel development are significant activities within the organization. Organizations such as banks are often seen as typical knowledge-intensive firms together with a diverse array of other businesses such as law and accounting firms; management, engineering, and computer consultancy companies; advertising agencies, research-and-development (R&D) units, pharmaceuticals, and high-tech companies.

The ideas of 'knowledge work' and 'knowledge-intensive firms' have gained much attention among scholars during the last decade (Starbuck, 1993; Alvesson, 1995; Deetz, 1995; Morris and Empson, 1998; Robertson et al., 1999). The concept of knowledge work is also important in overlapping academic fields, as demonstrated by the interest in knowledge creation in NPD/NSD (Nonaka, 1994; Nonaka and Takeuchi, 1995; Nemiro, 2000; Storey and Kelly, 2002; Mohrman et al., 2003; Cooper, 2003; Cummings and Teng, 2003; Van der Bij et al., 2003), knowledge creation through internal marketing (Varey and Lewis, 1999), and concepts such as social and intellectual capital (Nahapiet

and Ghoshal, 1998). The basic reason for distinguishing knowledge work and knowledge-intensive firms from other kinds of work and firms is the assumption that this kind of work, and this kind of environment, contains unique and essential qualities. The most dramatic difference lies in the assertion that knowledge work is primarily intellectual, as it draws on mental abilities, rather than physical strength or manual craft.

The literature on knowledge-intensive firms generally pictures these as a departure from the bureaucratic form (Mintzberg, 1998). The difficulties of employing valid and reliable rules and performance measures has led many authors to emphasize cultural-ideological or clan control instead of bureaucratic or market-like forms of internal control (Kanter, 1983; Wilkins and Ouchi, 1983; Kunda, 1992; Alvesson, 1995; Mintzberg, 1998). For example, in a study of a major U.S. high-technology company, Van Maanen and Kunda emphasized that, for many employees, 'culture' replaces 'structure' as an organizing principle and is used both to explain and guide action (Van Maanen and Kunda, 1989). They considered that the formal organization structure is not, per se, particularly important. Kunda (1992) maintained, however, that certain elements of bureaucratic control remain in place, even when normative control is predominant. Desirable behaviour, however, is achieved as a result of regulations and rules that focus on the individual's experiences and ideas, rather than on a direct focus on control of his or her behaviour.

Knowledge-intensive firms are typically engaged in complex and difficult tasks that cannot be perfectly converted into standardized work procedures and regulations. Hence, knowledge-intensive companies are forced to attract and retain qualified people who can adapt their repertoires to meet the demands of the task. As a consequence, managing them strictly through a focus on behaviour is difficult, due to the nature of the work, as a considerable amount of self-organization is necessary (Mintzberg 1998). This means that the most important organizational knowledge is dislocated from standardized work processes to the individual's skills, experiences, and capabilities. In contrast to the bureaucratic form, mission-critical organizational knowledge is thus not 'stored' or

manifested in procedures and processes in knowledge-intensive firms but rather in qualified individuals, - the professionals.

The claim that knowledge-intensive firms break with or substitute the bureaucratic form is linked to general societal and organizational trends and development. These are frequently described as increasing the significance of knowledge, flexibility, networking, and innovation, - all features making bureaucracy and its features (e.g., hierarchy, stability, standardization, and rules) less relevant as key organizational mechanisms. As perhaps most vividly advocated by Senge (1996), the manager is no longer a 'boss', but rather a teacher primarily concerned with knowledge development and learning (Table 3.5).

Table 3.5: Knowledge-intensive firm and the bureaucratic-ideal type: a comparison

Key aspects	Bureaucratic ideal type	Knowledge-intensive firm
Mode of production	Standardization	Ad hoc problem solving
Dominant control logic	Enforcement of rules	Negotiated order
Environmental contingencies providing relative advantage	Stable, anticipated change	Turbulent, disruptive change
Nature of product and service	Homogenous	Ambiguous
Leveraging capital	Financial	Intellectual
Locus of power	Manager	Professional

Source: Kärreman et al. (2002)

In sum, contemporary writings on management and organization are advocating trends such as organizational learning, knowledge management, flexibility, reduction of hierarchies, networks, empowerment, feminization of management, and so on (Kane and St. Marceau 1996; Miles et al. 1997). This literature on contemporary organizations in general, and knowledge-intensive firms in particular, suggests that bureaucratic modes of operation are substituted for more organic and flexible forms of organizing and coordinating.

3.4.2 The argument for tight structures for organizing and coordinating

As discussed above, knowledge-intensive firms typically deal with tasks that are assumed to invalidate and to break with bureaucratic modes of operation: hierarchy, division of labour, formalization, and standardization. However, recently there has emerged a new line of research suggesting that the adoption and on-going adaptation of novel, flexible and loosely coupled organizational forms such as virtual teams requires tight managerial mechanisms to organize and coordinate (Argyres, 1999; Galunic and Eisenhardt, 2001; Schilling and Steensma, 2001; Kärreman et al., 2002; O'Sullivan, 2003). Referring to the works of Child (1972) Galbraith (1977) and Pugh (1979b) this emerging research suggests that particularly fluid and flexible organizational forms require the mutual adaptation of the workflow through centralized (Ahuja and Carley, 1998), formalized (Maznevski and Chudoba, 2000), and standardized (O'Sullivan, 2003) forms of organizing and coordinating.

The argument for tight managerial mechanisms suggests that loose organizational forms such as dispersed units, virtual teams, or multilateral development organizations pose significant managerial challenges. The extensive reliance on virtual interaction makes it difficult to develop a basic operating structure and set of ground rules to get things up and running (Maznevski and Chudoba, 2000; Malhotra et al., 2001). Moreover, in the course of their work, participants will need to be iteratively achieving consensus and conflict resolution about such issues as the specification of interfaces and elimination of interferences between loosely coupled subsystems (Sabbagh, 1995; Baba and Nobeoka, 1998; Adler et al., 1999). Research further indicates that consensus formation and conflict resolution is especially difficult in time-limited virtual contexts (George et al., 1990). Also, in a work context that encompasses multifarious boundaries (cross-functional, cross-team, cross-organizational, cross-geographical, and cross-cultural) endemic misinterpretations and conflicts resulting from incompatibility between communication norms and practices formed in different organizational contexts are probable (Jarvenpaa et al., 1998; Malhotra et al., 2001). The above authors then suggest that tight managerial structures can eliminate or at least facilitate some of these problems. Formalization informs organizational members how to operate instrumentally inside as

well as outside of teams (Adler et al., 1999). Hierarchy and centralization provides information on organizational status and presumed competence, but also emphasizes the importance of long-term membership in the company (Kärreman et al., 2002). Standardized work methodologies provide a common language and frames of reference (O'Sullivan, 2003).

Another problem of highly flexible organizational forms is the ambiguity inherent in the work process (Alvesson, 2001). Ambiguity is related to the nature of complex work, calling for the exercise of judgment, and the difficulty of assessing what goes on and what are the outcomes during various phases of the work, sometimes even including the final products (Alvesson 1993; 2001). High ambiguity translates into uncertainty, confusion, and contradiction for staff. To counter ambiguity intensity in the work process Kärreman et al. (2002) suggest that bureaucratic features can provide a sense of closure, control, and predictability in organizations and work relations, and thus makes them more manageable. In this sense, bureaucracy operates as an ambiguity-coping strategy: as a way of resolving ambiguity and creating a minimal sense of clarity and certainty.

As mentioned previously, the notion of tight organization structures to organize and coordinate is everything but new. There is a long history of theorists who posit the relevance of structural features to attain high performance in organizations. At the group level of analysis, organizational structure translates into a variety of group structural dimensions.

3.4.3 Dimensions of team structure

The structure of a project team may be considered as the anatomy of a group, providing a foundation within which the group functions (Dalton et al., 1980). Group structure is believed to affect the behaviour of group members. As Galbraith (1977) notes, this belief is based on a simple observation. Buildings have halls, stairways, entries, exits, walls, and roofs. The specific structure of a building is a major determinant of the activities of the people within it. Similarly, behaviour in groups is influenced by the group structures. However there is one major difference between the structure of a building and the

structure of a group, the latter is not a rigid and concrete construct but flexible and amendable and, as such, controllable by management. Child (1974) and Galbraith (1977) further suggest that group structure has three basic functions, each of which affects individual behaviour and group performance. First, structures are designed to minimize or at least regulate the influence of individual variations on the group. Second, structure is the setting in which power is exercised, decisions are made, and the group activities are carried out. Third, structure provides managerial mechanisms for coordinating, organizing, and controlling the behaviours of position incumbents.

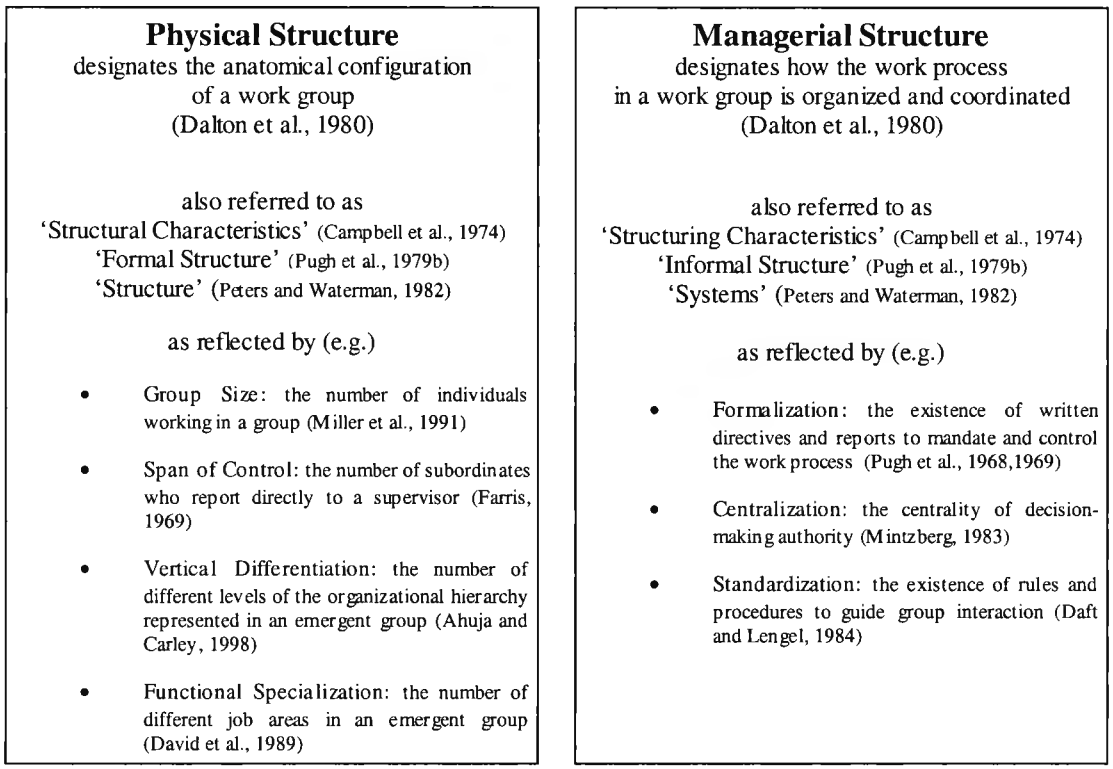
Group structure has been atomized into component parts, referred to as group structural dimensions. Their exact nature, and the question of whether or not they are proper atomization, has been a matter of debate. Dalton et al. (1980) suggests a distinction between the 'physical structure' and the 'managerial structure' of a group. The 'physical structure' of a group refers to its physical characteristics, such as size, span of control, and hierarchical levels. In contrast, 'managerial structure' refers to policies and activities occurring within the group that prescribe or restrict the behaviour of group members.

More specifically, 'physical structure' reflects the anatomical configuration of a group, and is either imposed by the overall organizational structure or determined by the nature of the group task. Conversely, 'managerial structure' reflects the operational aspects of group structure, can be controlled and adapted by management *during* the work process and, therefore, has a more immediate effect on teamwork and team performance (Dalton et al., 1980; Pearce and David, 1983). Dalton et al. (1980) note that it is the managerial structure that reflects the organization and coordination of a group's complex interaction processes.

The categorization of 'physical structure' versus 'managerial structure' is echoed by the work of other scholars who have introduced similar distinctions to analyze organization structure (Figure 3.1). For example, in the famous Aston studies Pugh and colleagues (1979b) distinguished between 'formal' and 'informal' structure. Campbell et al. (1974) suggested a distinction between 'structural' and 'structuring' characteristics. As discussed

previously, in their '7Ss' framework Peters and Waterman (1982) suggested a distinction between 'structure' and 'systems'. The authors defined 'structure' as the characteristics of the organization chart, while 'systems' was defined as the nature of proceduralized co-ordination and control mechanisms.

Figure 3.1: Dimensions of team structure



As mentioned previously, recent research on particularly loose and flexible organizational forms such as virtual teams has demonstrated the relevance of managerial structure dimensions such as formalization, centralization, and standardization. The flexibility of virtual teamwork is often accompanied by managers' need to make structural changes in the work environment to accommodate the interaction patterns of team members with their managers and peers (Pearlson and Saunders, 2001). In virtual teams, chance encounters and informal discussions do rarely occur and do not affect interactions and developing work relationships. Instead, managers, as well as co-workers, must schedule all formal meetings, reviews and communication incidents within the

virtual team (Mazenevski and Chudoba, 2000). Further, managers must keep track of work schedules to make sure that there is adequate work coverage at all times (Pearlson and Saunders, 2001). Research findings addressing this issue of 'dispersed interaction' include the heightened importance for a virtual (as opposed to non-virtual) team of the early development of formalized work norms (Mazenevski and Chudoba, 2000), a centralized operating structure (Malhotra et al., 2001, O'Sullivan, 2003), and the development of standardized communication patterns (Elkins, 2000; Montoya-Weiss et al., 2001).

The above discussion sends conflicting messages to virtual teams operating in the knowledge-intensive context of NSD. While some degree of freedom and flexibility seems to be an essential ingredient to the relative speed and success of knowledge-intensive units such as NSD teams (Nonaka and Takeuchi, 1995; Mohrman et al., 2003; Cooper, 2003; Cummings and Teng, 2003), apparently there is also the need for tight managerial mechanisms to facilitate and control virtual team interaction and processes (Galunic and Eisenhardt, 2001; Schilling and Steensma, 2001; O'Sullivan, 2003). Clearly, managing virtual teams in NSD requires new knowledge how to balance along the delicate line between micromanaging the work to be done and leaving team members enough flexibility to develop entrepreneurial self-organization. While this problem is not confined to a virtual context, managers find it particularly difficult to adapt to a virtual environment where they have to organize and coordinate across the many cross-functional, cross-team, cross-organizational, cross-geographical, cross-temporal, and cross-cultural divides (Pearlson and Saunders, 2001; O'Sullivan, 2003).

3.5 The need for research

The effective management of NSD is recognized as being fundamental to the long-term success of any organization. The NSD process is frequently executed following a project-management approach, and the organizational nucleus is the cross-functional development team (Griffin, 1997; Jassawalla and Sashittal, 2001; Lovelace et al., 2001). Research suggests that cross-functional teams have become an important tool used in the development of new services as they allow for lateral decision processes, which cut

across the traditional vertical lines of functional authority (Ancona and Caldwell, 1992a; Griffin 1997; McDonough III and Griffin, 1997).

The globalization of service development activities combined with radical changes in information technology have led to the emergence of a new type of cross-functional NSD team, the virtual NSD team (Moenaert et al., 2000; McDonough III et al.; 2001). Research on virtual NPD/NSD teams is limited. Past research indicates that the use of virtual teams in NPD/NSD is rapidly increasing and that these teams generally face greater behavioural and project management challenges than traditional co-located teams. Therefore, the knowledge we have about the traditional cross-functional team cannot be readily transferred to the context of virtual and dispersed teams (Kayworth and Leidner, 2002). Moenaert et al. (2000) note that the lack of attention devoted by scientific research to the management of virtual NSD teams contrasts sharply with the importance attached to it as a cornerstone of international business success.

Practitioner-oriented literature suggests that many organizations struggle to achieve effective virtual teamwork. Leaders of virtual teams are challenged to organize and coordinate in a team where the team members are rarely physically present. The key challenge for leaders is to organize and coordinate teamwork to ensure effective inter-team communication, information distribution, and task execution.

Organization theorists have proposed that organization structure serves both as the means of coping with environmental contingencies and a way of maintaining impersonal organizational coordination and control over a broad range of business conditions. Early theorists argue that tight structures provide effective mechanisms to organize and coordinate the workflow in organizational units (Child, 1972; Galbraith, 1977). More recent theorists challenge this argument asserting that the nature of work and the professionalism of the workers in knowledge-intensive units make tight and mechanistic structures archaic and inefficient (Mintzberg, 1998; Hansen, 2001). This latter line of research emphasizes the knowledge-intensive aspect of today's work, which potentially invalidates industrial-bureaucratic forms of structure reflected, for example, by tall

hierarchies, standardized work processes, and centralized decision-making (Greenwood et al., 1990; Hinings et al., 1991; Wallace, 1995). Yet, a new line of research has emerged recently suggesting that the adoption and on-going adaptation of novel, flexible and loosely coupled organizational forms such as virtual teams requires tight managerial mechanisms to organize and coordinate (Argyres, 1999; Galunic and Eisenhardt, 2001; Schilling and Steensma, 2001; Kärreman et al., 2002; O'Sullivan, 2003). Referring to the works of Child (1972) Galbraith (1977) and Pugh (1979b) this emerging research suggests that particularly fluid and flexible organizational forms require the mutual adaptation of the workflow through centralized (Ahuja and Carley, 1998), formalized (Maznevski and Chudoba, 2000), and standardized (O'Sullivan, 2003) forms of organizing and coordinating.

The implications for NSD teams operating within a virtual context are conflicting. While some degree of freedom and flexibility seems to be an essential ingredient to the relative speed and success of knowledge-intensive units, apparently there is also the need for tight managerial mechanisms to facilitate and control virtual team interaction and processes. Since practitioners (Kirkman et al., 2002) and researchers (O'Sullivan, 2003) alike voice the need for more conclusive research on the subject, this study investigates the organization and coordination of virtual teamwork for high performance in the dynamic context of NSD in corporate banking.

3.6 Conclusion

The present chapter reviewed the literature on new product/service development and discussed the internal organizational factors that affect development success. The chapter then examined the literature on cross-functional teams and virtual teams, stressing the need for further research on the organization and coordination of virtual teamwork in NSD. Subsequently, the literature on managerial mechanisms to organize and coordinate teamwork in project teams was reviewed. Lastly, the focus of this study was stated – the organization and coordination of virtual teamwork for high performance in NSD. The next chapter will formulate the research question, develop the propositions, and present the conceptual framework.

CHAPTER 4
PROPOSITIONS AND CONCEPTUAL MODEL

4.1 Introduction

The present chapter provides the conceptual model for the study. First, the need for research is summarized and the research question is formulated. Second, the chapter draws on the contingency perspective in organization theory and develops a set of research propositions. Third, the propositions are illustrated through a tentative, conceptual model. Last, the model is explained and the variables are defined.

4.2 Research question

Virtual teams in NSD operate typically within a highly complex and dynamic environment. The situation facing a virtual team frequently is complex in terms of both the tasks that it must perform and the environment with which it must cope. Managers of virtual teams are particularly challenged, as they have to cope with contextual complexity as well as manage a group of geographically dispersed individuals who rarely meet in person. In particular, managers of virtual teams are challenged to organize and coordinate teamwork to ensure effective inter-team communication, information distribution, and task execution.

Organization theorists have proposed that organization structure serves both as the means of coping with environmental contingencies and a way of maintaining organizational coordination and control over a broad range of business conditions (Montanarai and Freedman, 1981). The term 'organization structure' embodies a variety of concepts. Structure has been atomized into component parts, referred to as structural dimensions. As discussed in Chapter 3, Dalton et al. (1980) suggest that 'managerial structure' reflects the organization and coordination of a group's complex work processes. Managerial structure refers to policies and activities occurring within the group that prescribe or restrict the behaviour of group members and is reflected, for example, by formalization, centralization, and standardization.

Early theorists argue that effective mechanisms for organizing and coordinating the workflow are reflected by tight managerial structures such as standardized work processes and centralized decision-making (Child, 1972; Galbraith, 1977). More recent theorists challenge this argument asserting that the nature of work and the professionalism of the workers in knowledge-intensive units make tight and mechanistic structures archaic and inefficient (Mintzberg, 1998; Hansen, 2001). This latter line of research emphasizes the knowledge-intensive aspect of today's work, which potentially invalidates industrial-bureaucratic forms of structure (Greenwood et al., 1990; Hinings et al., 1991; Wallace, 1995). Yet, recently there has emerged a new line of research suggesting that the adoption and on-going adaptation of novel, flexible and loosely coupled organizational forms such as virtual teams requires tight managerial mechanisms to organize and coordinate (Argyres, 1999; Galunic and Eisenhardt, 2001; Schilling and Steensma, 2001; Kärreman et al., 2002; O'Sullivan, 2003). This emerging research suggests that highly fluid and flexible organizational forms require the mutual adaptation of the workflow through centralized (Ahuja and Carley, 1998), formalized (Maznevski and Chudoba, 2000), and standardized (O'Sullivan, 2003) forms of organizing and coordinating.

The implications for NSD teams operating within a virtual context are conflicting. On one hand, studies on novel and loosely coupled organizational forms suggest that the early formalization of workflows and standardization of interaction patterns are likely to be significant to facilitate teamwork within the highly dynamic and complex virtual context (Maznevski and Chudoba, 2000; O'Sullivan, 2003). On the other hand, research on co-located, knowledge-intensive units such as NSD teams highlights the role of loose managerial structures and the importance of freedom and flexibility as an essential ingredient to high performance (Mohrman et al., 2003; Cooper, 2003; Cummings and Teng, 2003; Van der Bij et al., 2003). Since research is limited one cannot yet say how the challenge of organizing and coordinating a virtual NSD effort can be surmounted. That is to say, while there is now a considerable body of research on virtual teams, there have been very few studies concentrating on the organization and coordination of virtual teamwork for high team performance. To address this issue this study investigates the

organization and coordination of virtual teamwork in the dynamic context of NSD in corporate banking.

The research question is posited as follows:

"What is the association between the way teamwork is organized and coordinated and the performance of a virtual NSD team?"

4.3 Managerial structure and contingency theory

4.3.1 Contingency theory perspective

As discussed in section 3.4, the type of organization and coordination suited for achieving best performance in work units has long been the subject of conjecture. The debate centres on the tensions between the necessity to impose tight managerial mechanisms for efficiency and the advantages of keeping the work process open and flexible to promote entrepreneurial initiatives. One school of organization theorists suggests that interaction and task execution in work units is facilitated and influenced by structural reflections such as formalization, standardization, and centralization (Pugh et al., 1968, 1969; Comstock and Scott, 1977; Leifer and Huber, 1977; Montanari, 1979; Tushman and Nadler, 1978; Draft and Lengel, 1984; 1986). Another, more recent school of research argues for loosening up, freeing up and 'letting go' of a firm's entrepreneurial initiatives (Starbuck, 1992, 1993; Alvesson, 1995; Deetz, 1995; Senge 1996; Morris and Empson, 1998; Mintzberg, 1998; Robertson et al., 1999). A further currently emerging line of research indicates that highly fluid and flexible organizational forms such as virtual teams require tight mechanisms to organize and coordinate across the many cross-functional, cross-team, cross-organizational, cross-geographical, cross-temporal, and cross-cultural boundaries (Argyres, 1999; Galunic and Eisenhardt, 2001; Schilling and Steensma, 2001; Kärreman et al., 2002; O'Sullivan, 2003).

Overlapping with the above schools of organization research, a substantial number of scholars have advocated a contingency approach towards managerial mechanisms to organize and coordinate. Central to the contingency theory perspective is the notion that

there is no one best way to structure (Galbraith, 1977) and that properly aligning organizational structure with key elements in the organization's context is necessary for high performance (Daft and Macintosh, 1981; Fry 1982; Fry and Slocum, 1984; Drazin and Ven de Ven, 1985; David et al., 1989). At the organizational level of analysis, however, the number of potentially relevant variables has clouded rather than clarified the power of this perspective. For example, in detailing his quantum view of structural change in organizations Miller (1987) provides a partial list of relevant variables drawn from prior research technology: bureaucratisation; formalization; specialization; concentration of authority; workflow integration; vertical and horizontal span of control; organizational differentiation and integration; sophistication of communication and coordinating devices, and mechanistic versus organic qualities of the organization. Overlaying this array of variables are models of organizational change such as population ecology, adaptation, and transformation models (Tushman and Romanelli, 1985).

Within this array, one stream of contingency-focused research that has been consistently pursued examines the effects of the fit between the firm's technology and its organization structure on performance. Beginning with Woodward (1965), a number of authors have posited that the fit between the technological sophistication of the firm and its organizational structure is a key predictor of performance (Thompson, 1967; Perrow, 1970; McDonough III and Leifer, 1983, 1986; Alexander and Randolph, 1985; Ito and Peterson, 1986; Kozlowski and Hults, 1986; David et al., 1989; Ahuja and Carley, 1998).

Studies by Dewar and Werbel (1979), Schoonhoven (1981), Argote (1982), Fry and Slocum (1984), Alexander and Randolph (1985), and David et al., (1989) have all supported the thesis that fit between technology and structure is a better predictor of performance than either technology or structure alone, or together but as separate predictors. However, other studies have produced contradictory evidence (Randolph et al., 1981; Fry, 1982; Barley, 1986) suggesting no association between task-technology fit and organizational performance. Since research conducted at the organizational level of analysis deemed inconclusive, scholars have moved the level of analysis from the organizational level to the group level.

Several studies have examined the fit between technology and structure as a predictor of performance at the group level (McDonough III and Leifer, 1983, 1986; Alexander and Randolph, 1985; Ito and Peterson, 1986; Kozlowski and Hults, 1986; David et al., 1989). All of these studies demonstrated that project measures of technology and structure are more effective in assessing structural design and performance issues than organizational-level measures. The problem with linking technology and structure at the organizational level to predict performance is that multiple technologies and diverse organization structures often cannot be matched in a meaningful way (Dewar and Werbel, 1979; Argote, 1982; David et al., 1989). For example, Fry's (1982) analysis of 108 studies of technology and structure found a stronger relationship between technology and structure at the group level than at the organizational level.

In the following sections it is argued that a contingency theory perspective provides a viable solution to the ongoing dispute whether to apply loose or tight managerial mechanisms to organize and coordinate in work groups. The basic notion of contingency theory suggests that the same work group requires different degrees of managerial looseness or tightness under varying organizational conditions and that there is no one best way to organize and coordinate. It is proposed that a contingency approach is also applicable to the context of virtual teams. Since the contingency theory perspective is closely linked to the notion of technology-structure fit, the next section first provides the definition of technology in work groups, continues with a discussion on the concept of technology/structure fit and concludes with the development of propositions.

4.3.2 Definition of technology

In order to provide a conceptualization of technology it is helpful to refer to the work of Pugh et al. (1963), Perrow (1967) and Hickson et al. (1969), who distinguish between three facets of technology, namely *operations technology*, *materials technology*, and *knowledge technology*. The concept of *operations technology* was first introduced by Pugh et al. (1963) and defines technology as "the techniques used in workflow activities". *Materials technology*, an element in Perrow's (1967) theoretical theme, broadens the notion of technology as "the actions that an individual performs upon an

object in order to make some changes to that object". Lastly, *knowledge technology* (Hickson et al., 1969) is defined as "the characteristics of the knowledge used in the workflow". Taking the above definitions together, technology describes the relationship between a specific task and an individual's knowledge to execute the task and the impact of this relationship on the workflow.

As such, technology is a rather elusive construct that often includes terms like *complexity* (Woodward, 1965), *variability* (Hickson et al., 1969), *interdependence* (Hrebiniak, 1974), *routine - non-routine* (Perrow, 1967; 1970), and *manageability of raw materials* (Mohr, 1971). Studies of technology have been conducted at the individual, group, and organizational levels of analysis. Characteristics of technology at one level often are not reflected in a firm's technology at the next level (Fry and Slocum, 1984; Ito and Peterson, 1986; Miller et al., 1991; Lin and Carley, 1997).

A promising approach for assessing technology at the group level of analysis is a combination of typologies from Perrow (1967) and Thompson (1967). Specifically, Hrebibiniak (1974), Randolph (1981), Fry and Slocum (1984), and David et al. (1989) suggest that group technology can be conceptualized as having three dimensions related to the nature of the work task:

1. *Task predictability*: the degree to which stimuli required in performing a job are perceived as familiar or unfamiliar (few vs. many exceptions) by group members. Work groups that perform tasks with few exceptions experience more certainty, which allows individuals to predict problems and activities in advance.

2. *Problem analyzability*: the nature of the search that is undertaken by individuals when exceptions occur in performing their job. Problem analyzability becomes less difficult when objective or computational procedures are available to facilitate the generation and evaluation of alternative solutions.

3. *Interdependence*: the degree to which individuals are dependent on and support others in task accomplishment. The greater the interdependence, the greater the need to gather, analyze, and distribute information among group members.

Several studies have collapsed these three technology components into a routine – nonroutine continuum (Fry, 1982; Daft and Lengel, 1984,1986; Miller et al., 1991, Ahuja and Carley, 1998), others into a continuum of high/low complexity (Mintzberg, 1983; Woods, 1988; Mathiassen and Stage, 1992; Mathiassen and Sørensen 2002). According to Daft and Macintosh (1981), nonroutine (highly complex) tasks are more difficult to analyze in terms of alternative course of action, costs, benefits, and outcomes. Routine (less complex) tasks are more predictable and typically require less interdependence to be performed well.

4.3.3 Technology in NPD/NSD

In NPD/NSD, technology is defined as "the work process of developing new products and services" (Burgelman et al., 2001). Typically developers split the NPD process into different stages. The number of project stages deployed in NPD varies widely from three to far more than twenty stages. Also, the terminology used to classify each development stage differs significantly from industry to industry and from development to development. For the sake of simplicity and to ensure cross-case cohesiveness, researchers examining development projects often divide the NPD process into three generic development *phases*, namely (a) initiation, (b) development, and (c) implementation (Song et al., 1998; Alam, 2002). These three project phases are generic in the sense that they apply to almost every NSD/NPD project notwithstanding the type of service or product developed or the context of the development (Lovelock, 1982). Each of the three project phases may vary in terms of task predictability, problem analyzability, and interdependence (Song et al., 1998). That is, the situation facing a NPD team frequently differs in complexity in terms of both the tasks that it must perform and the environment with which it must cope.

For example, the initiation phase in NPD, including activities such as idea generation and idea screening, are assumed to be particularly complex, because these require the execution of non-routine, unfamiliar tasks and demand high innovativeness of all team members involved (Iwamura and Jog, 1991; Verganti, 1999). Indeed, previous research suggests that the initiation phase involves mainly non-routine tasks, which are of high complexity and require creativity (McDonough III, 1993). The latter two phases of the innovation cycle involve activities that are more routine in nature such as business analysis or market testing. For example, through the initiation phase, proposals to innovate are audited within a formalized and standardized auditing process (Cowling and Newman, 1995). In the implementation phase of the innovation process, including the market test stage and the launch stage, the end-proposal is evaluated and the service-launch is finalized and executed. Crawford (1983) suggests that the latter phase of the innovation process involves primarily routine tasks, which are lower in complexity and require lower levels of creativity and innovativeness.

Further, in the initiation phase of the NPD project, the so-called 'fuzzy front-end', project-stage uncertainty is high as there are not yet clearly identified project objectives or project outlines (Verganti, 1999). Also, the individual roles and responsibilities of the project members are not yet clearly established. McDonough III (1993) notes that the vague understanding of the NPD project during the early project stages is likely to result in greater uncertainty about how to solve technical problems, and uncertainty concerning what problems are crucial to solve. Smith and Blanck (2002) note that the beginning of a project is undoubtedly a make-or-break situation for the NPD team. Upfront project ambiguity has to be addressed through defining the project (items such as its scope, schedule, budget, resources); defining the product (what will it look like; what will it do; what it will cost), and establishing the team's style for getting its work done (for instance, when does the team meet; how does the team address decision-making; what team member is in charge of which area). However, as the project moves on through the NPD cycle project uncertainty gets reduced as project, tasks, and teamwork get more clearly defined. McDonough III (1993) notes that in midstream project stages, where technology knowledge is greater, uncertainty is less not only about how to solve technical problems,

but also about which problems warrant attention. When moving into the final phase of the project, such as the launch and implementation phase, project uncertainty is at its lowest as the ultimate project goal should be clearly defined by now (Song et al., 1998). Also, the launch and implementation phase tends to be the most meticulously planned and precisely timed of all NPD project stages (Cooper, 1990c). Project members not only know the precise launch procedure but also realize whether or not some of the project objectives (e.g., on time, on budget) will be met.

In sum, NPD teams are typically expected to work through a number of different project phases that may vary in terms of task predictability, problem analyzability, and team interdependence. At the same time, they must cope with an internal environment, for example other work units, as well as with external environmental factors such as the customer. It seem unlikely that there is one ideal way to structure a work unit in order to effectively handle this complex array of tasks many of which must be dealt with simultaneously. The literature on technology-structure indicates that the same work group requires different degrees of managerial looseness or tightness under varying organizational conditions. It is generally predicted that loose managerial structures combined with more complex technologies will yield high performance, whereas tight managerial structures with less complex technologies will yield high performance (Perrow, 1970; Galbraith, 1977; Miller et al., 1991).

4.4 Proposition development

4.4.1 Propositions: managerial structure and teamwork effectiveness

As discussed in section 3.4, managerial structure reflects the mechanisms in place to organize and coordinate the work process. Structural dimensions typically associated with managerial structure are formalization, centralization, and standardization (Pugh et al., 1968, 1969; Comstock and Scott, 1977; Leifer and Huber, 1977; Montanari, 1979; Tushman and Nadler, 1978; Daft and Lengel, 1984; 1986, David et al., 1989).

Formalization refers to the existence of written directives and reports to mandate and control the work process (Pugh et al., 1968,1969; Dalton et al., 1980). *Centralization*

refers to the centrality of decision-making authority (Freeman, 1979; Mintzberg, 1983; Burkhardt and Brass, 1990; Donnellon, 1993). *Standardization* refers to the planning and sequencing of communication patterns through intensive scheduling (Cohen and Levinthal, 1990; Keller, 1994; Lipnack and Stamps, 1999, 2000; O'Sullivan, 2003). These dimensions reflect the managerial aspects of a functional subunit's structure rather than describe the anatomical configurations of the unit (e.g., group size, span of control, vertical differentiation, specialization).

Much of the early research on the structure of work units within organizations assumes that each work unit displays a single, relatively unchanging managerial structure (Comstock and Scott, 1977; Leifer and Huber, 1977; Van de Ven, 1976). For example, researchers assumed that the structure of a particular work unit was reflected by an invariably high/low degree of formalization, centralization, or standardization. Later research repeatedly demonstrated that each work unit, in fact, displayed changing degrees of structural looseness or tightness to deal with the variety of contingencies they face (McDonough III and Leifer, 1983; David et al., 1989; Ahuja and Carley; 1998). McDonough and Leifer (1983) even suggested that effective work units display simultaneously high and low degrees of formalization and centralization as there does not exist sufficient task and environmental homogeneity to rely on a fixed degree of managerial looseness or tightness.

With regard to *formalization*, several authors have found that effective work units display a managerial structure reflected by low formalization for tasks of high complexity. Conversely, these units displayed a structure reflected by high formalization for tasks of low complexity. This relationship has been observed in cross-functional teams (Forte and Hoffman, 2000); organizations (David et al., 1989); simulated organizations (Carley, 1992), and small groups (Tushman, 1979). The explanation given in the literature is that a high degree of formalization through written rules and procedures is a useful integrating mechanism when work teams are executing routine tasks of low complexity and low uncertainty. David et al. (1989) suggest that in stable, routine situations the team members know what to expect because they have encountered the situation before.

Consequently, it is possible for them to rely on established rules and procedures. Also, the low complexity of the task implies that rules and procedures are sufficiently outlined and adequately formulated to allow efficient task execution. High complexity, however, cannot be captured adequately in writing or language and rules and procedures are of little use. Therefore, when project tasks are complex and uncertain, the effectiveness of rules and procedures as a coordinating device among team members decreases. Pinto et al. (1993) suggest that while high formalization is relevant for a team, team members also need to have some degree of autonomy to establish their own approach of executing complex tasks.

With regard to *centralization*, Duncan (1973) found that a particular work unit displayed a tight, mechanistic managerial structure reflected by high centralization for making routine decisions. The same work unit shifted to a loose, organic managerial structure reflected by low centralization for making complex, non-routine decisions. Likewise, Johnston (1976) found that the design of a consulting team fluctuated dramatically from a mechanistic centralized design to one that was more organic-adaptive, in response to changing individual and organizational contingencies. The temporary fluctuations resulted in better fit between the decision-making structure of the team and the task and environmental demands. The literature suggests that if decision-making for a complex task is centralized among relatively few people, the group should be less productive since a large amount of the group's know-how and creativity will remain untapped. Such creativity and know-how is not required for less complex tasks, and having someone in charge of the task, while others follow instructions, is more efficient. Therefore, if the unit structure of a project team performing a less complex task is centralized, the team can be expected to perform better (Carley, 1992).

More than formalization and centralization, *standardization* has attracted considerable attention in research on novel and loosely-coupled organizational forms (Argyres, 1999; Galunic and Eisenhardt, 2001; Schilling and Steensma, 2001; O'Sullivan, 2003). The literature on virtual teams uses the term 'standardization' to describe the extent to which communication incidents are planned and sequenced through intensive scheduling

(Cohen and Levinthal, 1990; Keller, 1994; Lipnack and Stamps, 1999, 2000). The term 'communication incident' denotes a group meeting, either face-to-face or technology-mediated, in which a substantial number of group members participate. In virtual teams, chance encounters and informal face-to-face discussions rarely occur and do not affect interactions and developing work relationships. Instead, managers, as well as co-workers, must schedule all formal communication incidents within the virtual team (Mazenevski and Chudoba, 2000; Pearlson and Saunders, 2001). This can be done through, for example, agreeing which specific communication modes to use and when as well as which coordination protocols to follow (Malhotra et al., 2001).

The extant literature indicates that effective virtual teams rely on strongly standardized communication incidents when the work process is highly complex. Standardized communication incidents facilitate equivocality and uncertainty reduction of tasks by enabling team members to overcome different frames of reference and by providing a framework for interaction patterns (Keller, 1994; Ocker et al, 1998; Bolisani and Scarso, 1999; Maznevski and Chudoba, 2000). The absence of standardized cues that regulate the flow of conversation and provide feedback can lead to many topics being active at the same time, and team members making contributions at different times on different topics. This lack of synchronicity can lead to discontinuous and disjointed discussions and serious coordination problems (Ocker et al., 1995, 1998; Montoya-Weiss et al., 2001). The potential lack of standardized communication incidents in complex work phases can create difficulties in reaching agreement on integrated programmes of action and subsequent implementation of decisions (Gersick and David-Sacks, 1990). Therefore, research findings addressing virtual teamwork include the heightened importance of developing standardized communication patterns in phases of particularly high task complexity (Majchrzak et al., 2000; Montoya-Weiss et al., 2001).

On the other hand, when complexity is less, the need for standardization decreases and team members are more able to rely on spontaneous, ICT-mediated communication incidents, such as e-mails exchanges or ad hoc telephone calls (Hollingshead et al., 1993). Indeed, spontaneous ICT-mediated communication can be useful in routine

situations to address ad hoc problems, allowing broad and rapid access to many of the project participants (Hightower and Sayeed, 1996; Straus, 1996). However, spontaneous communication incidents are less structured, less comprehensive, and often detail, confidential issues, and idiosyncrasies of messages hinder their effectiveness (Smith and Vanecek, 1990; Ocker et al., 1998). As such, spontaneous communication incidents potentially lack the diligence required for complex, non-routine situations (Ocker et al., 1995; Hightower and Sayeed, 1996). In complex situations, standardized communication incidents help to limit endemic misinterpretations and conflicts resulting from the incompatibility between communication norms and practices formed in different organizational and/or functional contexts (Jarvenpaa et al., 1998; Malhotra et al., 2001).

The above discussion indicates two important implications for this study. First, organization theorists typically suggest formalization, centralization and standardization as key dimensions of managerial structure. The formalization of the work process, centralization of decision-making, and standardization of communication incidents reflects the setting in which power is exercised, decisions are made, and the group activities are carried out. The second implication relevant for this study is that research on unit structure must be sensitive to varying levels of structural looseness and tightness as well as the contextual characteristics of tasks and of the work unit itself. As such, the simplistic notion of a homogeneous managerial structure inhibits understanding of the complex and dynamic process of organizing and coordinating teamwork (Ahuja and Carley, 1998). Much previous research examined managerial structure and has found that, as work units face varying demands for their tasks and environments, more effective units display varying levels of formalization, centralization and standardization (Tushman, 1979; McDonough III and Leifer, 1983; David et al., 1989; Carley, 1992; Lin and Carley, 1997; Ahuja and Carley, 1998; Forte and Hoffman, 2000). The level of formalization, centralization and standardization relates to the degree of task complexity. Research suggests that if the unit structure of a team performing a less complex task reflects high formalization, high centralization but low standardization the task should be performed effectively. Conversely, if a team low in formalization, low in centralization, but high in standardization performs a more complex task, it can be performed effectively

(Ito and Petersons, 1986; Lin and Carley, 1997). However, it remains to be examined how formalization, centralization and standardization translates to the organization and coordination of teamwork in the highly complex virtual context. To examine this question the following set of propositions is formulated:

Managerial structure and teamwork effectiveness: higher task complexity

P1: Lower formalization of the work process is positively associated with teamwork effectiveness.

P2: Lower centralization of decision-making is positively associated with teamwork effectiveness.

P3: Higher standardization of communication incidents is positively associated with teamwork effectiveness.

Managerial structure and teamwork effectiveness: lower task complexity

P4: Higher formalization of the work process is positively associated with teamwork effectiveness.

P5: Higher centralization of decision-making is positively associated with teamwork effectiveness.

P6: Lower standardization of communication incidents is positively associated with teamwork effectiveness.

4.4.2 Propositions: team performance and teamwork effectiveness

The above propositions have suggested a causal link between managerial structure, task complexity and teamwork effectiveness in a virtual team. The following section proposes a causal link between teamwork effectiveness and overall team performance.

Many concepts exist which encapsulate the meaning of teamwork. Among the various terms used to describe the notion of individuals working together in a team to accomplish a specific task are: (1) teamwork (McDonough III, 2000); (2) coordination (Van de Ven, 1976; Argote, 1982), (3) collaboration (Trist, 1977), (4) cooperation (Schermerhorn, 1975) and (5) integration (Gupta et al., 1986). The variability in terminology raises a critical question regarding what, if anything, the underlying concepts have in common. While each of the terms have separate and distinct names, they refer to a similar and overlapping idea as evidenced by the commonalities in their definitions. The lowest common denominator, which integrates the five concepts, is "joint behaviour towards some goal of common interest" (Pinto et al., 1993). In this study virtual teamwork is defined as *the joint interaction of team members to execute the work process*. Teamwork effectiveness comprises the following three dimensions: (a) quality of inter-team communication, (b) quality of information distribution, and (c) quality of task execution (Deutsch, 1949, Tjosvold 1984; Ahuja and Carley, 1998). As such, teamwork is distinct from team performance as teamwork refers to team interaction *during* the project, whereas team performance refers to the ultimate project outcome.

As discussed in Chapter 3, the literature on team performance in NPD/NSD is vast encompassing hundreds of articles. Researchers looked at levels and dimensions of measuring performance as well as at internal and external factors that impact on company performance. One repeating pattern in the literature, however, is NPD/NSD performance measures related to task outcomes such as on time, on budget, and profitability. These criteria are usually employed because they are meaningful, tangible, and often easy to quantify (Griffin and Page, 1993; Hart, 1993; Page, 1993; Montoya-Weiss and Calantone, 1994). Until recently, little attention had been given to broadening the scope of performance measures to include the intangible dimensions of performance, those

issues that have been labelled *psychosocial* outcomes. Hackman's (1990) collection of case-studies of work group processes and outcomes offers a more complete examination of performance measures of work groups, including: (i) outputs – similar to the above task measures, (ii) interpersonal relationships – the degree to which the process of doing the work enhances the capability of team members to work together in the future and (iii) growth and well-being – the perception by team members that the activity has been a rewarding personal experience.

While Hackman's (1990) work has done much to improve our understanding of the importance of psychosocial outcomes for work teams, for a long time the construct has not been adequately operationalized in field research settings in order to determine its impact on NPD/NSD team performance. One effort in this regard has been the work of Reukert and Walker (1987), which documented the importance of psychosocial outcomes on inter-functional NPD interaction. Relying on the work of Van de Ven (1976), they suggested that psychosocial outcomes refer to the degree of conflict and perceived effectiveness of the relationship between marketing personnel and people in other functional departments. More recently Pino et al. (1993) assessed the relationship between teamwork and team performance in NPD considering both task outcomes and psychosocial outcomes. The authors concluded that efficient cross-functional teamwork was a significant predictor of both perceived task and psychological performance.

Following the work of Pino et al. (1993) this study examines virtual NSD team performance along two performance dimensions, namely the tangible dimension and the intangible dimension. The tangible dimension refers to the task-related outcomes of the project such as on time and on budget. The intangible dimension relates to the psychosocial outcomes such as whether or not the project was considered worthwhile, satisfying, and productive by the team members. Propositions 7 and 8 posit the effects of teamwork effectiveness on both dimensions of team performance, the tangible and the intangible dimension.

Teamwork effectiveness and team performance

P7: Teamwork effectiveness is positively associated with the tangible dimension of team performance.

P8: Teamwork effectiveness is positively associated with the intangible dimension of team performance.

4.5 The conceptual framework

4.5.1 The tentative conceptual model

According to the propositions formulated a tentative conceptual model is developed in which the managerial structure of a virtual team (primary independent variable) is associated with NSD team performance (dependent variable). This model (Figure 4.1) illustrates the following underlying propositions. First, the managerial structure is reflected by (a) formalization of the work process, (b) centralization of decision-making, and (c) standardization of communication incidents. Adopting a contingency theory perspective it is proposed that different levels of managerial looseness or tightness are required under varying levels of task complexity to yield high teamwork effectiveness. That is, the NSD work process has a moderating effect on managerial structure. It is predicted that loose managerial structures combined with high task complexity yields high teamwork effectiveness. Conversely, it is suggested that tight managerial structures combined with low task complexity ensures high teamwork effectiveness. Second, it is suggested that the relationship between managerial structure and team performance is mediated by teamwork effectiveness. That is, managerial structure is not expected to impact directly on team performance. Instead, the model suggests that managerial structure impacts on teamwork effectiveness and, subsequently, teamwork effectiveness impacts on overall team performance. Third, managerial structure is not the only variable expected to impact on the mediating variable (teamwork effectiveness) and the dependent variable (team performance). Previous research suggests that teamwork and team performance in NPD/NSD are influenced by an amalgam of factors, internal to the

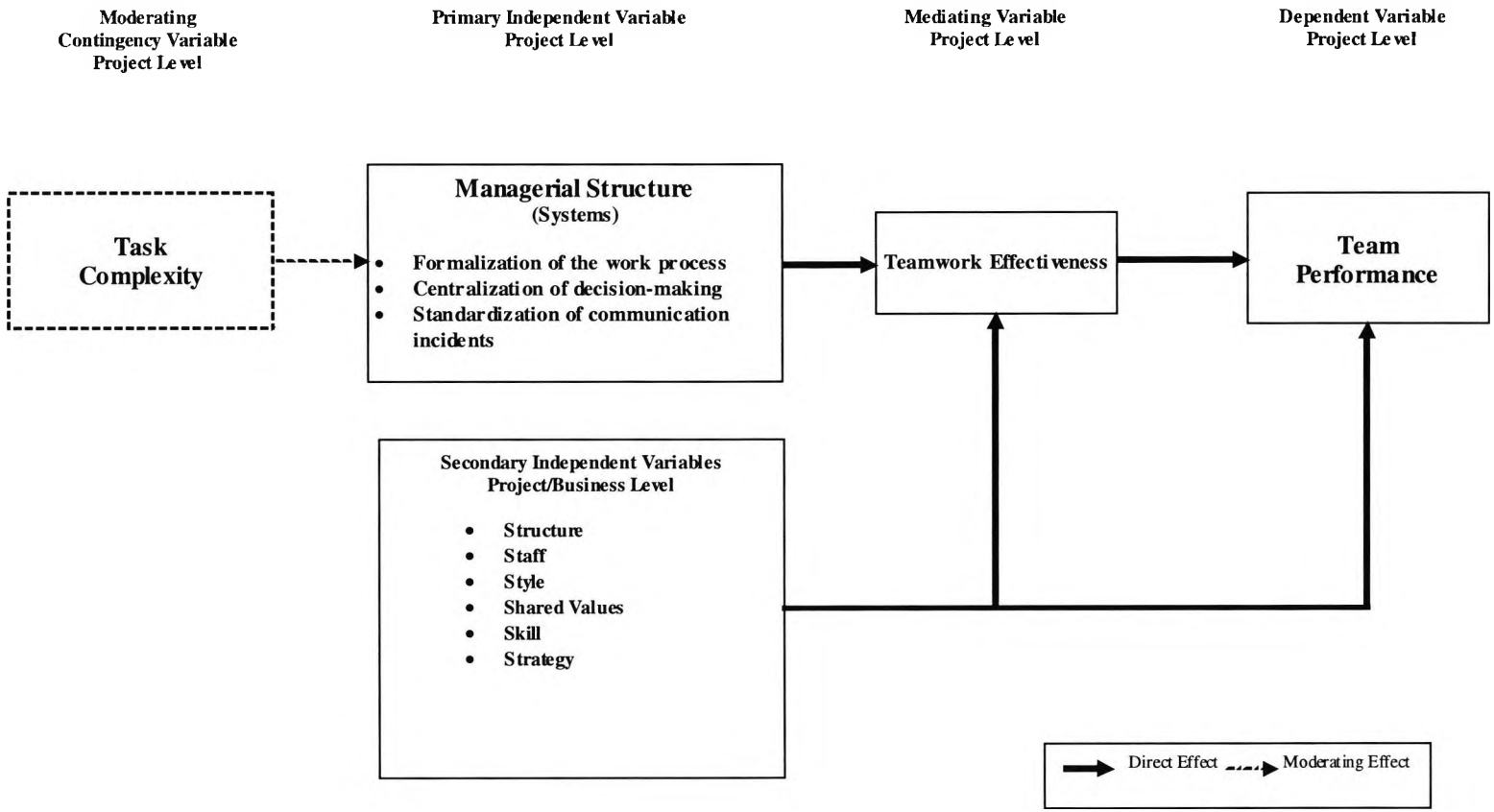
company and under the control of management. In this study, these factors are ordered using the McKinsey '7Ss' schema popularized by Peters & Waterman (1982).

The McKinsey '7Ss' schema has been used in previous NPD/NSD studies by Johne & Snelson (1988), Barclay and Benson (1990), Dwyer & Mellor (1991), Johne & Pavlidis (1996), and Johne and Davies (1999). As discussed under 3.2.4, the schema is built around seven main aspects under the control of management, each of which begins with the letter S: *Systems* is synonymous with the primary independent variable 'managerial structure' and refers to the managerial mechanisms in place to organize and coordinate the development process. *Structure* characterizes the anatomical configurations of the business and work group in which NPD/NSD is executed. *Strategy* embraces the new product development game plan. *Style* refers to the type of leadership practiced by top management and by the team manager. *Shared values* refer to the relationship between organizational objectives and personal objectives. *Skill* refers to the level of expertise present in NPD/NSD. *Staff* refers to the range of functional specialists available. The schema was originally devised for analysis at the organizational level. However, many researchers have applied the postulated factors at both the business and project level of analysis (Johne and Snelson, 1988b; Barclay and Benson, 1990).

In sum, the conceptual framework suggests that the organization and coordination of virtual teamwork requires different levels of managerial looseness or tightness under varying levels of task complexity to yield high teamwork effectiveness. It is further proposed that high teamwork effectiveness will positively impact on team performance.

The tentative model (Figure 4.1) comprises five different variables, namely: (i) the moderating contingency variable, task complexity; (ii) the primary independent variable, managerial structure; (iii) the mediating variable, teamwork effectiveness, (iv) the dependent variable, team performance; and (v) the secondary independent variables, the aforementioned McKinsey framework including structure, staff, style, shared values, skill, and strategy.

Figure 4.1: The conceptual model of the organization and coordination of teamwork in a virtual NSD team



4.5.2 Variables

This section provides the definitions of the aforementioned variables. However, before proceeding with the discussion, it is helpful to take a brief look ahead at the research method. As explained in Chapter 5, this study is based on qualitative field research. The conventional image of field research is one that keeps pre-structured designs to a minimum. Yet, the leading scholars in qualitative research emphasize the need for prior instrumentation, as conceptual frameworks, research questions, and propositions have a focusing and bounding role within a study. As evident in this chapter a considerable amount of prior instrumentation is undertaken and all variables are defined with some detail. In particular, to warrant cross-case cohesiveness this study uses absolute measures to examine team performance, teamwork effectiveness, and task complexity. That is, precise criteria are prescribed through which the dependent, moderating and mediating variables are assessed (Miles and Huberman, 1994). However, to preserve the exploratory and inductive nature of this research, the independent variables (formalization, centralization, standardization) are explored through relative measures, which are more loosely defined (Miles and Huberman, 1994). Data for all variables are then collected through in-depth interviews as well as documentation. For data analysis no scales are used to measure variables in degrees. Instead, the variables are explored through emerging data patterns in the higher and lower performing project teams, and, subsequently, these patterns are compared within and across cases in relation to the propositions (Miles and Huberman, 1994).

4.5.2.1 Dependent variable: NSD team performance

Following the work of Pino et al. (1993) this study examines virtual NSD team performance along two performance dimensions, namely the tangible dimension and the intangible dimension. The tangible dimension refers to the task-related outcomes of the project such as on time, on budget. The intangible dimension relates to the psychosocial outcomes such as whether or not the project was considered worthwhile, satisfying, and productive by the team members. As such, team performance is examined by asking respondents how well teams met specific objectives. Teams are considered higher performing if they attained at least three out of the following four objectives: (a)

completed the project on time; (b) completed the project on budget; (c) attained individual satisfaction with project; (d) attained collective satisfaction with project. Teams are considered lower performing if they attained two or less of the above objectives.

It should be noted that any performance measures related to profit were intentionally excluded. Albeit popular in the literature, the preliminary fieldwork revealed the minor importance of profit goals in corporate banking NSD projects. The question whether or not single NSD projects generate revenue is secondary for banks who are rather interested in cultivating a profitable long-term relationship with their corporate clients. It is the overall volume and value of business with a client that constitutes financial performance, not necessarily the profitability of a single project. In NSD, banks tend to be primarily concerned with the smooth delivery of the new service on time and on budget.

4.5.2.2 Primary independent variable: managerial team structure

This study examines three structural dimensions associated with managerial organization and coordination in work groups:

(a) Formalization refers to the existence of written directives and reports to mandate and control the work process (Pugh et al., 1968,1969; Dalton et al., 1980). In this study, written directives indicate whether activities and tasks in the work process are mandated. Written reports indicate whether activities and tasks in the work process are controlled. If, for instance, the work process is governed by the frequent issuance of detailed written reports and written directives, the structure is considered highly formalized. Moderate formalization would exist in a work group where the work process is governed by frequent verbal directives and frequent verbal reports. Low formalization would exist in a work group without established lines of reporting or directing so that group members work in autonomy.

(b) Centralization refers to the centrality of decision-making authority (Freeman, 1979; Mintzberg, 1983; Burkhardt and Brass, 1990; Donnellon, 1993). If, for instance, the power to make decisions is continuously exercised by relatively few persons, the group structure is considered moderately centralized. A group structure where one person is making every decision would be considered highly centralized (Kimberly, 1976; Miller et al., 1991). Low centralization (decentralization) would exist in a work group where decision-making is consensus-driven so that decision-making is exercised equally by every group member (Kozlowski and Hults, 1986).

(c) Standardization refers to the extent to which communication incidents are planned and sequenced through intensive scheduling (Cohen and Levinthal, 1990; Keller, 1994; Lipnack and Stamps, 1999, 2000). The term 'communication incident' denotes a group meeting in which a substantial number of group members participate. In a virtual team, communication incidents can be conducted through personal or impersonal modes of communication. *Personal communication incidents* relate to face-to-face group meetings, *impersonal communication incidents* relate to group meetings mediated by Information Communication Technology (ICT) such as videoconferences or teleconferences. High standardization would exist in a work group where all communication incidents are scheduled through written protocols and sequenced in strict temporal patterns (Maznevski and Chudoba, 2000; Malhotra et al., 2001). Low standardization would exist in a team where all communication incidents evolve spontaneously out of the work process without being scheduled or sequenced.

4.5.2.3 Mediating Variable: teamwork effectiveness

In this study virtual teamwork is defined as *the joint interaction of team members to execute the work process.* It should be noted that teamwork is distinct from team performance as teamwork refers to team interaction *during* the project, whereas team performance refers to the ultimate project outcome. It is suggested that the relationship between managerial structure and team performance is mediated by teamwork effectiveness. That is, managerial structure is not expected to impact directly on team performance. Instead, the model suggests that managerial structure impacts on teamwork

effectiveness and, subsequently, teamwork effectiveness impacts on overall team performance.

Teamwork effectiveness is assessed along the following three dimensions (Deutsch, 1949, Tjosvold 1984; Ahuja and Carley, 1998):

1. *Quality of inter-team communication*: whether or not the team members are able to contact all other members without delays and errors and get adequate feedback in a timely manner.

2. *Quality of information distribution*: whether or not the team members steadily receive and have access to all information relevant to their work. Also, whether team members know the responsibilities and areas of expertise of other members and whether team members are well informed about the work progress of other members.

3. *Quality of task execution*: whether or not single team members, a sub-group, or the whole team execute tasks in a timely manner and to the satisfaction of participating members, the whole team, and the team manager.

4.5.2.4 Moderating contingency variable: task complexity

It is proposed that the organization and coordination of virtual teamwork requires different levels of structural looseness or tightness under varying levels of task complexity to yield high teamwork effectiveness. Task complexity is defined along three dimensions (Hrebibiniak, 1974; Randolph, 1981; Fry and Slocum, 1984; David et al., 1989):

1. *Task predictability*: the extent to which stimuli required in performing a job are perceived as familiar or unfamiliar (few vs. many exceptions) by team members. Work groups that perform tasks with few exceptions experience more certainty, which allows individuals to predict problems and activities in advance. The lower task predictability the higher task complexity.

2. *Problem analyzability*: the nature of the search that is undertaken by team members when exceptions occur in performing their job. Problem analyzability becomes less difficult when objective or computational procedures are available to facilitate the generation and evaluation of alternative solutions. The lower problem analyzability the higher task complexity.

3. *Interdependence*: the extent to which team members are dependent on and support others in task accomplishment. The greater interdependence the higher task complexity.

4.5.2.5 Secondary independent variables

The secondary independent variables comprise internal factors under control of management that may influence both teamwork effectiveness and team performance. As discussed in Chapter 3, the analytical tool used for addressing these secondary independent variables is the McKinsey '7Ss' framework.

The McKinsey '7Ss' framework was developed originally to appraise the workings of a total organization. However, it can be applied with equal effectiveness for analyzing and enhancing understanding at the project level, the level in the organization at which particular activities are actually carried out (Johne and Snelson; 1988a). Indeed, Crawford (1983) has emphasized that product innovation is second only to corporate strategy in the way it involves all aspects and all functions of management. Table 4.1 shows how the '7Ss' framework has been adapted for examining internal organizational factors at the project and business level of analysis. The framework enjoys parsimony since all factors are embraced under only seven headings, all of which are readily understood by and meaningful to practitioners. Although it is not claimed that the framework captures the full complexity of what underlies the NSD process, it is a helpful tool for facilitating intricacy and assessing potential factors, in addition to managerial structure, that may impact on teamwork effectiveness and team performance in a virtual NSD team.

Table 4.1: Internal organizational factors under control of management

Internal organizational factors that may impact on teamwork effectiveness and team performance at the project and business level of analysis	
Primary Independent Variable	
1. Systems	
Project level of analysis	Managerial structure of the project team
Secondary Independent Variables	
2. Structure	
Project level of analysis	The physical structure of the project team.
Business level of analysis	The physical structure of the business.
3. Skill	
Project level of analysis	The skill of individual project team members in developing new services and their experience with virtual teamwork.
Business level of analysis	The skill of the business in fostering innovation and developing successful new products.
4. Strategy	
Project level of analysis	The strategy of the project team with regard to NSD.
Business level of analysis	The strategy of the business with regard to NSD.
5. Shared Values	
Project level of analysis	Shared values among project team members and a common belief in the need to pursue the development project.
Business level of analysis	The conviction that innovation and NSD is important to the long-term success of the business.
6. Style	
Project level of analysis	The team manager's leadership style and personal involvement.
Business level of analysis	Senior management's involvement and support for NSD.
7. Staff	
Project level of analysis	The range of functional experts employed for and their contribution to the project.
Business level of analysis	The availability and accessibility of experts for NSD.

Source: Adapted from Peters and Waterman (1982) and Johne and Snelson (1988b).

4.6 Conclusion

This chapter has discussed the conceptual framework for the study. Recognizing the need for more research on the management of virtual teams, this study analyzes the organization and coordination of virtual teamwork with reference to managerial structure. It was proposed that managerial structure reflected by the formalization of the work process, centralization of decision-making, and standardization of communication incidents has a positive effect on teamwork effectiveness. Adopting a contingency theory perspective it was further suggested that the management of virtual teams requires different levels of managerial looseness or tightness under varying levels of task complexity to yield high teamwork effectiveness. It was also proposed that high teamwork effectiveness has a positive impact on both, the tangible and intangible dimensions of team performance. The next chapter will discuss the research methodology, the research method and the sample.

CHAPTER 5

METHODOLOGY, METHOD AND SAMPLE

5.1 Introduction

The present chapter discusses the methodology, the method, the sample and the process of data analysis. First, the research methodology and the research method are examined. Also, the rationale is provided for selecting descriptive, qualitative research based on multiple case studies[1]. Second, the nature of the preliminary fieldwork is discussed; the selection of the sample is analyzed; the data collection and analysis tools are explained and their value for this type of research is discussed. Third, the chapter elaborates on the limitations of the adopted research design and reviews the steps taken to overcome them.

5.2 Research objective

This study has one specific objective: to examine the association between the way teamwork is organized and coordinated and the performance of a virtual NSD team. In particular, this study investigates the association between managerial structure and task complexity, and the impact of this relationship on teamwork effectiveness and team performance in a virtual NSD team.

To attain this objective this study examines the organization and coordination of teamwork in higher performing virtual teams and in lower performing virtual teams and then determines the differences between the two. This distinction is introduced for two reasons. First, comparing high performing with low performing project teams allows to

[1] In the extant literature the terms case studies and field studies have both been used to refer to studies of group work in its organisational context (McDonough III and Leifer, 1986). Some authors have proposed typologies of field based research methods that maintain a distinction between the notions of field studies and case studies. While the definitions of field and case studies that have been offered in these typologies are predominantly similar, field studies have been distinguished as involving the investigation of two or more organisations, from case studies that refer to studies with a sample of one. Denzin and Lincoln (2000) distinguish field and case studies on the basis of the level of aggregation on which the analysis is focused. Other authors, however, such as Yin (1996) and Mason (1996) have not suggested such a demarcation. In this vein McCracken (1999) maintains that the use of sample size as a distinguishing feature of field and case studies is not required as sample sizes, particularly as they might contribute to statistical significance, are not of fundamental concern to the field researcher. For these reasons, this study uses the terms field and case studies interchangeably in reference to the research method employed.

obtain a fuller understanding of the differentiating factors that help or hinder teamwork effectiveness and team performance. Second, as explained later in the chapter, no scales are used to measure variables in degrees. Instead, the variables are examined through emerging data patterns in the higher and lower performing project teams, and, subsequently, these patterns are compared within and across project teams.

This research is designed to enhance both theory and practice. On one hand, it aims to increase academic understanding of a particular type of teamwork, the virtual teamwork. On the other hand, it will provide financial services developers with the knowledge necessary to achieve effective virtual teamwork and high virtual team performance, ensuring that new services are successfully delivered to the marketplace.

5.3 Methodology and method in the research design

McCracken (1999) asserts that research methodologies are the philosophies that underpin the research process whereas research methods are the technical issues associated with the conduct of research. Whether or not certain methods should be regarded as preferential to others, given the beliefs about what constitutes knowledge, is a passionately debated topic in the philosophy of science.

Some authors suggest a tight linkage between methodology and method. For example, Zikmund (2000) contends that the philosophy of science limits the tools, or research methods that it is possible to use in research projects. Other researchers, for example Yin (1996), argue that methodology and method are not linked as we observe the same methods being used by researchers with distinct methodologies and researchers frequently using multiple methods to triangulate on a particular phenomenon of interest.

The research methodology and research method applied in this research are now discussed in turn. Miles and Huberman (1994) and Mason (1996) contend that it is incumbent on case researchers to clarify how the shape of the social world is construed and how a credible account of it is to be provided within a study. Such disclosures regarding research methodologies will foster the development of practical standards,

workable across different perspectives, for judging the worth of conclusions (Miles and Huberman, 1994).

5.3.1 Methodology: Positivism

Babbie (2001) defines research methodologies as the philosophies that underpin the research process. McCracken (1999) asserts that these philosophies are differentiated in reference to a series of assumptions that define the domains of knowledge (epistemology), the empirical phenomena under examination (ontology) and the relationship between the two within a study. Ontological beliefs precede and govern subsequent epistemological assumptions (McCracken, 1999).

The net that contains the researcher's epistemological, ontological, and methodolgical premises may be termed a *paradigm* (Denzin and Lincoln, 2000), or an interpretive framework, a basic set of belief that guides action (Guba, 1990). At the most general level, four major interpretive paradigms structure research: positivist and post-positivist, constructivist-interpretive, critical (Marxist, emancipatory), and feminist-post-structural.

In accord with the literature that informs this study a positivist epistemological stance is adopted. Positivists view social science as an organized method for combining deductive logic with precise empirical observations of individual behaviour in order to discover and confirm a set of probabilistic casual laws that can be used to predict general patterns of human activity (Denzin and Lincoln, 2000). This positivist epistemological stance is premised on an ontological belief in physical realism. That is, the assumption that there exists a physical and social reality in an objective plane which is external to an independent scientist (Denzin and Lincoln, 2000). It is assumed that there is a reality to be studied, captured, and understood. However, the post-positivist stance is also acknowledged, accepting that reality can never be fully apprehended only approximated (Guba, 1990). The positivist epistemological stance is also reflected in the development of a conceptual model and propositions.

It is further acknowledged that it would have been possible to address the research questions of interest in this study from a variety of alternative perspectives such as constructivist-interpretive, critical, or feminist-post-structural. For example, the constructivist paradigm assumes a relativist-ontology (there are multiple realities), a subjectivist epistemology (knower and respondent co-create understandings), and a naturalistic (in the natural world) set of methodological procedures (Denzin and Lincoln, 2000). Conversely, feminist, ethnic, Marxist, and cultural studies and queer theory models assume a materialistic-realist ontology (the real world makes a material difference in terms of race, class, and gender) and deploy a subjectivist epistemology and a naturalistic set of methodological procedures (Mason, 1996; Denzin and Lincoln, 2000).

However, the adoption of a positivist epistemological stance reduces vagueness and abstraction inherent in this study's findings through the typical positivist evaluation criteria of internal and external validity, reliability, and objectivity (Denzin and Lincoln, 2000). It is maintained, however, that despite this rigorous approach the cultivation of innovative research insights in this study was fostered through the analysis of rich contextual data collected in the conduct of this research.

5.3.2 The research method

The following section reviews the research strategy deployed in this study as well as the research methods selected. Also, the issues of reliability and validity are discussed; the unit of study and unit of analysis defined; the sample selection reviewed, and the methods for data collection and data analysis presented.

A number of research designs were considered for the study to meet two specific objectives, namely (a) exploring propositions gleaned from the literature and (b) providing insight into the workings of virtual NSD teams. Laboratory experiments and controlled groups within a commercial environment are impractical for a highly competitive industry. On the other hand, any ethnography, diary based or action based, would be protracted, resource hungry and therefore lack immediacy for practitioners. One

had to bear in mind that banks operate within an environment of extreme confidentiality and discretion and that business policy would forbid the disclosure of any sensitive data or records. The literature was also explored to identify other case studies that could be used for secondary analysis in support of the field study, but none could be found.

The final choice, therefore, rested between a design using survey methods that would permit statistical generalization of results, for example a postal questionnaire, and a more in depth study of a smaller number of cases. In other terms, the researcher had to decide between a qualitative and a quantitative research approach.

5.3.2.1 Qualitative versus quantitative research

Perhaps the most striking difference between the two methods is the way in which each tradition treats its analytic categories. The quantitative goal is to isolate and define categories as precisely as possible before the study is undertaken, and then to determine, again with great precision, the relationship between them. The qualitative goal, on the other hand, is often to isolate and define categories during the process of research. The qualitative investigator expects the nature and definition of analytic categories to change in the course of a project (Glaser and Strauss, 1965; Brenner, 1985; McCracken 1999).

Both Denzin and Lincoln (2000) and Mason (1996) suggest that qualitative researchers differ in their use of positivism. The two perspectives, quantitative and qualitative, are shaped by the positivist traditions in the physical and social science. As discussed before, the positivist science tradition holds to naïve and critical realist positions concerning reality and its perception. Historically, qualitative research was defined within the positivist paradigm, where qualitative researchers attempted to do good positivist research with less rigorous methods and procedures (Denzin and Lincoln, 2000). As such, qualitative researchers will seldom report their findings in terms of the kinds of complex statistical measures or methods to which quantitative researchers are drawn (Mason, 1996).

Another difference between qualitative and quantitative approaches is the number of respondents that should be recruited for research purposes. The quantitative project requires investigators to construct a sample of the necessary size and type to generalize to the larger population. In the qualitative case, however, the issue is not one of generalizability. It is that of access (Brenner, 1985; McCracken, 1999). The purpose of the qualitative approach is not to discover how many, and what kinds of, people share a certain characteristic. It is to gain access to the cultural categories and assumption according to which one culture (e.g., team managers) construes the world. Glaser and Strauss (1965) point out that how many people hold these categories and assumptions is not, in fact, the compelling issue. It is the categories and assumptions, not those who hold them, that matter. As such, the qualitative researcher believes that rich descriptions of the social world are valuable, whereas quantitative researchers are deliberately unconcerned with rich descriptions because such detail interrupts the process of developing generalizations (Guba, 1990).

These differences between qualitative and quantitative methods have several implications. The first is that the two research approaches represent two sets of intellectual habits and frames of mind. Second, the qualitative and quantitative approaches are never substitutes for one another. This is so because, necessarily, they observe different realities, or different aspects of the same reality (McCracken, 1999). This distinction must be honoured. One cannot draw quantitative conclusions from qualitative work (Brenner, 1985).

5.3.2.2 The type of method adopted: qualitative case study research

As mentioned above, the researcher had to decide between a quantitative design using survey methods that would permit statistical generalization of results, and a qualitative approach in the form of an in-depth study of a smaller number of cases. A qualitative case study approach was adopted for the following reasons: First, this study investigates a contemporary phenomenon within its real life context, where the boundaries between phenomenon and context are not clearly evident. Second, the review of extant literature highlights the thin understanding of the nature of virtual team deployment in new service

development, confirming the need for more theories in the area, and qualitative case studies address theory building rather than theory testing (Wilson and Vlosky, 1997). In the early stages of theory development quantitative research methods may lead to inconclusive findings (Parkhe, 1993) Third, qualitative methods such as case studies facilitate in-depth analysis of complex and ill-researched activities and phenomena (Yin, 1996; Alam, 2002). While this study builds upon the extant research literature, on the dynamics of virtual teamwork and new service development in particular, both are complex and dynamic processes. Case studies can help to makes sense of complexity (Yin, 1996), are based on some previous understanding of the nature of the research problem (although the problem is not yet defined clearly), and can be used to determine the extent of differences in the needs, perceptions, attitudes and characteristics of subgroups such as virtual teams (Zikmund, 2000). Last, building on contingency theory this study is particularly interested in the context in which its population operates. While the quantitative researcher usually aims for larger numbers of context-stripped cases and seeks statistical significance, the qualitative researcher works with small samples of people, nested in their context, and studies in-depth sample and context (Miles & Huberman, 1994).

Although the case study is a distinctive form of empirical enquiry, many research investigators have disdain for the strategy. The case research methodology has been criticized for being less codified than those for theory testing methodologies such as surveys and experiments. But case study research can be carried out rigorously, and its data collection process can be structured (Adams et al., 1998). Thus a *systematic* process of conducting case research was followed in this research. Within this systematic framework, the research followed a multiple case study approach, a purposive sampling procedure, and multiple data collection methods (Eisenhardt 1989; Leonrad-Barton, 1990; Yin, 1996; Perry, 1998).

A second common concern about case studies is that they provide little basis for scientific generalization. Scientific facts are rarely based on single experiments; they are usually based on multiple sets of experiments, which have replicated the same phenomenon

under different conditions. Yin (1996) points out that the same approach can be used with multiple case studies. The case studies, like experiments, are generalizable to theoretical propositions, and not to populations or universes. In this sense, the case study, like the experiment, does not represent a 'sample' and the investigator's goal is to expand and generalize theories in the form of *analytic* generalizations and not to enumerate frequencies as in *statistical* generalizations.

The case study inquiry copes with technically distinctive situations in which there are many more variables of interest than data points. As one result, the case study inquiry relies on multiple sources of evidence, with data needing to converge in a triangulating fashion. And as another result, the case study inquiry benefits from the prior development of theoretical propositions to guide data collection and analysis (Yin, 1996). Consequently, for this research, specific propositions have been formulated based on the review of the literature.

Although case study research involves primarily inductive theory building, in practice it includes some deduction based on prior theory. It is unlikely that any researcher could genuinely separate the two processes of induction and deduction. For example, Richards (1993) suggests that "both (prior theory and theory emerging from data) are always involved, often simultaneously", and that "it is impossible to go theory-free into any study". Also, Miles and Huberman (1994) conclude that induction and deduction are linked research approaches. Their own empirical experiences have led them to emphasize the importance of 'pre-structured research' for new qualitative researchers working in areas where some understanding has already been achieved but where more theory building is required before theory testing can be done (like the area this study concentrates on). Prior theory can be critical in the design of the case study and the analysis of data and can be used to triangulate evidence (Perry, 1998). Pure induction might prevent the researcher from benefiting from existing theory, just as pure deduction might prevent the development of new and useful theory (Perry, 1998). Both extremes are untenable and unnecessary and the process of ongoing theory advancement requires continuous interplay between the two (Parkhe, 1993). Although it is established that the

use of both deduction and induction can be beneficial for qualitative studies, a set of specific reasons for this mixed strategy had to be determined. According to the suggestions of Miles and Huberman (1994) this study uses prior instrumentation for the following reasons:

(i) The concepts to be analyzed are defined from the beginning of the study
(ii) The study is mainly theory driven and examines existing theory within a radically new context
(iii) Comparability is very important in cross-case analysis and is not possible in studies with little instrumentation

Consequently, although this study is qualitative and descriptive in nature, a considerable amount of prior instrumentation was undertaken. A set of propositions was formulated from the beginning and a theoretical framework was constructed prior to the field study.

5.3.2.3 Case study design

According to Yin (1994), there are four different case study designs. They are: (a) single-case holistic designs; (b) single-case embedded designs; (c) multiple-case (holistic) designs, and (d) multiple-case embedded designs. With reference to this typology of case study designs, this study employs a multiple-case, embedded research framework. A multiple-case design is a study, which consists of more than one case (Yin, 1996). An embedded design is one where the same case study involves more than one unit of analysis. This occurs when, within a single case, attention is also given to a subunit or subunits (Yin, 1996). Thus, this study will look at two subunits in each case – a higher performing virtual NSD team and a lower performing virtual NSD team.

Multiple-case designs have a distinct advantage in comparison with single-case designs. The evidence from multiple cases is often considered more compelling, and the overall study is therefore regarded as being more robust. A major insight is to consider multiple cases as one would consider multiple experiments – that is, to follow a *replication logic* (Yin, 1996). This is far different from a mistaken analogy in the past, which incorrectly

considered multiple cases to be similar to the multiple respondents in a survey – that is to follow a *sampling logic*. The methodological differences between these two views are revealed by the different rationales underlying the replication as opposed to the sampling logics.

Multiple-case sampling adds confidence to findings. By looking at a range of similar and contrasting cases, one can understand a single-case finding, grounding it by specifying how and where and, if possible, why it carries on as it does. One can strengthen the precision, the validity, and the stability of the findings. As mentioned before, this study follows a replication strategy (Yin, 1996). If a finding holds in one setting and, given its profile, also holds in a comparable setting but does not in a contrasting case, the finding is more robust. It is important to note that with multiple-case studies the issue of generalizability does not change. This study generalizes from one case to the next on the basis of a match to the underlying theory, not to a larger universe (Miles & Huberman, 1994).

A multiple-case design was considered appropriate as it permitted both literal and theoretical replications to be undertaken. The replication logic is analogous to that used in multiple experiments (Yin, 1996). Each case must be carefully selected so that it either (a) predicts similar results (literal replication) or (b) produces contrasting results for predictable reasons (theoretical replication). An important step in all these replication procedures is the development of a rich, theoretical framework. The framework needs to state the conditions under which a particular phenomenon is likely to be found (a literal replication) as well as the conditions when it is not likely to be found (Yin, 1996). Literal and theoretical replications provided an important mechanism through which the study's internal validity was enhanced.

5.3.2.4 Case-Study validity and reliability

Particular attention is given to the issues of validity and reliability in all research methodologies. Validity is one of the most important issues connected to a research design. There are three types of validity, namely construct, external and internal.

5.3.2.4.1 Construct validity

Construct validity is concerned with ensuring that the correct operational measures are used for the concepts being studied. Construct validity is especially problematic in case study research. People who have been critical of case studies often point to the fact that a case study investigator fails to develop a sufficiently operational set of measures and that subjective judgements are used to collect data. In order to increase construct validity this study followed the recommendations of Yin (1996) and used multiple sources of evidence in a manner that encouraged convergent lines of inquiry. This study deployed in-depth interviews as well as observation and documentation for data collection. Also, interviews were conducted with team managers as well as with respective team members. Additional tactics to increase the construct validity were to establish a chain of evidence and to have the draft case study report reviewed by key informants (Miles and Huberman, 1994).

5.3.2.4.2 Internal validity

Internal validity has been given the greatest attention in experimental and quasi-experimental research. The concern over internal validity for case study research may be extended to the broader problem of making inferences (Miles and Huberman, 1994). Basically, a case study involves an inference every time an event cannot be directly observed. Thus an investigator will 'infer' that a particular event resulted from some earlier occurrence, based on interview and documentary evidence collected as part of the case study. This study deployed the analytic tactic of pattern-matching as suggested by Yin (1996) to ensure internal validity. Yin (1996) describes pattern-matching as "one of the most desirable strategies in case study analysis". The logic of pattern-matching compares an empirically based pattern with a predicted one. If the patterns coincide, the results can help a case study strengthen its internal validity. In this study, the patterns found in the analysis of the data were related to the initial conceptual model as well as to the formulated propositions.

5.3.2.4.3 External validity

External validity is concerned with whether or not a study's findings can be generalized beyond the immediate case study. The external validity problem has been a major barrier in doing case study research (Eisenhardt, 1989). Critics typically state that single cases offer a poor basis for generalizing. However, such critics are implicitly contrasting the situation to survey research, in which a 'sample' readily generalizes to a larger universe. Yin (1996) stresses that the analogy to samples and universes is incorrect when dealing with case studies. This is because survey research relies on statistical generalization, whereas case studies rely on analytical generalization. In analytical generalization, the investigator is striving to generalize a particular set of results to some broader theory. In order to allow for analytical generalization this study tested the theory through multiple case studies.

5.3.2.4.4 Reliability

The goal of reliability is to minimize the errors and biases in a study. This depends on the skills in case study research and especially on the selection of appropriate data collection and analysis tools and on their effective application during the study. Prior to conducting the field study, the most appropriate research strategy was carefully selected, propositions were developed based on information gathered from the literature, and the method of data collection and analysis was devised. Also, preliminary fieldwork was undertaken to check that the language and concepts were familiar to practitioners. That is, the responses in the initial interviews were analyzed to identify any areas of difficulty for informants.

The same research tools were applied to all interviewees by a single researcher who recorded the information during the interview. The same researcher used standard data analysis tools such as pattern-matching for presenting differences in the organizational configuration of sample companies for all cases and then reported the findings based on the division of the sample into two groups, the higher and the lower performing NSD teams. Each case was individually analyzed and then the results were aggregated in tables for the two groups in order to permit comparisons and examine the validity of propositions. Also, to increase coding and analysis reliability coder training and inter-

coder-reliability tests were conducted. The analytical tools used provided a structured analysis of results and a frame of reference for other researchers who may want to replicate this study.

5.3.2.5 Preliminary fieldwork

The preliminary fieldwork took place between January 2001 and December 2001 to understand the practical context of new service development in the UK corporate banking sector, and involved a review of academic journals, trade journals and then interviews with practitioners, journalists and academics studying the industry. Specifically, the preliminary fieldwork served three objectives:

1. To examine the importance of the research
2. To define the appropriate context for the field investigation
3. To provide the information necessary to select the right sample and to devise a suitable research template

Five exploratory interviews were conducted. More specifically, semi-structured personal interviews were held with a purposive sample of service managers and service innovation experts. Each interview lasted for about 40 to 50 minutes. The interview focused on identifying the important issues facing key decision makers about new service development teams that operate in a virtual context. The findings supported the notion of virtual teamwork being associated with a multitude of challenges that result out of a highly complex and dynamic work environment. Further, managers of virtual teams confirmed the problem of maintaining managerial organization and coordination within the virtual team.

In addition, the fieldwork found that no individual business was considered as being generally more innovative than others. It was agreed by respondents that a combination of market and technology changes offered significant opportunity for innovation, but typically, the industry moved forward through individual innovations that were rapidly copied by competitors. Consistently respondents remarked that there were not any

generally innovative businesses just innovative projects. It was also established that there are no more or less successful innovators, only more or less successful innovations. To account for differences in the development process of more and less successful development projects, the approach of conducting research at the project level rather than the business or programme level proved particularly valuable.

5.3.2.6 Unit, context and level of analysis

The *unit of analysis* for this study was the virtual NSD team, defined as a group of geographically and/or organizationally dispersed co-workers that cooperate mainly through impersonal communication modes to accomplish the organizational task of initiating, developing and launching a new product or service.

As discussed in Chapter 2, the virtual NSD team was investigated in the *context* of corporate banking in the UK because the industry is important to the overall economy; operates under tremendous competitive pressure; is in need of constant product innovation, and operates on a national and international scale. In addition, banks in the corporate sector are the UK's foremost users of the type of organizational form that corresponds to this study's definition of a virtual team.

The *level of analysis* was the project level, which means single development projects were investigated rather than the firm's overall approach towards new service development. To adopt a different unit of analysis would have compromised the results of the study. For example, instead of conducting research at the project level of analysis, this study could have focused on the programme level and business level or the overall organizational level. However, this would have been inappropriate as this study is interested in the workings and performance of virtual teams, which are engaged in a specific type of project, the NSD project. Changing the level of analysis away from the project level would have distorted the focus of the study.

5.3.2.7 Sample

Several key decisions on sample selection assisted in selecting a boundary for the research. For example, to select multiple cases, a population was specified that helped to limit extraneous variations and sharpened external validity (Wilson and Vlosky, 1997). The population of interest was the UK corporate banking sector. Originally, a potential sample of 18 banks was determined using the purposive sampling method (Alam, 2000) because random selection of cases is inappropriate for case-study research (Eisenhardt, 1989). That is, to increase the likelihood of increasing *variability* in the results and to gather a richer set of ideas and insights, banks were selected based on service types, the firm's ownership, and size. This is in keeping with one of the goals of the case method of research, which is to portray the range and depth of the phenomena, which in turn is important to developing theory (Alam, 2002).

Furthermore, the variables of product/service types, the firm's ownership and size were found to produce some variability in results in a recent meta-analysis of new product success factors (Griffin, 1997). Three types of banks were considered, namely investment banks, wholesale banks, and mortgage banks. These included both English and international banks. Within this range of banks the study concentrated on NPD/NSD geared towards the corporate market. Firms with at least 2000 employees were selected because exploratory interviews had shown that this minimum size was necessary to ensure continuous new service development in corporate banking.

Once the 18 banks were selected, it proved highly challenging to identify team managers who were not only in charge of new service development but also in charge of virtual NSD teams. To make matters worse, the heavy reduction of headcount in banking over the last two years made it very difficult to rely on any kind of directories or databases. Thus, to identify respondents, the researcher first contacted the Head of IT in each selected bank in writing, explaining the purpose of the study and asking for a personal interview (for the contact letter see Appendix II). The researcher knew from preliminary fieldwork that IT personnel are always involved in one way or another in projects that make heavy use of Information Communication Technologies. And indeed, the majority

of contacts in IT proved very helpful in referring the researcher to the appropriate departments and project managers. The project managers were contacted first in writing to explain the study and then by phone to arrange for a personal meeting (for the contact letter see Appendix II). Of the 18 banks that were selected originally, 8 banks agreed to participate in this study, resulting in a purposive sample of 8 cases. These are: Deutsche Bank, NM Rothschild & Sons, Schroders, Bank of Scotland, Abbey National, Lloyds TSB, Barclays Capital, and Goldman Sachs (Figure 5.1). Within the 8 cases, 16 new service development projects were studied. That is, for each of the 8 cases, two recent new service projects were selected. These two projects were purposively chosen to ensure maximum representability as suggested by Eisenhardt (1989) and Alam (2002). The team manager was the first to be interviewed in each selected firm. He was requested to select two projects that could meet three criteria: (a) fully completed or terminated within the past three years, (b) all developed within a virtual context, and (c) one higher performing project team and one lower performing project team.

The first criteria ensured that only fully completed or finally terminated NSD projects were selected where the performance of the team could be clearly evaluated. The second criteria demanded that only virtual NSD projects were selected, where the team members had been geographically and/or organizationally dispersed and had mainly used IT and ICT to co-operate. The last criteria required that the sample was divided into one higher performing project team and one lower performing project team. This distinction was introduced to determine the nature and extent of differences between these two teams in relation to the conceptual variables. Based on earlier studies on the subject (Hackman, 1990; Pino et al., 1993; McDonough, 2000) and based on the preliminary fieldwork, team performance was defined as meeting objectives set for the team. That is, teams were considered higher performing if they had attained at least three out of the following four objectives: (a) completed the project on time; (b) completed the project on budget; (c) attained individual satisfaction with project, and (d) attained collective satisfaction with project. Teams were considered lower performing if they had attained two or less of the above objectives.

Figure 5.1: The 8 case studies, display of interviewees

1st Case Study
GOLDMAN SACHS

Managing Director
General Industrial Group

Associate
General Industrial Group

Associate
General Industrial Group

Managing Director
Goldman Sachs Sweden

2nd Case Study
SCHRODERS

Managing Director
Schroder Property Investment
Management Limited

Associate
Schroder Property Investment
Management Limited

Associate
Schroder Property Investment
Management Limited

3rd Case Study
NM ROTHSCHILD & SONS

First Director
Acquisition Finance Team

Associate
Acquisition Finance Team

Associate
Acquisition Finance Team

Director
Debt Capital Markets Advisory

4th Case Study
BARCLAYS CAPITAL

Director
Corporate Financial Advisory Team

Managing Director
Corporate Financial Advisory Team

Associate
Corporate Financial Advisory Team

Associate
Corporate Financial Advisory Team

5th Case Study
ABBEY NATIONAL

Head of
Abbey National Treasury Services

Managing Director
Abbey National Treasury Services

Associate
Abbey National Treasury Services

Associate
Abbey National Treasury Services

6th Case Study
LLOYDS TSB

Managing Director
Lloyds TSB Financial Institutions &
International Trade Finance

Director
of Relationship Banking

Associate
Relationship Banking

Managing Director
R&D Cogent

7th Case Study
BANK OF SCOTLAND

Managing Director
Integrated Finance Unit

Associate
Integrated Finance Unit

Associate
Integrated Finance Unit

Managing Director
Structured Finance Unit
Bank of Scotland

8th Case Study
DEUTSCHE BANK

Chief Operation Officer

Managing Director
DB Capital Partners London

Associate
DB Capital Partners London

Managing Director
DB Capital Mezzanine Partners
London

Managing Director
DB Capital Private Equity London

Otherwise, team managers were free to choose the two project teams they reported on. The respective team-members were selected based on the team manager's accounts of events and his recommendations. Of the selected team members, at least one formed part of the higher performing team and at least one formed part of the lower performing team. Again, the team members were contacted in writing to explain the study and then by phone to arrange for a personal meeting (for the contact letter see Appendix II).

The reliance on multiple respondents meant that responses could be crosschecked and any conflicting or inconsistent response resolved. The key-informant method (Alam, 2002) was used for data collection. That is, all the respondents had two key characteristics. First, they were experienced practicing managers in service development or a related position; second they were closely involved in the development activities and had an understanding of the development process within a virtual context.

5.3.2.8 Method of data collection

To collect data from the 8 cases, a total of 32 in-depth interviews were conducted, that is, at least 3 interviews per case. Data collection took place between March 2002 and January 2003. Data were collected using standard tools with care taken to record full details of the interview and the interviewee. Subsequently, a chain of evidence in the form of databases was established. The data collection tools consisted of personal in-depth interviews as well documentation.

5.3.2.8.1 The personal in-depth interview

McCracken (1999) describes the personal in-depth interview as one of the most powerful methods in qualitative research. Qualitative methods are most useful when they are used to discover how the respondent sees the world. This objective of the method makes it essential that testimony be elicited in as unobtrusive nondirective manner as possible (Brenner, 1985). It is important that the investigator allows the respondents to tell his or her story in his or her own terms. However, it is just as important that the interviewer exercises some control over the interview (McCracken, 1999). In order to impose order as well as manufacture distance in the data-collection stage the researcher deployed a

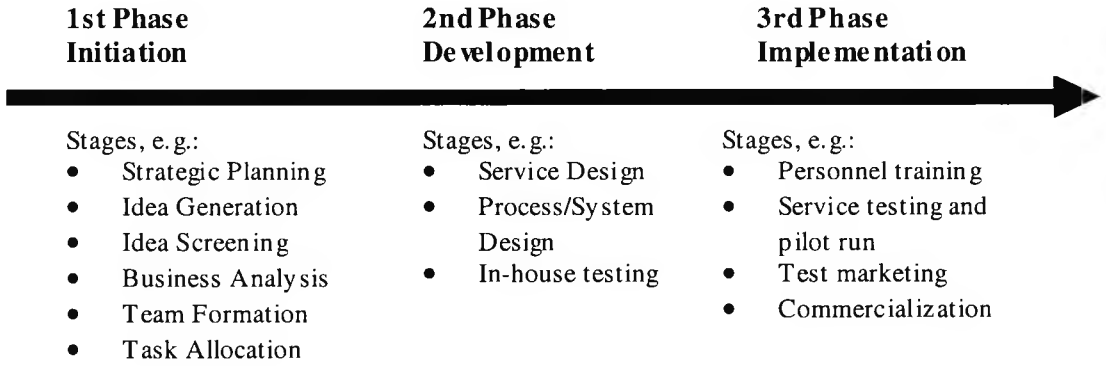
structured interview guide (see Appendix III). The use of an interview guide is sometimes regarded as a discretionary matter in qualitative research interview. But for the purpose of the long, in-depth qualitative interview, a well-structured interview guide is indispensable (McCracken, 1999). In this study, the personal interview sought to gain the team manager and the team members' perceptions on the nature of managerial structure in a specific project team, the managerial mechanisms used to organize and coordinate in that project team, and whether these mechanisms changed according to fluctuations in task complexity.

Questions were formulated to address the variables identified in the initial conceptual model. As such, the core questions examined team performance, the perceived complexity of work tasks, the perceived effectiveness of teamwork, and the managerial structure of the team. To address additional internal organizational factors under the control of management that may have impacted on teamwork effectiveness and team performance, the McKinsey '7Ss' framework was deployed as discussed in Chapter 3 and Chapter 4. Further, to warrant cross-case cohesiveness absolute measures were used to examine team performance, teamwork effectiveness, and task complexity (Miles and Huberman, 1994). That is, precise criteria were prescribed through which respondents had to assess the dependent, moderating and mediating variables. However, to preserve the exploratory and inductive nature of this research, the primary independent variables (formalization, centralization, standardization) were explored through relative measures. That is, questions concerning the primary independent variables were broadly formulated and loosely structured, giving respondents opportunity to reply in an exhaustive and unstructured manner (Miles and Huberman, 1994).

The interview was divided into background questions and process questions. Background questions examined the background of a particular project team including the nature of development, the team configuration, and overall team performance (the dependent variable). Process questions addressed all other conceptual variables and were targeted at specific project phases. That is, to explore fluctuations of variables throughout project execution, questions regarding managerial structure, task complexity, and teamwork

effectiveness were targeted at each of three generic development phases: (a) initiation phase, (b) development phase, and (c) implementation phase (Figure 5.2). These project phases are 'generic' in the sense that they apply to almost every NSD project notwithstanding the type of service developed or the context of the development (Lovelock, 1982).

Figure 5.2: The three-phase NSD/NPD process



In particular, questions were designed to investigate the following main areas of interest:

Background Questions:

- Identify the respondent's professional background
- Identify the overall performance of the project team
- Investigate the nature of the project and the team's approach towards innovation
- Identify other organizational factors that may have impacted on teamwork effectiveness and team performance

Process Questions:

- Identify the task complexity inherent in each of the three generic NSD project phases, initiation, development, and implementation

- Identify the nature of formalization, centralization and standardization evident in each of the three generic NSD project phases, initiation, development, and implementation
- Identify the perceived effectiveness of teamwork in each of the three generic NSD project phases, initiation, development, and implementation

As mentioned above, in each interview a structured interview guide was deployed. The interview guide has several functions. Its first responsibility is to ensure that the investigator covers all the terrain in the same order for each respondent. The second function is the care and scheduling of the prompts necessary to manufacture distance. The third function of the interview guide is that it establishes channels for the direction and scope of discourse. The fourth function is that it allows the investigator to give all his attention to the informant's testimony. Brenner (1985) points out that the first responsibility of the interviewer is the highly contingent work of assumption-inference, and he must not be distracted by any task that can be routinized. In sum, the structured interview guide protects the larger structure and objectives of the interview so that the interviewer can attend to immediate tasks at hand.

However, it is important to emphasize that the use of an interview guide does not pre-empt the 'open-end' nature of the qualitative interview (McCracken, 1999). Within each of the questions, the opportunity for exploratory, unstructured responses remains. Indeed, this opportunity was taken advantage of frequently during the course of each interview in this study, as the interviewer was mindful to utilize the contingency of the interview. As such, the structured interview guide was used to order data and free the interviewer and not to destroy the elements of freedom and variability within the interview.

Yin (1996) notes that one of the most important differences between most qualitative and quantitative research is that the former demands a much more complex relationship between investigator and respondent. There is a group within the qualitative research community that wishes to make the respondent a kind of collaborator (Elden 1981; Reason and Rowan, 1981). This approach has the merit of encouraging fuller disclosure

of research objectives, and this in turn helps to solve some of the ethical issues that surround qualitative work (Eden, 1981). However, McCracken (1999) argues that there is something in the qualitative interview that argues against full collaboration. Certainly, the investigator must be careful to establish a relationship of substance and some kind of connection with the respondent. But it is possible to go too far and allow the intimacy to obscure or complicate the task at hand. The most obvious danger is that the respondent who is given the terms and objectives of research is not likely to give full spontaneous and unstudied responses (McCracken, 1999). As a consequence the respondent may prove over-helpful, and try to serve up what he or she thinks is wanted.

Second, the respondent in a qualitative interview is subject to several risks. Participation in a qualitative interview can be time consuming, privacy endangering, and intellectually and emotionally demanding in ways that quantitative interviews rarely are. For example, the researcher of this study has found respondents to be concerned about giving away detailed corporate information because of the extreme confidentiality that surrounds new service developments in corporate banking. In contrast to the personal market, the corporate market often requires banks to develop services and products for one single corporate client and revealing detailed project-specific information might diminish the competitive advantage the new product creates for the bank or the bank's client. Additional obstacles that may hinder respondents to share knowledge freely and openly are fear of superiors, fear of competitors, and even fear of colleagues and subordinates (Parkhe, 1993).

In order to address the aforementioned pitfalls, the researcher clearly established an unambiguous social distance between interviewee and interviewer and reassured the respondent of the utmost neutrality and confidentiality with which the information would be treated. Also, it was emphasized that in case of publication neither the name of the respondent nor the name of the institution would be mentioned. However, once initial hesitations were overcome most respondents engaged freely in an intellectually challenging process of self-scrutiny and, in some cases, even experienced a kind of catharsis through reflection. Together, these reactions led the researcher conclude that

there were for most respondents benefits to compensate for the risk of the qualitative interview.

The actual interview was opened with a set of biographical questions. However, the opening of each interview had an important pragmatic burden. The opening is an important time to reassure the respondent because it is these opening stages that he or she sets his or her defences (McCracken, 1999). Within the first few minutes the interviewer had to demonstrate that he is a benign, accepting, curious but not inquisitive individual who is prepared and eager to listen to virtually any testimony with interest. Respondents were assured that the aforementioned face-loss was not a grave danger in this particular interview. The way to create this atmosphere of face-safety was to make the opening questions simple, informal ones. Thus biographical data questions, designed to allow the investigator to ascertain the simple descriptive details of the respondent's professional career, served this purpose.

Once the preliminaries were completed, the interviewer deployed grand-tour questions as well as floating and planned prompts. The investigator was careful to keep as low and unobtrusive a profile as possible. For example, in the case of question formulation, great care was taken that questions were phrased in a general and nondirective manner. These opening, nondirective questions have been aptly named in the literature as "grand-tour questions" (McCracken, 1999). Zikmund (2000) suggests that once grand-tour testimony is forthcoming, it is relatively easy to sustain it in an unobtrusive way through the use of "floating prompts". The objective here was to watch for key terms as they emerged from the testimony and to prompt the respondent to say more about them. Floating prompts allowed this in a relatively unobtrusive and spontaneous way. Used in combination, grand-tour questions and floating prompts were often enough to elicit all the information required. However, in some cases the categories that had been identified in the literature did not emerge spontaneously in the course of the interview. In these cases, the investigator took a more proactive and obtrusive position and had to resort to "planned prompts", as suggested by McCracken (1999) and Zikmund (2000).

Zikmund (2000) points out that planned prompts are especially important when topics belong to the realm of the self-evident or the imponderable. The purpose of this second category of prompts is to give respondents something to "push off against". It is to give them an opportunity to consider and discuss phenomena that do not come readily to mind or speech (McCracken, 1999). These planned prompts were placed in the interview after each grand-tour question, so that they were not asked until the material they were designed to elicit had failed to surface spontaneously.

Another planned prompting strategy was to ask respondents to recall exceptional incidents in which the research topic was implicated, a particular source of team conflict within the NSD process, for example. In these cases, a counter-expectational reality had already helped to pry the respondent away from his or her assumptions (Miles and Huberman, 1994). Questions of this kind gave the respondent an opportunity to glimpse expectations that were normally concealed from them (McCracken, 1999).

In summary, the interview consisted of a set of biographical questions followed by a series of question areas. Each of these had a set of grand-tour questions with floating and planned prompts at the ready. Almost invariably the interview that includes all these probing devices proves to be relatively long. For this research, the interview with the team manager lasted between 90 to 120 minutes, as the team manager had to address the higher performing team as well as the lower performing team. However, the interview was intentionally restricted to a maximum of 120 minutes, partly because of respondents' time constraints and partly because the respondent (as well as the investigator) showed clear signs of exhaustion after discussing the complex and demanding issues of the research topic for a long period of time. The selected team members had to report on either the higher performing team or the lower performing team. Accordingly, the interview was shorter and lasted between 60 to 90 minutes.

5.3.2.8.2 Documentation and observation

A major strength of case study data collection is the opportunity to use different sources of evidence. Yin (1996) suggests that in case study research the need to use multiple

sources of evidence far exceeds that in other research strategies, such as experiments, surveys or histories. Experiments, for instance, are largely limited to the measurement and recording of actual behaviour in the laboratory and generally do not include the systematic use of survey or verbal information. Surveys tend to be the opposite, emphasizing verbal information but not the measurement or recording of actual behaviour. Finally, histories are limited to events in the 'dead' past and therefore seldom have any contemporary sources of evidence, such as direct observation of a phenomenon or interviews with key actors. Hence, the multiple sources of evidence in case studies allow an investigator to address a broader range of attitudinal and behavioural issues. However, the most important advantage presented by multiple sources of evidence is the development of *converging lines of inquiries* (Yin, 1996) also called *the process of triangulation* (Zikmund, 2000). Miles and Huberman (1994) suggest that any finding or conclusion in a case study is likely to be much more convincing and accurate if it is based on several different sources of evidence. For this reason, this study deployed not only the strategy of *informant triangulation* but also that of *data triangulation* and collected information with two different sources of evidence, namely in-depth interviews and documentation.

As discussed in the previous section, the in-depth interview was the main source of evidence. In addition, documentation was deployed and, as a supporting tool, observation. For case studies, documentation is important to corroborate and augment evidence from additional sources (Yin, 1996). First, documents are helpful in verifying the correct spellings and titles or names of organizations that have been mentioned in the interview. Second, documents can support the information received from the respondent. For example, during the course of data collection the researcher obtained a variety of supporting documents such as memoranda, agendas, project proposals, and business cards. Third, inferences can be made from documents. For example, the researcher asked each respondent to sketch the physical structure of the NSD team in question. During the interview, these sketches allowed the researcher to pose probing questions and to clarify issues. After the interview, they helped in transcribing the recorded content.

Because of their overall value, documents play an explicit role in case study research (Yin, 1996). At the same time, many people have been critical of the potential over-reliance on documents in case study research. According to McCracken (1999) this is because the causal investigator may mistake certain kinds of documents, such as proposals for projects, for those containing the unmitigated truth. In fact, it is important in reviewing any document to understand that it was often written for some specific purpose and some specific audience other than those of the case study being done. In this sense, the researcher only pursued the role of an uninvolved observer, while the documentary evidence reflected a communication among other parties attempting to achieve some other objectives.

A third and supporting source of collecting case study information was the strategy of direct observation. As Yin (1996) points out, observational evidence is often useful in providing additional information about the topic being studied. It must be stressed, however, that this form of data collection served a supportive purpose only as the sample was restricted to a *post hoc* examination of NSD projects. Nevertheless, the researcher had the opportunity to observe directly two face-to-face meetings between the General Industrial Group of Goldman Sachs London and their clients, the Volvo Tuck Corporation, Sweden. These meetings served the purpose to discuss the launch of a new financial product designed for the lending arm of Volvo Trucks. There are two reasons why these observational findings were included in the study. First, the General Industrial Group of Goldman Sachs maintains an ongoing partnership with the Volvo Tuck Corporation and one of the case studies addresses a fully completed NSD project that was derived out of this collaboration. Second, many respondents stated that face-to-face meetings are indispensable mechanisms for effective teamwork even for virtual teams. As such, the researcher felt the need to observe directly what was repeatedly described. For reasons of confidentiality, however, the researcher was only allowed to make written notes and not to tape record any of the meetings. Also, all notes were restricted to pure technical and behavioural observations; no record was allowed of information related to the companies, participants or the product.

In summary, for data collection two different sources of evidence were deployed: the in-depth personal interview and documentation. In one case observation was used as a supporting tool. As such, this study followed the call for converging lines of inquiry and triangulation when pursuing case study research as formulated by Miles and Huberman (1994), Yin (1996), McCracken, (1999), and Zikmund (2000). The personal in-depth interview was the main source of evidence, as this form of data collection provided the greatest wealth and depth of information. However, interviews should always be considered as *verbal* reports only. As such, they are subject to the common problem of bias, poor recall, and poor inaccurate articulation (Yin, 1996). To overcome these drawbacks the interview data was corroborated with information from other sources. Documentation was deployed to support and challenge the evidence gleaned from interviews. Eventually, all collected information was transcribed verbatim and ordered and filed in a formal case study database.

5.3.2.9 Method of data analysis

Shortly after completion of data collection all interviews were transcribed verbatim, resulting in hundreds of pages of transcripts. The transcripts of each interview in each case were carefully reviewed along with field notes to highlight important issues and to identify data patterns. While reviewing and analyzing these patterns, relevant documents obtained from the respondents were also examined for triangulation purposes. For example, for analysis the researcher frequently consulted documents such as project proposals, communication schedules, and team memorandums. In one case, findings from direct observations were incorporated. Once the analysis of each single case was completed, cross-case analysis was conducted deploying the method of cross-case pattern matching as described by McCracken (1999), Yin (1996), and Miles and Huberman (1994). In order to facilitate data analysis qualitative analysis software called NUDIST (2002) was used. In the following the method of data analysis is discussed in more detail.

5.3.2.9.1 Single case analysis

Each single case consisted of at least three interviews. Miles and Huberman (1994) point out that the analysis of qualitative data is perhaps the most demanding and least examined

aspect of the qualitative research process. This study followed the method of data analysis as suggested by McCracken (1999). That is, shortly after completion of the interviews, a verbatim transcript of each interview testimony was created. The object of the analysis was to determine the categories, relationships and assumptions that inform the respondent's view of the context in general and the topic in particular (McCracken, 1999). Also, great care was taken to separate the findings for the higher performing teams and the lower performing teams.

During the analysis of the transcript, the investigator made use of qualitative analysis software. The software package NUDIST (2002) allowed for a systematic approach to the complex task of analyzing interview transcripts. Each of the interviews was first transcribed using Microsoft Word. Then transcripts were uploaded into the NUDIST (2002) interface. The software allowed the investigator to easily code, annotate and compare the data. Coding was the initial phase in the analysis process. To devise a coding theme, a preliminary data tree was designed. To ensure this data tree included all variables in an orderly fashion and not missed out on key concepts that came up during the interviews, three interviews from three different cases were first hand-coded. As a consequence, the initial data tree was slightly amended and updated (for the coding tree please see Appendix IV).

The investigator then started coding (for coder training and inter-coder reliability tests see 5.3.2.9.2). During the coding process words, sentences or paragraphs from raw and non-summarized transcripts were associated with one or more of the constructs in this study. The constructs were defined in a coding structure and reflected the variables of interest under investigation. During coding, points of interest that were identified as being of potential relevance for future analysis were recorded in memos on the NUDIST (2002) interface. These memos discussed preliminary insights into the key themes of interest. Once the transcripts were coded NUDIST (2002) also provided a powerful means to access the data through its search and retrieval tools. These tools permitted the text in the transcripts to be reorganized and reported back under the various themes of interest identified in the coding tree.

The reorganized transcripts were then systematically analyzed. This study followed a five stages process of analysis, each of which represented a higher level of generality. The first stage treated each utterance in the interview transcript in its own terms, ignoring its relationship to other aspects of the text. As such, the treatment of each useful utterance created an observation (McCracken, 1999). The second stage concentrated on these observations and developed them, first by themselves, second according to the previous literature review and the formulated propositions. Also, information from the collected documents was incorporated. The third stage examined the interconnection of the second-level observation, resorting once again to the previous acts of literature review and propositions. The focus of attention now shifted away from the transcript and towards the observations themselves. At this stage summaries of the key themes were created for each interviewee that included quotations from the interview transcripts, as well as memos created by the author that reflected some data interpretation and analysis. The fourth stage took the observations generated at previous levels and subjected them, in this collective form, to collective scrutiny. The object of analysis was the determination of patterns of inter-theme, consistency and contradiction (Miles and Huberman, 1994; Yin, 1996; McCracken, 1999). Throughout data collection and analysis no scales were used to measure the variables, instead the variables were examined through emerging data patterns within the cases. The fifth stage of analysis took these patterns and themes, as they appeared in the several interviews that made up a case, and subjected them to a final process of general analysis within and across cases (see Appendix V). This final process of general analysis adhered to the following single-case analysis template (Figure 5.3):

(A) First, the overall team performance of the higher and the lower performing team was examined, concentrating on the attainment of performance objectives.

(B) Second, focusing on the higher performing team the main variables were examined in each of the three project phases: initiation, development, and implementation. That is, emerging data patterns were assessed with regard to task complexity, formalization, centralization, standardization, and teamwork effectiveness in each project phase. Also, potential associations between these

variables were examined in each project phase. Subsequently, this procedure was repeated for the lower performing team.

(C) Third, emerging data patterns in each project team were subjected to the propositions. Again, focusing on the higher performing team potential fluctuations (*higher/lower*) in the data patterns of variables were examined. In particular, it was assessed whether or not these data patterns changed across project phases. For example, a cross-phase analysis showed that over the development phase the data pattern displayed *higher* formalization and *higher* complexity but *lower* teamwork effectiveness *in comparison with* the data patterns observed over the initiation phase and the implementation phase. These emerging data patterns were then subjected to the propositions, carefully evaluating whether the data patterns strengthened or weakened a proposition or whether no inference regarding that proposition could be made. Subsequently, this procedure was repeated for the lower performing team.

(D) Fourth, again focusing on the higher performing team the association between teamwork effectiveness and team performance was examined. Also, additional internal organizational factors that may have emerged over data analysis were identified and their associations with the main variables were explored (not shown in Figure 5.3). Subsequently, this procedure was repeated for the lower performing team.

(E) Last, the overall level (*high/moderate/low)* of formalization, centralization, and standardization was determined in both the higher and lower performing team. This was done through data pattern comparison within a case and across cases. That is, in a first step the data patterns of the higher performing team were compared with the data patterns of the lower performing team. In a second step, the data patterns of both teams were compared with the data patterns of all other project teams that made up the sample. For example, if project team A of Case 1 displayed the pattern of lowest formalization within the sample while project team

B of Case 7 displayed the highest, all other 14 project teams were placed along a continuum ranging from project team A (lowest) to project team B (highest).

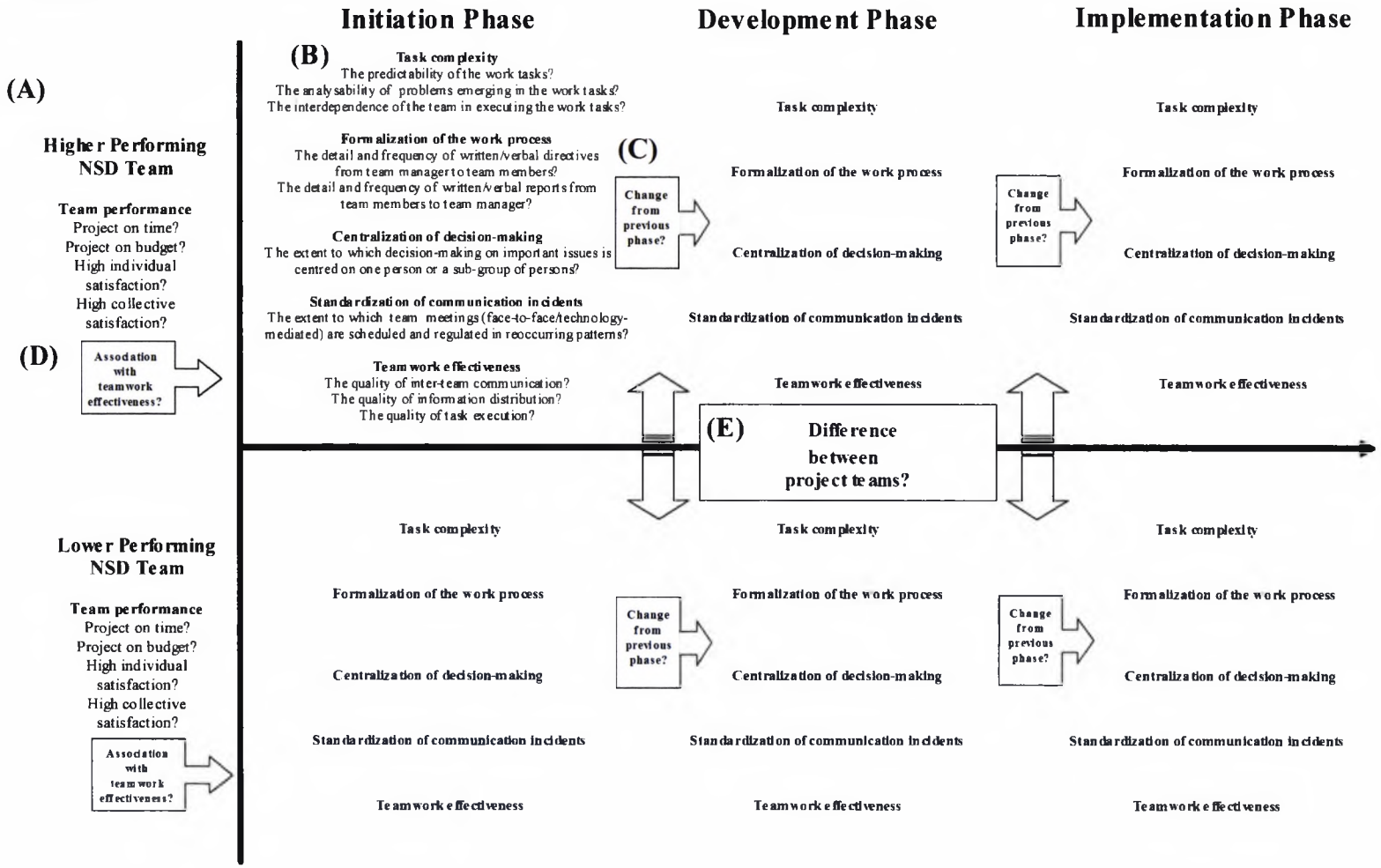
In sum, the single case analysis first required the verbatim transcription and coding of interview data. Working with the data in this form, the investigator undertook five stages of analysis. The first of these locked the investigator securely in the fine details of the interview, while the last advanced him to general single-case conclusions. In this ascent, the investigator moved from data to observations, keeping a careful eye throughout to separate findings for the higher and lower performing project team. (Please note Appendix V. contains the single-case analysis including cross-case conclusions.)

Further, Eisenhardt (1989) asserts that solid case-study research requires a story to be told. To account for storytelling 'the story' of each individual case is reported, referring to the background of the company, the context of the project, the nature of development, and the role of the team manager as well as the team members. These case reports are presented in a descriptive, journalistic writing style and are included in Appendix VI.

5.3.2.9.2 Coder training and inter-coder-reliability

The author of this thesis was responsible for the coding of all verbatim transcripts. In the preparation stage, several sessions were planned in which a sample of transcribed interviews was examined and coded. These sessions were used to revise and clarify the coding tree until the coder was comfortable with the materials, the procedures, and the software application. Additionally, a pilot analysis was conducted to check the inter-coder reliability. Miles and Huberman (1994) suggest that definitions become sharper when two researchers code the same data set and discuss their initial difficulties. A disagreement shows that a definition has to be expanded or otherwise amended. As such, check-coding not only aids definitional clarity but also is a good reliability check.

Figure 5.3: Single-case analysis template



Following the practice advocated by Miles and Huberman (1994) the author of this thesis invited a fellow researcher to assist in inter-coder reliability testing. The two then coded separately a sub sample of the data (three verbatim transcribed interviews taken from three cases) and then determined an inter-coder reliability coefficient. The inter-coder reliability was calculated using the Simple Holsti Formular (Holsti, 1969):

$$\text{reliability} = \frac{\text{number of agreements}}{\text{total number of agreements} + \text{disagreements}}$$

The first inter-coder reliability test produced a relatively low inter-coder reliability coefficient of 76%, which is acceptable but not excellent (Miles and Huberman, 1994). Accordingly, the two researchers discussed their discrepancies, reviewing each rendition and amending definitions as well as the data coding-tree. In a second round another data-subset was coded (three verbatim transcribed interviews taken from three other cases) and the more satisfactorily inter-coder reliability coefficient of 89% was achieved (Miles and Huberman, 1994).

5.3.2.9.3 Cross-case analysis

Eventually, the researcher had to cross-examine the 8 cases, each including one higher performing team and one lower performing team. One aim of studying multiple cases is to increase the analytical generalizability of the study. At a deeper level, the aim is to see processes and outcomes across many cases to understand how they are qualified by local conditions, and thus to develop more sophisticated descriptions (Miles and Huberman, 1994). Many researchers approach cross-case comparison by forming types or families. That is, investigators inspect cases to see whether they fall into clusters or groups that share certain patterns or configurations. To do that, the cross-case data have to be made comparable via common reporting formats for each case.

Again using NUDIST (2002), the comparison of single-case summaries across cases completed the analysis procedure. That is, the single-case summaries were combined to create a *meta-matrix* (Miles and Huberman, 1994). This meta-matrix was used to assemble and prune down the individual case summaries to one cross-case summary that

had considerably condensed the original data. This analysis moved from single-case matrices to the meta-matrix by summarizing the findings of each single team in a set of brief sentences. Once the data were condensed the researcher was able to identify patterns across cases. However, when patterns emerged it was vital to refer to the original individual case reports to investigate potential themes in greater detail. As such, the condensed form of the meta-matrix forced the researcher to stay grounded in the case data and prevented him escaping into vagueness or premature abstraction. The rich detail of the single case reports, on the other hand, allowed for tracing emerging patterns back to their origins. Chapter 6 provides the discussion of the findings, synthesizing identified patterns of the cross-case analysis.

5.4 Limitations of the research design

Although the selected research design was deemed the most appropriate for this study, a set of limitations are apparent and include the following:

1. Due to the exploratory nature of this research, in-depth field interviews were used in a small number of service firms. Further, no scales were used to measure variables. Therefore, the findings should be considered tentative.

2. The study focuses on a very specific industry sub-sector, which may hamper the generalizability of findings. However, many other highly complex services share the characteristics of services in corporate banking. Besides, the focus of investigation was the service development process rather than the service itself. As such, it is maintained that the results may be analytically generalized to similar new service developments within a business-to-business context.

3. By the use of retrospective data, this study relies on managerial perceptions of virtual teamwork. Although this method is common in the extant literature, the problem of bias effect is always present. Additional problems are poor recall and poor, inaccurate articulation. Nevertheless, throughout the interviews, the respondents were asked for names of participants and dates of events to keep

them grounded in the particulars and thus to aid their recall (Alam, 2002). Also, the problem of bias was addressed by using the triangulation of evidence and the triangulation of respondents.

4. The team managers were the first to be interviewed in every selected firm. They were free to choose the two teams they reported on. Successively, the respective team members were selected based on the team managers' accounts of events. This process of team selection again created the problem of bias because project managers might choose only those teams they thought would make their department 'look good'. However, this concern about respondent reliability was addressed by having the respondent select two projects, one where a team was higher performing and one where a team was lower performing. Also, using several key informants such as the team manager as well as the team members allowed information to be crosschecked and verified.

5. Finally, it must be highlighted that the case study method is not a panacea and can lead sometimes to overly complex theories sacrificing parsimony (Parkhe 1993). Eisenhardt (1989) comments on this by saying that faced with vivid, voluminous data, researchers are tempted to build theory that tries to capture everything. However, in this study the research methodology is guided by a tentative conceptual framework. As such, this framework attempts parsimoniously to tie core variables into an integrated theoretical system (Parkhe, 1993).

5.5 Conclusion

This chapter has discussed the research objectives, the research design, the methodology followed, and has provided the rationale for selecting the research method for this study. The study is based on qualitative field research in the form of multiple case studies. The primary tool for data collection is the personal in-depth interview, secondary tools are case documentation and, as a supporting tool, case observation. Data were collected through 32 in-depth personal interviews in eight cases, each case comprising one higher

and one lower performing virtual NSD team. The method of data analysis included single-case pattern matching and cross-case meta-matrix analysis. The next chapter will provide an overview of the single-case findings.

CHAPTER 6

OVERVIEW OF THE CASE FINDINGS

6.1 Introduction

This chapter is based on the data analysis where each of the eight cases was examined individually and emerging data patterns were subjected to the initial conceptual framework and propositions (see Appendix V). The following discussion is organized into two parts. First, the chapter provides an overview of the single-case findings briefly discussing emerging data patterns in the higher and the lower performing project teams. Also, the emerging data patterns are succinctly subjected to the propositions. Second, the chapter provides a meta-matrix that assembles all emerging data patterns across cases in relation to the propositions. Based on this meta-matrix the most frequent data themes are identified for the further discussion in Chapter 7.

6.2 The cases

The following section provides a discussion on the single-case findings. Table 6.1 outlines the key characteristic of the eight cases, each case comprising one higher and one lower performing virtual NSD team.

Please note Figure 6.2 at the end of this chapter (see section 6.3) provides the meta-matrix. The reader is encouraged to refer to the meta-matrix throughout the following discussion.

Table 6.1: Overview of the case characteristics

Cases	Informants	Documentation (in addition to generic marketing material such as brochureware, annual reports, and business cards)	Team performance	Teamwork effectiveness	Type of innovation	Duration of project	Team characteristics
Case1, Team 1 Goldman Sachs Higher Performing Team	Team Manager, Associate A, Managing Director	Communication protocol, Project proposals	On time, On budget, High individual, satisfaction, High collective satisfaction	High teamwork effectiveness throughout project execution	Incremental: Third-Party Equity Scheme	22 weeks	1 team manager, 4-12 team members dispersed across 2-3 locations depending on project phase
Case1, Team 2 Goldman Sachs Lower Performing Team	Team Manager, Associate B, Managing Director	Communication protocol, Project proposals	Project delayed, Project over budget, Low individual satisfaction, Low collective satisfaction	Teamwork effectiveness fluctuated from moderate to low to high	Incremental: Exchange Rate Inventory System	32 weeks	1 team manager, 3-6 team members dispersed across 2-3 locations depending on project phase
Case 2, Team 3 Schroders Higher Performing Team	Team Manager, Associate A	Communication protocol, Project proposals	On time, On budget, High individual, satisfaction, High collective satisfaction	High teamwork effectiveness throughout project execution	Incremental: Property Fund	Initiation: 3 years Development and Launch: 20 weeks	1 team manager, 4-14 team members dispersed across 3 locations depending on project phase
Case 2, Team 4 Schroders Lower Performing Team	Team Manager, Associate B	Communication protocol, Project proposals	Project delayed, Project over budget, Low individual satisfaction, Low collective satisfaction	Teamwork effectiveness fluctuated from low to moderate to high	Incremental: Property Fund	32 weeks	1 team manager, 12-21 team members dispersed across 1-4 locations depending on project phase

Continued overleaf

Cases	Informants	Documentation (in addition to generic marketing material such as brochureware, annual reports, and business cards)	Team performance	Teamwork effectiveness	Type of innovation	Duration of project	Team characteristics
Case 3, Team 5 NM Rothschild Higher Performing Team	Team Manager, Associate A, Managing Director	Project proposals	On time, On budget, High individual, satisfaction, High collective satisfaction	High teamwork effectiveness throughout project execution	Radical: Acquisition Finance Structure	44 weeks	1 team manager, 9-68 team members dispersed across 3-4 locations depending on project phase
Case 3, Team 6 NM Rothschild Lower Performing Team	Team Manager. Associate B	Project proposals	Team suspended during initiation phase	Low teamwork effectiveness during initiation phase	Incremental: Acquisition Finance Structure	6 weeks	1 team manager, 7 team members dispersed across 2 locations
Case 4, Team 7 Barclays Capital Higher Performing Team	Team Manager, Associate A, Managing Director	Project proposals	Project delayed, On budget, High individual, satisfaction, High collective satisfaction	High teamwork effectiveness throughout project execution	Incremental: Commercial Mortgage Backed Securities	60 weeks	1 team manager, 8– ca.110 team members dispersed across 2-5 locations depending on project phase
Case 4, Team 8 Barclays Capital Lower Performing Team	Team Manager, Associate B, Managing Director	Project proposals	Project delayed, Low individual satisfaction, Low collective satisfaction	Teamwork effectiveness fluctuated from high to low to moderate	Incremental: Purchasing Finance Structure	24 weeks	2 team managers, 5– ca.100 team members dispersed across 2-4 locations depending on project phase
Case 5, Team 9 Abbey National Higher Performing Team	Team Manager, Associate A, Managing Director	Communication protocols, project proposals, memos	On time, On budget, High individual, satisfaction, High collective satisfaction	Teamwork effectiveness fluctuated from high to moderate	Incremental: Mortgage-Backed Securities	29 weeks	1 team manager, 4-10 team members dispersed across 3-5 locations depending on project phase

Continued overleaf

Cases	Informants	Documentation (in addition to generic marketing material such as brochureware, annual reports, and business cards)	Team performance	Teamwork effectiveness	Type of innovation	Duration of project	Team characteristics
Case 5, Team 10 Abbey National Lower Performing Team	Team Manager, Associate B, Managing Director	Communication protocols, project proposals, memos	Project delayed, Project over budget, Low individual satisfaction, Low collective satisfaction	Teamwork effectiveness fluctuated from low to high	Incremental: Mortgage-Backed Securities	22 weeks	1 team manager, 12-13 team members dispersed across 4-6 locations depending on project phase
Case 6, Team 11 Lloyds TSB Higher Performing Team	Team Manager, Associate, Manager A, Manager B	Project proposals, online project log	On time, On budget, High individual, satisfaction, High collective satisfaction	High teamwork effectiveness throughout project execution	Radical: Internet-Based B-to-B Transaction Service	35 weeks	1 team manager, 10 team members dispersed across 2-5 locations depending on project phase
Case 6, Team 12 Lloyds TSB Lower Performing Team	Team Manager, Associate, Manager A, Manager B	Project proposals, online project log	Project terminated during initiation	High teamwork effectiveness during initiation	Radical: Internet-Based B-to-B Transaction Service	15 weeks	1 team manager, 17 team members dispersed across 3 locations
Case 7, Team 13 Bank of Scotland Higher Performing Team	Team Manager, Associate A, Manager	Communication protocols, project proposals	On time, On budget, High individual, satisfaction, High collective satisfaction	High teamwork effectiveness throughout project execution	Incremental: Integrated Finance Product	14 weeks	1 team manager, 7 team members dispersed across 3 locations

Cases	Informants	Documentation (in addition to generic marketing material such as brochureware, annual reports, and business cards)	Team performance	Teamwork effectiveness	Type of innovation	Duration of project	Team characteristics
Case 7, Team 14 Bank of Scotland Lower Performing Team	Team Manager, Associate B, Manager	Communication protocols, project proposals	Project delayed, High individual satisfaction, Client withdraws from project during initiation	High teamwork effectiveness during initiation	Incremental: Integrated Finance Product	7 weeks	2 team managers, 40 team members dispersed across 5 locations
Case 8, Team 15 Deutsche Bank Higher Performing Team	Team Manager, Associate, Manager A COO	Project proposals, extract of communication schedule	On time, On budget, Moderate individual, satisfaction, Moderate collective satisfaction	Teamwork effectiveness fluctuated from high to moderate	Incremental: Integrated Finance Product	19 weeks	1 team manager, 5-32 team members dispersed across 2-4 locations depending on project phase
Case 8, Team 16 Deutsche Bank Lower Performing Team	Team Manager, Associate, Manager B	Project proposals, extract of communication schedule	High individual satisfaction Client terminates project during initiation	High teamwork effectiveness during initiation	Incremental: Integrated Finance Product	7 weeks	1 team manager, 7 team members dispersed across 3 locations

6.2.1 Case 1: Goldman Sachs

The Goldman Sachs Group, Inc. is a global investment banking and securities firm that provides services worldwide to a substantial and diversified client base. Business processes within Goldman Sachs are highly structured and are managed hierarchically. Multi-disciplinary teams are formed to develop new products and services, which are mostly conceived for large corporate clients as well as pension and investment funds. New product development is considered a compulsory process that evolves naturally out of business activities and there are no specific mechanisms, functions or experts in place for fostering innovation. The business culture is described as highly competitive and challenging with relatively low tolerance for failure. Overall, the organization has a reputation for being aggressive and entrepreneurial.

Goldman Sachs: the higher performing team

This involved the development of a third-party equity scheme for the lending arm of Volvo Trucks, Sweden. The project commenced in March 2000 and was completed on time, on budget and to the customer's satisfaction in August 2000. Accordingly, team manager and team member voiced great content with teamwork and team performance. Senior management was informed about the project, but the general understanding was that it was too small to be of particular interest. Overall, the team yielded high teamwork effectiveness throughout project execution.

Formalization: Building on his previous experience with virtual teams, the team manger immediately established strong reporting lines and requested every member to submit a brief progress report on a daily basis. This report was submitted verbally through a sophisticated voicemail platform. Conversely, the team manager circulated a daily briefing through the voicemail platform, outlining the events of the previous day and detailing the most immediate tasks at hand. This pattern of formalization was kept unchanged throughout the complex initiation phase and the complex development phase. Formalization was slightly reduced during the less complex implementation phase when the team members had to submit verbal progress reports on a weekly instead of a daily basis. Likewise, the team manager reduced his briefing to one per week. These weekly

briefings were less rich in detail, merely outlining the overall project progress but no longer detailing specific tasks. The emerging data pattern differs from the pattern predicted in Proposition 1 and Proposition 2. The observed data pattern suggests higher formalization and effective teamwork in project phases of higher complexity (e.g. initiation and development). Conversely, the data pattern indicates lower formalization and effective teamwork in a project phase of lower complexity (e.g. implementation).

Centralization: The following data pattern was observed during the complex initiation and the complex development phase: The team manager insisted to be contacted by team members before project-related decisions were made. He would then circulate the decision to the whole team in his next voicemail memo. However, acknowledging that he was "not an expert on everything" he gave every team member great leeway in making decisions regarding minor issues that emerged in his/her area of expertise. Particularly important decisions were addressed in face-to-face meetings, attended by all team members. It was important to the team manager that risky decisions were thoroughly discussed and intelligence was gathered collectively. The final decision, however, rested with the team manager. During the less complex implementation phase, the team manager transferred the responsibility of decision-making to his colleague in Sweden. After this shift of authority, decision-making rested with the small task force located in Sweden, who adopted a decentralized, consensus-driven approach. The team manager was informed only after decisions had been made and implemented. Overall, the evidence suggests both centralization and decentralization of decision-making in a team characterized by high teamwork effectiveness. Caution is advised, however, with the term 'centralization'. The data does not suggest a centralized decision-making structure to the extent that one authority made the final decision without conferring with other team members. On the contrary, the data indicate that the entire team debated extensively about important and complex decisions before devising several possible solutions. The final decision about what solution to implement was then made in a centralized manner by the team manager. The emerging data pattern differs from the pattern predicted in Proposition 3 and Proposition 4. The observed data pattern suggests higher centralization and effective teamwork in project phases of higher complexity (e.g. initiation and

development). Conversely, the data pattern indicates lower centralization and effective teamwork in a project phase of lower complexity (e.g. implementation).

Standardization: Throughout the complex initiation phase, communication within the team was scheduled through temporal patterns as well as through directives what communication modes to deploy. That is, verbal progress reports and memos from team and team manager had to be submitted on a daily basis through the voicemail platform. The team manager circulated his memos always early in the morning, while the team members' progress reports were always submitted late in the afternoon. In addition, individual team members were requested to communicate with the team manager, but not with the whole team, via telephone at least twice per week. During the complex development phase, the team and team manager continued to forward verbal voicemail memos and reports on a daily basis. In addition, the team manager held daily telephone conferences with the Managing Director in Sweden and the team members in Frankfurt. During the less complex implementation phase, the team manager maintained phone contact with the team members in Stockholm and Frankfurt at least twice per week. These phone calls had the character of team meetings and were scheduled according to protocol. The protocol detailed timing and content of phone-calls and was devised mutually by all team members. Overall, the data suggest continuously high standardization and effective teamwork, notwithstanding fluctuations in complexity.

Goldman Sachs: the lower performing team

This involved the development of a sophisticated inventory system for Volvo Trucks. The project commenced in January 2000 and was finalized in August 2000 on time, but with a grossly inflated budget. The client was satisfied with the project but team manager and team member complained about the lack of effective teamwork. Initially, senior management was uninvolved but internal rumours combined with a budgetary increase eventually drew their attention. Overall, the team yielded varying teamwork effectiveness throughout project execution, ranging from low to moderate to high.

Formalization: During the less complex initiation phase, formalization was evident in the form of verbal reporting lines from team members to team manager on a daily basis. For example, it was mandatory for every team member to submit a verbal progress report to the team's voicemail platform on a daily basis. In addition, each member was obliged to contact the team manager per telephone once a day to receive verbal instructions on task execution. The complex development phase had to be executed in cooperation with an external joint developer. During development, the team manager abandoned any form or formalization and relied on the external party's self-organization. Despite early warning signs suggesting that teamwork with the external party formed strenuous and ineffective, the development continued up to the point of total project breakdown. After a major éclat with the client, the team manager reverted to a moderately formalized work process in the form of verbal reporting and verbal directing on a daily basis. Overall, the data suggest that a moderately formalized work process contributed to effective teamwork, whereas the absence of formalization was partly responsible for a cooperation deadlock. The emerging data pattern differs from the pattern predicted in Proposition 1 and Proposition 2. The observed data pattern suggests lower formalization and ineffective teamwork in a project phase of higher complexity (e.g. development), contradicting Proposition 1. Further, the case data display no cohesive pattern concerning Proposition 2. The data pattern indicates higher formalization and merely moderately effective teamwork in project phases of lower complexity (e.g. initiation and implementation).

Centralization: During the less complex initiation phase, decision-making was largely consensus-driven with only one occasion where the team manager proactively made a major decision on his own. Teamwork was perceived as merely moderately effective. During the more complex development phase, an external developer joined the team. However, there was no structured process of decision-making established and each team member was left in the dark about decisions made and implemented by others. Since teamwork proved ineffective, the team manager eventually re-established a structured decision-making process with patterns of moderate centralization. As a consequence, teamwork improved somewhat. These findings argue for a *structured* process of decision-making in order to attain teamwork effectiveness. Also, the data support the notion of a

balanced approach towards decision-making to yield effective teamwork. The emerging data pattern differs from the pattern predicted in Proposition 3 and Proposition 4. The data pattern suggests lower centralization and ineffective teamwork in a project phase of higher complexity (e.g. development), contradicting Proposition 3. Further, the case data display no cohesive pattern concerning Proposition 4. The data pattern indicates higher centralization and merely moderately effective teamwork in project phases of lower complexity (e.g. initiation and implementation).

Standardization: During the less complex initiation phase, the team adhered to a communication protocol, which outlined the frequency and timing of formal team meetings. These meetings were held through teleconferencing every week on the same day and at the same time. All team members were requested to attend. Communication between these meetings was unstructured and conducted through telephone or e-mail on ad hoc basis between individual members. One lengthy face-to-face meeting was conducted to address a particular complex problem. During the more complex development phase, an external developer joined the team but no specific communication patterns were established. Instead, it was agreed to maintain ad hoc communication through e-mail exchanges and telephone calls. When the project encountered substantial problems, the team manager reintroduced a formal communication protocol during the less complex development phase. In addition, a strong pattern of fortnightly face-to-face meetings was established. The emerging data pattern fifers from the pattern predicted in Proposition 5. The data pattern suggests lower standardization and ineffective teamwork in a project phase of higher complexity (e.g. development). Further, the case data display no cohesive pattern concerning Proposition 6. The data pattern indicates higher standardization and merely moderately effective teamwork in project phases of lower complexity (e.g. initiation and implementation).

6.2.2 Case 2: Schroders

Schroders Investment Management Ltd. is one of the world leaders in asset management, operating a global network of offices. The business structure is that of hierarchically managed functional departments who cooperate in cross-functional project teams to

develop and launch products. The core activities in new product development rest with creating new funds and selling these to institutional investors. The organization considers continuous innovation as one of their core competencies and is particularly active in developing alternative investments including property, structured products, private equity, and hedge funds. However, there are no specific mechanism, functions, or experts in place to guide and foster innovation. The business culture is changing due to significant reductions in headcount resulting in an internal climate of high uncertainty and low tolerance for failure. In addition, the newly appointed senior management strives to create a more competitive climate, fostering the entrepreneurial spirit among employees.

Schroders: the higher performing team

This involved the development of a new property fund featuring a portfolio of Business Parks spread across the UK. After an initiation phase of three years the actual product development commenced in April 2002 and was completed on time and on budget in August 2002. Team Manager and team members were satisfied with the project and considered it a "worthwhile experience". Overall, the team yielded high teamwork effectiveness throughout project execution.

Formalization: The less complex initiation phase continued for three years. During this period a small number of individuals were charged with the preparation of the project. The nature of the work tasks allowed these individuals to work relatively autonomous and there was no need for substantial teamwork. Accordingly, the team manager regarded any form of formalization as superfluous. However, once the project entered the highly complex development phase, the team manager established strong verbal reporting lines within the team and distributed daily written directives. These directives outlined project progress, highlighted risks, and summarized task objectives. It was maintained that a detailed written protocol was an essential ingredient to accelerate project execution by reducing ambiguity inherent in the work process. For the moderately complex implementation phase, the team size was reduced to only six individuals. Accordingly the need for formalization was reduced as well. The findings suggest that both team size and

the nature of the work task were associated with perceived complexity of the work process. The emerging data pattern differs from the pattern predicted in Proposition 1 and Proposition 2. The observed data pattern suggests higher formalization and effective teamwork in project phases of higher complexity (e.g. development and implementation). Conversely, the data pattern indicates lower formalization and effective teamwork in a project phase of lower complexity (e.g. initiation).

Centralization: Throughout the less complex initiation phase, each team member worked in relative autonomy. Decision-making was left to the discretion of the individual member with the team manager being fairly uninvolved as he considered his staff to be the experts who "know what they are doing". This decentralized decision-making structure was altered once the team entered the highly complex development phase. By that time, the team manager established a more centralized approach, making sure that he was "involved in everything, ... every decision, every turn, every change". That is, the team manager insisted on having the final word in all relevant decisions. The team manager maintained this centralized approach throughout the highly complex development phase and the complex implementation phase. These findings then suggest patterns of both centralization and decentralization throughout project execution. However, the emerging data pattern differs from the pattern predicted in Proposition 3 and Proposition 4. The observed data pattern suggests higher centralization and effective teamwork in project phases of higher complexity (e.g. development and implementation). Conversely, the data pattern indicates lower centralization and effective teamwork in a project phase of lower complexity (e.g. initiation).

Standardization: Throughout the less complex initiation phase, there was no need for intense teamwork and the team conducted both, personal and impersonal communication incidents on ad hoc basis when required. Impersonal communication was unstructured and conducted through telephone or e-mail. Face-to-face interaction was limited to occasional meetings. The team manager was updated on progress through the London based team members on a weekly basis in regular face-to-face departmental meetings. Once the team entered the highly complex development phase a communication protocol

was established. This protocol was updated on a weekly basis and scheduled all conference calls between the team manager and each participating function. In order to "make sure that everybody really understood what was going on" the team manager also called for weekly face-to-face meetings at the London office attended by the whole team including the Jersey members. These face-to-face meetings were always scheduled on the same weekday and at the same time. This pattern of intense scheduling was maintained throughout the complex implementation phase. The emerging data pattern corresponds to the pattern predicted in Proposition 5 and Proposition 6. The observed data pattern suggests higher standardization and effective teamwork in project phases of higher complexity (e.g. development and implementation), relating to Proposition 5. Conversely, the data pattern indicates lower standardization and effective teamwork in a project phase of lower complexity (e.g. initiation), relating to Proposition 6.

Schroders: the lower performing team

In 1996 Schroders Property Investment developed the first fund of its kind to feature a portfolio of properties located in the West End of London. Over the years this 'West End Fund' became a very popular investment vehicle for pension funds and in early 1999 Schroders decided to transfer the issuing house from Schroders London to Schroders Jersey. This move was intended to offer investors additional tax-related benefits. The project commenced in late December1999 and was put on halt in March 2000. After several organizational changes it was continued in late 2000 and eventually completed with a delay of nine months in February 2001. The development was considered a draining experience for all members involved including team manager and senior management. Overall, the team yielded varying teamwork effectiveness throughout project execution, ranging from low to moderate to high.

Formalization: The project was to be executed co-jointly with another, internal function. However, during the highly complex initiation phase the team manager struggled for weeks without notable success to establish an adequate reporting and communication line between the two functions, which led to a breakdown in project execution. After intensive restructuring, the project eventually commenced with strongly established lines of

reporting and directing. That is, all task forces within the team were obliged to forward written reports on a weekly basis. Conversely, the team manager distributed daily written directives, outlining project progress and specifying task objectives. According to respondents, this strong pattern of formalization facilitated teamwork and was maintained throughout the moderately complex development phase as well as the highly complex implementation phase. The problem of ineffective teamwork during initiation was based on many sources of team-conflict, one of them being that one party rejected any attempt to establish managerial mechanisms to coordinate the work process. The emerging data pattern differs from the pattern predicted in Proposition 1 and Proposition 2. The observed data pattern suggests higher formalization and effective teamwork in a project phase of higher complexity (e.g. implementation). Conversely, the data pattern suggests lower formalization and ineffective teamwork in a project phase of higher complexity (e.g. initiation). Both patterns contradict Proposition 1. Further, the case data display no cohesive pattern concerning Proposition 2. The data pattern indicates higher formalization and merely moderately effective teamwork in a project phase of lower complexity (e.g. development).

Centralization: During the highly complex initiation phase, the team manager's attempts to establish a structured process of decision-making were rebuffed by the (internal) joint-developer. As a consequence, decision-making was neither centralized nor decentralized, but arbitrary. After a project breakdown, the team manager established a largely decentralized structure of decision-making, which yielded only moderate results. Consequently, he opted for a more centralized approach, where every major decision required his approval. This approach yielded far better results and was maintained throughout the highly complex implementation phase. These findings argue for a structured approach towards decision-making, mutually agreed with all project participants. The emerging data pattern differs from the pattern predicted in Proposition 3. The observed data pattern suggests higher centralization and effective teamwork in a project phase of higher complexity (e.g. implementation), contradicting Proposition 3. In similar vein, the observed data pattern suggests lower centralization and ineffective teamwork in a project phase of higher complexity (e.g. initiation), also contradicting

Proposition 3. Further, the case data display no cohesive pattern concerning Proposition 4. The data pattern indicates lower centralization and merely moderately effective teamwork in a project phase of lower complexity (e.g. development).

Standardization: Throughout the highly complex initiation phase, the team manager struggled for weeks without notable success to establish adequate communication lines between his functions and the joint developer. Phone calls were not transferred or remained unreturned, e-mails got ignored, and several scheduled face-to-face meetings were postponed. After intensive restructuring the team manager established communication protocols, which outlined the frequency and timing of formal team meetings. These meetings were held through teleconferencing every week on the same day and at the same time. All team members were requested to attend. Communication between these meetings was unstructured and conducted through telephone or e-mail on ad hoc basis between individual members. In addition, several, intensively scheduled face-to-face meetings were conducted to address particular complex matters. This pattern was maintained throughout the moderately complex development phase as well as the highly complex implementation phase. The emerging data pattern corresponds to the pattern predicted in Proposition 5. The observed data pattern suggests higher standardization and effective teamwork in a project phase of higher complexity (e.g. implementation), relating to Proposition 5. Conversely, the pattern suggests lower standardization and ineffective teamwork in a project phase of higher complexity (e.g. initiation), also relating to Proposition 5. However, the case data display no cohesive pattern concerning Proposition 6. The data pattern indicates higher standardization and merely moderately effective teamwork in a project phase of lower complexity (e.g. development).

6.2.3 Case 3: NM Rothschild & Sons

NM Rothschild is one of the few remaining privately owned merchant banks having a history of more than 200 years. The organization provides corporate banking, treasury, investment banking, fund management, private banking and trust services to governments, corporations and individuals. NM Rothschild's business culture is changing

slowly and is described as that of a large old-established corporation with rigid hierarchies and bureaucratic systems. Innovation is neither internally nurtured nor considered a major organizational strength.

NM Rothschild & Sons: the higher performing team

In 2000, NM Rothschild's Acquisition Finance Team acted as main advisor to Gala Group in their £340m acquisition of Ladbrokes Casinos. NM Rothschild participated in the acquisition with £10m in mezzanine facilities and advised Gala Group on refinancing existing debt. To facilitate the deal, the Acquisition Finance Team developed a radically new acquisition financing structure. The project involved the close collaboration with Credits Suisse First Boston Private Equity. After an initiation phase of 5 months the project commenced in July 2000 and was completed in December 2000 on time, on budget and to the satisfaction of the client, team manager, team members, and senior management. Overall, the team yielded high teamwork effectiveness throughout project execution.

Formalization: During the less complex initiation phase, the team size was limited to 12 members, who were termed 'the core-team'. Due to this relatively small and stable team configuration, the team manager felt no need to establish formalized lines of reporting or directing. This perception changed once the team entered the complex development phase. During development, the team size had increased to 68 members and involved internal and external functions. The team manager maintained loosely structured reporting lines within his core team on a daily basis. However, to inform the rest of the team he introduced daily memos detailing progress, tasks and objectives that were circulated through e-mail. The team manager and the core team co-jointly devised these memos. According to the team manager, it proved very time-consuming and daunting to devise memos with such detail on a daily basis. However, their effectiveness made worth the effort and greatly facilitated both the coordination of teamwork as well as the distribution of information across the many functions involved. Despite a drastically reduced team size (to 8 members) for the less complex implementation phase, the team manager intended to maintain the daily memos. However, the time-pressure to meet the

deadline made any written directives unwieldy and the team reverted to verbal lines of reporting. The data indicate that the team manager felt the need for stronger formalization at project mid-stream because the team size had increased drastically. In addition, an overall volatile physical team structure with strong fluctuations in functions involved and experts involved added to overall work process complexity. To counterbalance complexity the team manager then applied tight managerial mechanisms to provide guidance and stability and to facilitate teamwork. The emerging data pattern differs from the pattern predicted in Proposition 1 and Proposition 2. The observed data pattern suggests higher formalization and effective teamwork in a project phase of higher complexity (e.g. development). Conversely, the data pattern indicates lower formalization and effective teamwork in project phases of lower complexity (e.g. initiation and implementation).

Centralization: Throughout less complex initiation, decision-making within the small core-team was purely consensus-driven. That is, the whole team discussed an issue extensively before a collective decision was made. This decision-making process was altered during the complex development phase. While the overall team size was increased to 68 members, decision-making remained centred around the core team of 12 members. That is, minor decisions were directly handled through each core member and his or her staff without contacting the team manager. Moderately important decisions were presented and explicated to the team manager through the respective core member before a mutual agreed decision was made. Major decisions that could seriously affect the project outcome were collectively addressed in the core team's face-to-face meetings. During the less complex implementation phase the team was reduced to 8 members who operated under time-pressure. To save time, each team member was authorized to make all decisions in his/her area of expertise independently without conferring with the team manager beforehand. Overall, the data suggest that centralization was adjusted according to changing variables such as the size of the team and the dispersion of team members as well as time-constraints. The emerging data pattern differs from the pattern predicted in Proposition 3 and Proposition 4. The observed data pattern suggests higher centralization and effective teamwork in a project phase of higher complexity (e.g. development).

Conversely, the data pattern indicates lower centralization and effective teamwork in project phases of lower complexity (e.g. initiation and implementation).

Standardization: After selecting the core team members, the team manager established a communication protocol, which scheduled most personal and impersonal communication incidents within the team. Since the core team comprised UK-based members only, travelling proved relatively effortless. It was therefore established to conduct face-to-face group meetings fortnightly in London. It was further agreed that all core team members had to attend these meetings on a mandatory basis. The protocol detailed the timing and location of face-to-face meetings and was updated after each meeting. Usually the meetings were scheduled for the second and fourth Tuesday of each month at 10.00 am. Occasionally, slight amendments were made according to the team members' other obligations. The meetings were strongly structured and comprised detailed task agendas, which were co-jointly devised by the team beforehand. In between face-to-face meetings the core team communicated according to an established schedule of teleconferences. That is, task groups within the team conferred with the team manager twice a day according to a task schedule. The entire team held teleconferences every week on Friday morning. During the complex development phase, the group size had increased drastically. The team manager maintained daily reporting lines with his 12 core team members through telephone and fortnightly face-to-face meetings. To communicate with the rest of the team he introduced daily memos detailing progress, tasks and objectives that were circulated through e-mail. These memos followed strict temporal patterns and were distributed every day between 4 and 5 in the afternoon. During the less complex implementation phase the team operated under time constraints to meet the project deadline. Since no time was left for further face-to-face meetings, communication was limited to intensively scheduled teleconferences. The emerging data pattern differs from the pattern predicted in Proposition 5 and Proposition 6. Complexity fluctuated throughout the project. Contrary to the propositions, the data pattern suggests that standardization remained unaltered throughout the project, despite fluctuations in complexity.

NM Rothschild & Sons: the lower performing team

In 2001, NM Rothschild's Acquisition Finance team was key mediator in the acquisition of Austrian Tabak through Gallaher Group Plc. The Acquisition Finance team developed a new acquisition facility exclusively for Gallaher. The unit was main advisor to Gallaher and acted as the mediating underwriter to a number of other participating lending houses. After an initiation phase of 14 months the actual acquisition phase commenced in May 2000 and was completed in February 2001 on time and on budget. Overall the acquisition was considered successful, with senior management and clients being satisfied. However, the whole project was split into numerous sub-projects and the selected case concentrates on a particular sub-project where team manager and team members perceived virtual teamwork as ineffective.

Formalization: Due to several unfavourable circumstances the team manager was set in charge of a project team that dealt with a business area different from his area of expertise. He therefore preferred not to interfere with the team's dealings and left the members the utmost level of autonomy. However, from the team member's perspective this leaderless autonomy translated into chaos and confusion eventually resulting in a project breakdown and the team's suspension. During the highly complex initiation phase, there were neither established lines of reporting and directing nor a clear authority to report to or receive instruction from. Respondents associated this absence of a formalized work process with the collapse of teamwork. Further, respondents described the work process as complex due to task-related factors such as low task predictability, low problem analyzability, and high team interdependence. Respondents asserted that, while task-related factors initially produced the perception of high complexity, the absence of a formalized work process subsequently increased complexity even more. The emerging data pattern differs from the pattern predicted in Proposition 1. The observed data pattern suggests low formalization and ineffective teamwork in a project phase of high complexity (e.g. initiation). The project was terminated during the initiation phase. The lack of fluctuations towards lesser complexity allows no inference regarding Proposition 2.

Centralization: Each team member was given the utmost degree of autonomy without imposing any structure on the decision-making process. According to respondents, decision-making formed particularly difficult because of the considerable lack of adequate information distribution, which resulted in confusion and ambiguity. Also the limited information available often was riddled with dubious German to English translations of technical language. As a consequence, no member was able or willing to voice an expert opinion and many documents were sent back and forth with requests for clarification, resulting in cooperation deadlocks. The data further indicate that decision-making was not structured, but arbitrary. The team's inability to establish a *structured* approach towards decision-making added to confusion and ambiguity among team members and severely hindered the decision-making process. The emerging data pattern differs from the pattern predicted in Proposition 3. The observed data pattern suggests low centralization and ineffective teamwork in a project phase of high complexity (e.g. initiation). The project was terminated during the initiation phase. The lack of fluctuations towards lesser complexity allows no inference regarding Proposition 4.

Standardization: Neither the team manager nor the team members established structured communication lines. Instead, communication was limited to occasional phone calls and few e-mail exchanges between individual team members on ad hoc basis as problems arose. It was maintained that this absence of a structured communication process was the main reason for poor inter-team communication. The emerging data pattern differs from the pattern predicted in Proposition 5. The observed data pattern suggests low standardization and ineffective teamwork in a project phase of high complexity (e.g. initiation). The project was terminated during the initiation phase. The lack of fluctuations towards lesser complexity allows no inference regarding Proposition 6.

6.2.4 Case 4: Barclays Capital

Barclays Capital is the investment banking division of Barclays Bank PLC. The business is described as entrepreneurial and competitive with emphasis on flat management structures and non-bureaucratic work processes. Innovation is considered as key to the firms' long-term strategy and several reward and initiation schemes are in place to foster

new service development. In addition, the firm maintains one of the most sophisticated technological infrastructures in the industry.

Barclays Capital: the higher performing team

This involved the development of Commercial Mortgage Backed Securities (CMBS). To facilitate the process of developing CMBS, Barclays Capital developed a bespoke IT framework to allow it to originate and service its own mortgages. The project was developed in close cooperation with Merrill Lynch New York and a specialized software firm located in Silicon Valley, USA. After an initiation phase of 5 months the project commenced in October 1999. It was completed in July 2000 delayed but on budget and to the satisfaction of the team manager and team members. Overall, the team yielded high teamwork effectiveness throughout project execution.

Formalization: Throughout the project the team made heavy use of a virtual working platform powered by online collaboration software. This platform allowed each team member to access and submit project files and to collaborate synchronously. Also, the platform contained a message board where the team manager left memos on a daily basis summarizing his phone conversations with individual team members and senior management. During the less complex initiation phase, the team manager's memos did not list directives concerning the execution of specific tasks. Instead, the memos reported on project progress in a more general sense, ensuring that crucial information was evenly distributed throughout the team. The message board also served as a medium for the team and the team manager to submit suggestions and to pose questions. During the highly complex development phase, the team manager had to supervise a development group of 110 people dispersed across the UK and the USA. To tackle this challenge, the team manager relied heavily on his core-team. That is, each member of the core team was in charge of a specified development function and would lead a subgroup of people involved in this function. Notwithstanding organizational hierarchies or boundaries, this functional subgroup had to report to and was given order from the core team member who in turn reported directly to the team manager. The team manager insisted on strong, written reporting and controlling lines within the core team, but did not interfere with

group members outside the core team. All directives from the team manager to the core team members were forwarded in writing on a daily basis, detailing task execution. Based on these memos, the core team members then issued their instructions to the many non-core members. Conversely, the core team members received written progress reports from their subordinates on a daily basis and, subsequently, forwarded these through a written summary to the team manager. Respondents asserted that these formalized lines of reporting and directing greatly facilitated information distribution and task execution within the large, dispersed team. During the less complex implementation phase, the team size was reduced to 28, mostly co-located, team members. The team manager still issued memos on a daily basis, but now requested written progress reports on a weekly instead of a daily basis. The emerging data pattern differs from the pattern predicted in Proposition 1 and Proposition 2. The observed data pattern suggests higher formalization and effective teamwork in a project phase of higher complexity (e.g. development). Conversely, the data pattern indicates lower formalization and effective teamwork in project phases of lower complexity (e.g. initiation and implementation).

Centralization: Throughout the less complex initiation phase, decision-making was largely consensus-driven. That is, the core-team frequently conferred about relevant issues with the team manager, collectively gathering intelligence before making a consensus-driven decision. Barclay's collaboration software proved particularly helpful in coordinating decision-making. The software programme contained a feature called the 'decision-tree'. Under this menu the members posted particularly complex or important issues that needed to be addressed collaboratively. Each team member then had the opportunity to file a suggestion, lead an online discussion, or phone the relevant person directly. Particularly complex and important issues such as regulatory and budgetary considerations were addressed in face-to-face meetings. During the highly complex development phase, decision-making shifted towards centralization. To ensure that the team manager received continuous information on project progress, each non-core team member was requested to contact a core-team member before proceeding with decision-making. The core team member then evaluated the importance of the issue and decided on issues of lesser significance. In cases of more important matters, however, the team

manager was consulted and the final decision was implemented only after approval from the team manager had been received. During the less complex implementation phase, the team reverted to lower centralization, with the entire team of now 28 team members collectively addressing decision-making. The emerging data pattern differs from the pattern predicted in Proposition 3 and Proposition 4. The observed data pattern suggests higher centralization and effective teamwork in a project phase of higher complexity (e.g. development). Conversely, the data pattern indicates lower centralization and effective teamwork in project phases of lower complexity (e.g. initiation and implementation).

Standardization: Throughout the project, the communication incidents within the core team were standardized through a communication log, which listed date and time of incidents as well as expected participants and task agendas. During initiation the core team conducted one teleconference per day and one face-to-face meeting per month. Because of different time zones, the daily conference calls were always held at 4.00 pm to include the New York based members. The monthly face-to-face meetings were always conducted towards the end of the month in New York. While it was mandatory for all core team members to attend both, teleconferences and face-to-face meetings, non-core team members were invited only when needed. The communication log was part of the collaboration software and accessible by the entire team. Ad hoc interaction between scheduled meetings was conducted through the online collaboration system or through telephone. During the highly complex development phase the frequency of face-to-face meetings was increased to one meeting every 3 weeks. Once the team entered the less complex implementation phase, most of the project work had to be carried out in one geographic location. The daily teleconferences were therefore substituted with daily face-to-face meetings. However, these incidents remained intensively scheduled. The emerging data pattern differs from the pattern predicted in Proposition 5 and Proposition 6. Complexity fluctuated throughout the project. Contrary to the propositions, the data pattern suggests that standardization remained unaltered throughout the project, despite fluctuations in complexity.

Barclays Capital: the lower performing team

From 2000 to 2001, the Corporate Financial Advisory Team advised Thai Airways International Public Company Ltd on an extensive aircraft-purchasing programme. The programme involved two purchasing phases and required the arrangement of a $786m facility through Barclays Capital. The first phase was arranged through a traditional financing scheme worth $235 million. However, the second phase was more elaborate in nature and involved a newly developed financing scheme conceived in cooperation with the US EXIM Bank, the UK Export Credit Guarantee Department, and the Thai Ministry of Finance. Preparation for the second purchasing phase started in February 2001. The programme was completed in July 2001 with a delay of 2 months but to satisfaction of the client and senior management. The new financing theme proved highly successful and was subsequently deployed for further financing projects. Nevertheless, team manager and team members voiced frustration with teamwork effectiveness particularly during the development and implementation phase of the project.

Formalization: During the less complex initiation phase, each participating work group had to submit a written progress report to the online collaboration platform on a weekly basis to keep the rest of the team informed. The team manager promoted an open-door policy wishing to be contacted by every team member through telephone to assist in problem solving. In addition, he maintained daily reporting lines with key personnel, giving broader strategic directives. For development an external co-developer joined the team and the team size was increased to more than 100 members. Team leadership had to be shared between the team manager and his counterpart at the joint developer organization. To co-ordinate complex development, the team manager requested written progress reports from all participating functions twice per week. While teamwork between the internal functions evolved effortlessly, the cooperation with the external co-developer proved problematic. In particular, the external party declined to submit the progress reports, dismissing the suggestion as "superfluous" and "unworkable". In addition, the joint-developer frequently ignored instructions and directives issued from the team manager. This situation resulted in a collaboration deadlock and the elimination of the joint-developer. During the less complex implementation phase, the team manager

reduced formalization, still issuing daily written instructions to team members but reducing the frequency of written progress to one per week. The data show no cohesive pattern concerning Proposition 1. Overall, the data pattern suggests higher formalization and ineffective teamwork in a project phase of higher complexity, a pattern that corresponds to Proposition 1. Yet, teamwork only proved ineffective in relation to the co-operation between the two co-developers. Internally, the data pattern indicates higher formalization and effective teamwork in a project phase of higher complexity, a pattern that contradicts Proposition 1. The case data then suggest that formalized lines of reporting and directing can be effective in phases of higher complexity, but need to be mutually agreed with all participants. Imposing formalization from the top without consensus can be a potential source for conflict, particularly when external, independent parties are involved. In relation to Proposition 2, the emerging data pattern differs from the predicted one. The observed data pattern suggests lower formalization and effective teamwork in project phases of lower complexity (e.g. initiation and implementation).

Centralization: During the less complex initiation phase, the team size was small and comprised senior personnel of the developer and the joint-developer organization. The team engaged in purely decentralized and consensus-driven decision-making. During the highly complex development phase, the team size had increased considerably and comprised two large fractions, the developer and the joint-developer. Within the developer fraction decision-making was consensus-driven, but centralized. That is, the core team conferred about relevant issues and suggested a range of possible solutions to the team manager who made the final decision. Across the two functions, decision-making had to be shared between the team manager of the developer organization and his counterpart at the joint-developer organization. However, frequent disagreement between the two managers created a working environment of underlying tensions, which was perceived by team members as "indirect rivalry". Frustrated with the resulting cooperation deadlock the team manager eliminated the joint-developer and accepted sole responsibility for the project. During the less complex implementation phase, the team reverted to decentralized and consensus-driven decision-making. Yet again, the case data display no coherent pattern concerning Proposition 3, but demonstrate the need for a

structured approach towards decision-making, mutually agreed with all participants. In relation to Proposition 4, the emerging data pattern differs from the predicted one. The observed data pattern suggests lower centralization and effective teamwork in project phases of lower complexity (e.g. initiation and implementation).

Standardization: During the less complex initiation phase, communication incidents within the team were limited to four lengthy face-to-face meetings in Washington as well as occasional phone-calls and e-mail exchanges. However, there was no established communication protocol. Once the team entered the complex development phase, the team conducted weekly meetings with the London-based participants. All other internal functions were synchronized through Barclays' collaboration software. Problems started when the external joint developer rejected the offer to implement Barclays' collaboration software. The software was rejected on the grounds that it would be far too time-consuming and costly to introduce the entire external team to the system. Instead, it was suggested to rely on telephone and e-mail as the main modes of inter-team communication. However, any attempt to establish a communication log proved unfeasible due to the large size and intricate structure of the team. Most communication incidents therefore were conducted spontaneously. The pure reliance on telephone and e-mail made co-operation "slow and painful" resulting in severe communication impasses. After several internal team members criticized the apparent lack of information and coordination, the team manager filed a complaint with senior management. Once the team entered the less complex implementation phase, several rearrangements had taken place and the team now adhered to a detailed communication protocol. In particular, face-to-face meetings and teleconferences were intensively scheduled, which resulted in more effective teamwork. Yet again, the data display neither a coherent pattern in relation to Proposition 5 nor to Proposition 6, but demonstrate the need for a structured, mutually agreed process of communication in project phases of higher complexity.

6.2.5 Case 5: Abbey National

Abbey National is one of the UK's leading financial services providers. It was established as a mutual building society more than 150 years ago and converted to a bank in 1989. Throughout 2001 the group and the wholesale banking division in particular have been engaged in an extensive restructuring programme. Senior management claims that the groups' structure has moved away from a vertical, silo-based organizational approach, to a flatter, functional structure. Employees, however, describe the organization structure as hierarchical and bureaucratic. In addition, employees complain about the poor implementation of the restructuring programme, which resulted in an organizational climate of high uncertainty and risk aversion.

Abbey National: the higher performing team

From 2000 to 2002, Abbey National Treasury Services plc had developed and launched the worldwide largest European residential mortgage-backed securitization transaction. The transactions were developed and issued via Holmes Financing PLC, a special purpose vehicle established by Abbey National. The whole project was spilt into six transactions each of which represented an own sub-project. The following refers to the fourth transaction. The fourth transaction was initiated in early February 2002 and launched in August 2002 after a development phase of 29 weeks. The project was completed on time, on budget, and to the satisfaction of the team manager and team members. Overall, the team yielded varying teamwork effectiveness throughout project execution, ranging from highly effective to moderately effective.

Formalization: Project complexity fluctuated throughout the project. Notwithstanding fluctuations in complexity, the team adhered to the same level of formalization throughout project execution. That is, the team adhered to verbal reporting, which was organized through daily teleconferences attended by all members. These communication incidents were scheduled according to a set timetable twice a day in the morning and afternoon. Formalization was present in the form of daily memos drafted by the team manager immediately after the second teleconferenced team meeting and circulated by e-mail to all team members. These memos summarized progress, redefined objectives, and

formulated tasks for each single team member. Specifically, each memo displayed four columns. The first column listed the task area and the names of the members in charge of that area. The second column briefly outlined each work task. The third column was updated daily and summarized the key points in regards to task execution. The fourth column was also updated on a daily basis and contained personal remarks from the team manager stressing the issues that needed special attention in task execution. Throughout the project, the team maintained daily teleconferences and daily memos as the main lines of reporting and directing. The emerging data pattern differs from the pattern predicted in Proposition 1 and Proposition 2. Complexity fluctuated throughout the project. Contrary to the propositions, the data pattern suggests that formalization remained unaltered throughout the project, despite fluctuations in complexity.

Centralization: According to the team manager, decision-making was consensus-driven throughout the project with the team gathering as much intelligence as possible before reaching a collective decision. The team members, however, described decision-making as largely centralized. That is, the team manger usually engaged the team in a vivid discussion, pursuing the role of devil's advocate, before making the final decision on his own. During the more complex development phase, decision-making remained centred around the team manager. This, however, resulted in frequent disputes between team manager and the external members about the strategic direction of the project. To resolve discrepancies the team manager invited all members to a clarifying face-to-face meeting in the presence of senior management. It was agreed to involve the external members more actively in the decision-making process. It was further agreed that the team manager reserved the right for having the last word in decision-making. From this point onwards teamwork was perceived as more effective. In the data collection for this study, the team manager only hinted at potential deficiencies in teamwork during development, but never discussed the issue in detail. The other two respondents, however, stated that discrepancies arose between the team manager and the external joint developer regarding an overly centralized approach towards decision-making. It was maintained by team members that strong centralization can facilitate teamwork in complex project phases, but this centralization needs to be mutually agreed with all participants rather than imposed

from the top. Complexity fluctuated throughout the project. Contrary to the propositions, the data pattern suggests that centralization remained unaltered throughout the project, despite fluctuations in complexity.

Standardization: Throughout the project, the team adhered to a communication protocol, which scheduled location, timing, and content of team meetings. During the moderately complex initiation phase, team meetings were conducted through daily telephone-conferences in which all members participated. These communication incidents were scheduled according to a set timetable twice a day in the morning and afternoon. In telephone-conferences the team discussed particularly critical issues. Between telephone-conferences team members interacted on ad hoc basis either through e-mail or telephone. Throughout the initiation phase face-to-face meetings were considered superfluous because of the familiarity of all members and their experience with the project task. During the more complex development phase, those team members located at Abbey National continued to organize communication incidents through daily telephone conferences. To incorporate the external members in the work process, the team manager introduced bi-monthly face-to-face meetings held at the London premises of Abbey National. After the development phase the project was put on halt for a period of three months over which the team continuously monitored the market to identify a window of opportunity. At this stage, the team size was reduced to two members who worked part-time for the project. Team interaction was restricted to occasional telephone calls between the two members and the team manager to evaluate market movements. Once market conditions deemed favourable the whole team united again for a complex phase of intense cooperation. Throughout the last three weeks of teamwork, communication incidents resumed through daily telephone conferences and three intensively scheduled face-to-face meetings. The emerging data pattern differs from the pattern predicted in Proposition 5 and Proposition 6. Complexity fluctuated throughout the project. Contrary to the propositions, the data pattern suggests that standardization remained unaltered throughout the project, despite fluctuations in complexity.

Abbey National: the lower performing team

In early 2001, the Holmes residential mortgage master trust issued its second securitization transaction including mortgage-backed notes totalling £1.6 billion equivalent. The project was under supervision of the newly appointed Managing Director of Wholesale Banking, who had just joined Abbey National from a competitor. The project was completed after a development time of 5 months with a delay of 6 weeks and over budget. Team manager and team members voiced dissatisfaction with the project and with teamwork. The completed product, however, proved to be a commercial success in the market.

Formalization: When the team manager took charge of the project his experience was limited to co-located teams. Building on his experience with traditional work groups the team manager adopted a management style, which he described as "unobtrusive" and "hands off". During the complex initiation phase, formalization was kept at a minimum. That is, the team adhered to a broadly defined project proposal, but there were neither structured lines of reporting nor formalized directives. Reflectively, the team manager believed that each team member worked in relative isolation on assigned tasks that corresponded to his/her area of expertise. Also, he assumed that interaction within the team evolved naturally out of the work process without the need to be particularly planned or structured. From the viewpoint of team members, however, task execution formed problematic as an apparent lack of coordination resulted in impasses in information distribution. Eventually, coordination problems escalated and two team members complained to senior management, seriously criticizing project management. For the remainder of the complex project, the team manager adopted a more proactive and "hands on" leadership style, establishing stronger lines of reporting and introducing written directives on a daily basis. Reportedly, this tighter formalization of the work process greatly facilitated teamwork. High task complexity was observed throughout the project: Contrary to Proposition 1, over initiation the data indicate lower formalization and ineffective teamwork. What further weakens Proposition 1 is the data pattern observed over development and implementation: Contrary to Proposition 1, the case data indicate higher formalization and effective teamwork in both phases. Overall then, the

case data contradict Proposition 1 while the lack of fluctuation towards lesser complexity allows no inference concerning Proposition 2.

Centralization: During highly complex initiation, decision-making evolved naturally out of the work process and followed no structured guidelines. Team members were given the utmost autonomy in deciding about the issues related to their area of expertise. The team manager remained disengaged in decision-making and only interfered when explicitly asked to do so by team members or senior management. While team members criticized the lack of formalization during initiation they reportedly welcomed the unstructured and decentralized approach towards decision-making. During development and implementation the team manager altered his leadership style and adopted a more proactive approach. While the team manager asserted that decision-making remained decentralized and consensus-driven throughout the project, the team members observed a shift towards centralization. In particular, during the highly complex implementation phase respondents described decision-making as strongly centralized. Overall the data then suggests that decision-making ranged from unstructured-decentralized to structured centralized to strongly centralized. Despite the fact that team members voiced their preference for a decentralized approach, high teamwork effectiveness was yielded only during project phases characterized by higher centralization. These findings then argue for higher centralization in project phases of high complexity. High task complexity was observed throughout the project: Contrary to Proposition 3, over initiation the data indicate lower centralization and ineffective teamwork. What further weakens Proposition 3 is the data pattern observed over development and implementation: Contrary to Proposition 3 the case data indicate higher centralization and effective teamwork in both phases. Overall then, the case data contradict Proposition 3, while the lack of fluctuation towards lesser complexity allows no inference concerning Proposition 4.

Standardization: In a first move, the team manager invited all members to a face-to-face meeting in London to get acquainted and to outline project objectives. However, it soon became clear that money and time constraints made further face-to-face meetings

unfeasible, leaving the team no other choice but to interact through telephone and e-mail. In spite of this reliance on impersonal communications, there was no communication protocol established and all inter-team communication was conducted on an unstructured, ad hoc basis. From the viewpoint of team members, task execution formed problematic as an apparent lack of inter-team communication resulted in impasses in information distribution. Team members felt "left in the dark" about the strategic direction of the project, the work of other members and the significance of their own contribution. In addition, all team members were busy individuals who participated in several different projects simultaneously. As a consequence, inter-team communication suffered due to time constraints and the inaccessibility of team members. Eventually, two team members filed a complaint, criticizing poor project management. Henceforth, the team agreed on a daily telephone-conference on a set time and with all members participating. Also, the team manager agreed with senior management to provide additional funds for a bi-monthly face-to-face meeting attended by the whole team. Working with the new strategy teamwork effectiveness improved dramatically. Particularly, the team appreciated the bi-monthly face-to-face meetings, which were seen as an opportunity to verify issues and to present work progress. Also, these meetings served as valuable platform to incorporate external members from Barclays Capital and JP Morgan who had joined the project for the development phase. However, the problem of time-constraints remained throughout the project with several team members being unable to participate in telephone-conferences or to attend face-to-face meetings on a regular basis. During the highly complex implementation phase, further face-to-face meetings proved unfeasible due to time and budget constraints. To ensure effective teamwork nonetheless, the team manager increased the telephone conferences from once to twice a day and insisted on the participation of all members. Overall, the data indicate that the lack of structured communication during the complex initiation phase was partly responsible for low teamwork effectiveness. However, once a standardized communication process was established, teamwork effectiveness improved accordingly. High task complexity was observed throughout the project: Corresponding to Proposition 5, over initiation the data indicate lower standardization and lower teamwork effectiveness. What further strengthens Proposition 5 is the data pattern observed over development and

implementation: In line with Proposition 5, the case data indicate higher standardization and higher teamwork effectiveness in both phases. Overall then, the case data strengthen Proposition 5 while the lack of fluctuations towards lesser complexity allows no inference concerning Proposition 6.

6.2.6 Case 6: Lloyds TSB

Lloyds TSB is a UK based financial services group and the UK's third largest bank. In 1998, Lloyds Bank merged with Trustee Savings Bank and acquired Scottish Widows as well as Cheltenham & Gloucester. Today the group provides the whole range of financial services including consumer banking, corporate banking, and insurances. The overall business structure is that of hierarchically managed functional departments brought together in multidisciplinary project teams to develop and launch products. In some cases the project manager continues as the product manager. The business culture is changing towards a more entrepreneurial approach. Failure is accepted where it can be demonstrated as part of learning and the need for innovation is supported at main board level. To foster innovation the corporate banking division has a team of eight people in place who organize focus groups with employees to identify potential new ideas. This team also assists individual innovators to develop their idea into a marketable product.

Lloyds TSB: the lower performing team

In 2000, the Director of the Relationship Banking Team originated the idea of developing an e-banking service, which enables internet-access to international accounts for financial services. His customers in the Financial Institution market had told him that a key requirement from their bank was to be able to gain access to tools to establish their cash position on a real time basis. With this requirement in mind, the Director devised a project proposal, which aimed at developing an Internet based service to enable Financial Institutions to access balance, transaction and advice details on their accounts held with Lloyds TSB Bank. The development was initiated in late 2000, but was put on halt after complications in early 2001.This episode is comprised in the case of the lower performing team, which, for chronological reasons, is discussed first. However, in mid

2001 the project commenced and was successfully completed in early 2002. This episode forms part of the higher performing team and is examined later.

Formalization: Once the Director of Relationship Banking had completed the first draft for a proposal, he initiated market research discussing the need for an e-banking service with several clients. It soon became clear that the clients not only welcomed the idea, but also signalled much interest in participating in the development to later adapt the service for their own businesses. Most prominently, Alpha Bank of Greece and Bankhaus Metzler of Germany were willing to co-fund the project. Since Alpha Bank acted as one of the main project sponsors, the bank insisted on being closely involved in development. Throughout the initiation phase complexity was perceived as high due to the novelty of the development and high interdependence in a team that had never worked together before. To structure the work process, the team manager introduced an online project log. That is, an online communication platform was established designed to share important information, pose questions, and contribute ideas. Most importantly, the project log provided a medium to visualize project progress. The project log listed all 'to do' tasks and all tasks that had been already completed together with remarks from the team manager and the team members. It was daily routine for all team members to visit the log and make entries. Throughout the initiation phase, teamwork was perceived as effective. However, problems started when Alpha Bank failed to transfer the second transaction of project funds. In addition, Alpha Bank's team members, who had actively and enthusiastically participated throughout initiation, suddenly seemed withdrawn and inaccessible. After several unsuccessful attempts to contact senior management at Alpha Bank, the team manager reported to his supervisor. As it turned out, Alpha Bank had lost interest in the project due to internal organizational changes and had decided to withdraw from the project. Eventually, the team manager received instructions from senior management to either find an alternative sponsor or to terminate the project. As an alternative sponsor could not immediately be found, the project was put on halt ad infinitum. The emerging data pattern differs from the pattern predicted in Proposition 1. The observed data pattern suggests high formalization and effective teamwork in a project phase of high complexity (e.g. initiation), contradicting Proposition 1. The project

was terminated during the initiation phase. The lack of fluctuations towards lesser complexity allows no inference regarding Proposition 2. The case further illustrates that a project team may attain high teamwork effectiveness but fails nonetheless for reasons beyond the team's immediate control.

Centralization: The following data pattern was observed during the complex initiation phase: day-to-day issues were left to the discretion of every team member, while moderately important decisions had to be conferred with the team manager. The team manager would then circulate the decision to the whole team through the online project log. Major decisions were collectively addressed by the whole team and required the approval of senior management. Since the project was sponsored by several organizations the team manager had to confer with the senior management of all participating parties; a process that sometimes led to delays in decision-making. The case data display no cohesive pattern concerning the Propositions. The data pattern indicates a balanced approached of both centralized and decentralized decision-making in a project phase of high complexity (e.g. initiation).

Standardization: During the early stages of the complex initiation phase, the team manager conducted three face-to-face meetings with potential team members as well as senior management of all participating organizations. These meetings were designed to establish project objectives and to devise the development strategy. Once the parties had overcome initial differences and had agreed on the project outline, the team conducted all further meetings through impersonal communications. That is, the entire team held a two-hours videoconference every Monday morning as well as online discussion sessions three to four times per week. These communication incidents were structured around a predefined agenda, which was derived out of the project log. Overall, patterns of standardized communication incidents and high teamwork effectiveness were evident throughout project execution. The emerging data pattern corresponds to the pattern predicted in Proposition 5. The observed data pattern suggests high standardization and effective teamwork in a project phase of high complexity (e.g. initiation). The lack of fluctuations towards lesser complexity allows no inference regarding Proposition 6.

Lloyds TSB: the higher performing team

After termination of the project, the angry team manager contacted several clients to present the already well-advanced project plan and to ask for sponsorship. However, at that time market conditions for wholesale and investment banks had deteriorated and many institutions were cutting costs and reducing headcount. Accordingly, the search for a potential investor, prepared to carry the main burden of development costs, remained fruitless. In a last effort the team manager contacted the innovation team at Lloyds TSB asking for support. In cooperation with the innovation team he then revised the project proposal, cut back on development costs, and presented the new proposal to the Head of Corporate Banking. In June 2001, senior management eventually approved the new project plan and allocated sufficient resources for development. No external sponsors participated. Overall, the team yielded high teamwork effectiveness throughout project execution.

Formalization: Throughout project execution formalization was evident in the form of an online project log. The project log served as a collaboration and discussion forum and was accessible by all team members through Lloyds TSB's Intranet. Once team members had entered a password and were granted access to the log, they were able to retrieve information regarding specific task areas. Each task area contained several PDF-files such as project plans, budgets, and memos. The log also allowed users to collaborate with other team members synchronously on several documents. In addition, each task area had its own message board, where team members shared information, posed questions, and contributed ideas. Most importantly, the project log provided a medium for the team manager to forward directives and to control progress. The team manager skimmed through each task area on a daily basis and submitted his remarks concerning task execution. Conversely, the team members posted daily briefs about project progress. After several weeks of intense collaboration, the project log contained hundreds of records and dozens of documents, each retrievable by team members when needed. Also, the project log left a trail of evidence for the team manager to track directives and to control project progress. Overall, strong patterns of high formalization and high teamwork effectiveness were evident throughout project execution. The emerging data

pattern differs from the pattern predicted in Proposition 1 and Proposition 2. Complexity fluctuated throughout the project. Contrary to the propositions, the data pattern suggests that formalization remained unaltered throughout the project, despite fluctuations in complexity.

Centralization: Throughout the less complex initiation phase, minor decisions were directly handled through each member individually without contacting the team manager. Moderately important decisions were presented and explicated to the team manager before a mutually agreed decision was made. Major decisions that could seriously affect the project outcome were collectively addressed in the team's face-to-face meetings. Also, for particularly important decisions the team manager conferred extensively with Lloyds TSB's senior management. During the more complex implementation phase, the team was operating under tremendous time-pressure. To save time, the team manager adopted a centralized approach and made several major decisions on his own without consulting the team first. The findings suggest patterns of both centralization and decentralization throughout the highly effective project execution. The emerging data pattern differs from the pattern predicted in Proposition 3 and Proposition 4. The observed data pattern suggests higher centralization and effective teamwork in a project phase of higher complexity (e.g. implementation). Conversely, the data pattern indicates lower centralization and effective teamwork in a project phase of lower complexity (e.g. initiation).

Standardization: Throughout project execution, communication incidents were structured through a predefined communication schedule, which detailed timing and content of team meetings. The communication schedule was retrievable through the online project log. During initiation all communication incidents were sequenced in firm temporal patterns. That is, the team conducted weekly videoconferences always on the same weekday, at the same time and through the same medium. Since all team members were located in London, albeit at different locations, the team manager arranged for bi-monthly face-to-face meetings held at Lloyds TSB headquarters. These face-to-face meetings also followed strict temporal patterns and were conducted on the first and last Wednesday of

the month, at the same time and at the same location. During implementation the work process was highly complex and required intense team interaction. The team manager therefore eliminated videoconferences in favour of weekly face-to-face meetings. Yet again, these meetings were conducted always on the same weekday and at the same time. In between personal communication incidents the team communicated through either the online project log or the telephone on ad hoc basis. The emerging data pattern differs from the pattern predicted in Proposition 5 and Proposition 6. Complexity fluctuated throughout the project. Contrary to the propositions, the data pattern suggests that standardization remained unaltered throughout the project, despite fluctuations in complexity.

6.2.7 Case 7: Bank of Scotland

Bank of Scotland forms part of the HBOS group, which was created out of the merger of Bank of Scotland and Halifax in September 2001. The HBOS Group comprises five divisions, namely retail banking, business banking, corporate banking, treasury as well as insurance and investment. The following case concentrates on the corporate banking division, which includes the business base of Bank of Scotland corporate banking, together with certain structured finance activities based in Halifax Group Treasury & Wholesale Banking. One of the main objectives of the merger between Bank of Scotland and Halifax was to restructure both organizations and to eliminate any form of superfluous bureaucracy. Today's business structure is described as flat and functional with few formal hierarchies. The business culture is characterized as open, friendly, and supportive with tolerance for occasional failure. Innovation is important to the firm's long-term strategy and a small task force of 12 people is in place to foster creativity and innovativeness among employees.

Bank of Scotland: the higher performing team

This involved the development of an Integrated Finance product for HM Plant Ltd. In 1999, HM Plant Ltd was the subject of a secondary management buy-out backed by Alchemy Partners and Bank of Scotland Structured Finance. In late 2000 management began considering ways of buying out Alchemy Partners to enable majority ownership of

the business to pass to management. Following discussions with the Glasgow Structured Finance team, management were put in touch with Bank of Scotland's Integrated Finance Unit (IFU) who, in April 2001, structured a £27 million integrated debt plus equity funding package comprising senior debt, mezzanine debt and loan stock together with a subscription for a minority equity stake. By using the innovative Integrated Finance product to fund the tertiary management buy-out, the management team were able to obtain long term funding and a majority equity stake in their business. Overall, the team yielded high teamwork effectiveness throughout project execution.

Formalization: While complexity fluctuated throughout project execution, the level of formalization remained unaltered. Formalization was limited to a written project proposal, the so-called 'Agenda'. The agenda contained five chapters, each of which addressed one project area. The first chapter discussed regulatory requirements, the second chapter contained task definitions and value propositions, the third chapter outlined the project execution framework, the fourth chapter detailed roles and responsibilities of team members, the last chapter described overall project objectives. The agenda was devised co-jointly by the entire team during the early stages of the initiation phase. Once completed, the agenda was a comprehensive document of almost 300 pages that outlined each project area with some detail. According to team members, the agenda provided valuable guidance throughout the project. However, apart from the bi-monthly updated agenda there were no formalized lines of directing or reporting in place. Instead, the team manager conferred with each team member on ad hoc basis when the need arose. In cross-case comparison, the data display the lowest level of formalization, but high teamwork effectiveness. It is interesting to note that the present case is the only higher performing team, which displays a pattern of continuously low formalization. The question emerges, what distinguishes the present team from the other teams? The data indicate that the project was perceived as less complex for two reasons: First, the team size was small and comprised team members internal to the developer organization, who had cooperated before. Second, the team configuration was stable throughout the project, with the same group of people collaborating during each project phase. It is then suggested that less formalization can yield high effectiveness in less

complex projects, where the team is small, settled, and comprises team members familiar with the work as well as with each other. The emerging data pattern differs from the pattern predicted in Proposition 1 and Proposition 2. Complexity fluctuated throughout the project. Contrary to the propositions, the data pattern suggests that formalization remained unaltered low throughout the project, despite fluctuations in complexity.

Centralization: The team agreed on a structured process of decision-making at the start of the project. Typically, the whole team conferred on particular relevant issues before determining two to four possible solutions. The team manager then discussed the potential solutions with the client, making a recommendation. The final decision, however, rested with the client. Less important issues were collectively addressed by the team before a collective decision was made. To speed up the decision-process during the development phase, decision-making on minor to moderately important issues was left to the discretion of each individual team member. Knowing each member for years the team manager trusted the sound judgement of his colleagues and appreciated their expertise. Decision-making on major issues was still addressed collectively but the final decision rested with the client. However, to reach conclusions on risky decision that not only affected the client but also the Bank, the team manager conferred with senior management including the Head of Integrated Finance and the Head of Corporate Banking. This decision-making structure remained in place throughout development and implementation. Overall, the data indicate patterns of moderate centralization to the extent that the team conferred collectively about important issues but left the final decision to a central authority. As such, the data indicate a balanced approach towards decision-making, with strong patterns of both centralization and decentralization. The data further suggest that centralization was adapted in relation to the importance and complexity of the decision being made. That is, minor decisions were directly handled through each member without contacting the team manager; moderately important decisions were made collectively by the entire team; major decisions rested with the client and/or senior management. The data also indicate that more important decisions emerged over particular complex project phases. For example, over development senior management frequently engaged in centralized decision-making to decide upon several

highly important issues. However, over the less complex initiation and implementation phase, less important issues emerged and the team engaged in less centralized decision-making. These findings then suggest an association between complexity, type of decision, and the pattern of centralization. That is, higher complexity leads to many important decisions being made, which results in higher centralization. Conversely, when complexity is less only few major issues need to be addressed and decision-making is more consensus-driven and less centralized. The emerging data pattern differs from the pattern predicted in Proposition 3 and Proposition 4. The observed data pattern suggests higher formalization and effective teamwork in a project phase of higher complexity (e.g. development). Conversely, the data pattern indicates lower formalization and effective teamwork in project phases of lower complexity (e.g. initiation and implementation).

Standardization: Throughout project execution, most communication incidents evolved naturally out of the work process without being formally structured. That is, the team communicated through telephone or e-mail on ad hoc basis. Occasionally, the team also deployed teleconferences to enable synchronous interaction between several members. However, these teleconferences were scheduled on short notice and followed neither a predefined agenda nor a temporal pattern. The only exception formed face-to-face meetings that incorporated the client. These personal communication incidents were sequenced in strict temporal patterns that were always held at the same weekday, the same time, and the same location. The meetings were always conducted at the client's site and served as a platform to discuss the project requirements in detail. To structure the meetings, the team designed a predefined agenda and deployed detailed checklists and questionnaires. Only those team meetings involving the client were planned and sequenced through intensive scheduling. Again, it is suggested that the team was able to yield high effectiveness through lesser standardization because of overall lesser project complexity.

Bank of Scotland: the lower performing team

In addition to funding management buyouts, IFU provides development funding to businesses. In the case of easyCar, IFU intended to develop an integrated loan stock and

equity funding package to finance the expansion of the car rental business into mainland Europe and the UK. Initiated in early 2000, the project was co-jointly supervised by the Managing Director at IFU and his counterpart at NBGI Private Equity. Despite a successful initiation phase, product development stalled due to internal discrepancies resulting in a development delay of three weeks. The client, who was continuously in negotiations with other banks, impatiently withdrew from the project and switched to the competition.

Formalization: During the highly complex initiation phase, the team was intricately structured comprising 12 internal members and 28 external members, dispersed across 5 locations. In addition, the physical team configuration was highly volatile with varying functions being in charge of different project areas. To ensure effective teamwork the team managers introduced formal lines of reporting and directing, which respondents described as "stronger than usual". That is, the team managers asked for brief progress reports submitted by each project function in writing and on a weekly basis. These reports then were combined into one document, supplemented with directions from the team managers, and eventually distributed throughout the team by e-mail. The reports supported the project proposal by featuring more detailed, up-date information about project progress. In particular, they formed a valuable source of reference for team members who required information about project areas other than their own. Also, the team managers utilized the reports to evaluate project progress and to constantly revise the development strategy. The observed data pattern suggests high formalization and effective teamwork in a project phase of high complexity (e.g. initiation), contradicting Proposition 1. The project was terminated during the initiation phase. The lack of fluctuations towards lesser complexity allows no inference regarding Proposition 2.

Centralization: while day-to-day issues were left to the discretion of each team member, the entire team collectively addressed moderately important decisions. Decision-making on major issues was centred on senior management. Since the project was executed co-jointly with another organization decision-making proved to be a slow and strenuous process. In particular, the project was under supervision of two team managers and both

had to be consulted on major issues. This procedure proved to be very time-consuming with team members first contacting the team managers individually and then waiting for a response until the two managers had conferred with each other. The process was additionally prolonged for very important decisions. In this case, the team managers had to confer with senior management of each developer organization. One such occasion arose towards the end of the initiation phase when the team managers had to contact senior management to reach agreement on a particularly important decision. However, partly due time constraints and partly due to indecisiveness, senior management was unable to reach rapid conclusions, deferring project development for three weeks. In the meantime, the client had negotiated a better funding deal with a competitor and, using the delay as an excuse, withdrew from the project. The data indicate a balanced approach towards decision-making with centralization being adapted in relation to the importance and complexity of the decision being made. However, the case also illustrates that an overly complex decision-making process can result in a damaging project delay. Further, decision-making centred on the wrong authority, one that is too detached from the actual project execution, can lead to deferred and inadequate judgments.

Standardization: The lower performing team was characterized by a large team size and a highly volatile physical team structure. The team managers therefore decided to arrange initial face-to-face meetings to make the team members acquainted and to discuss project execution. Throughout the initiation phase, the team conducted three lengthy face-to-face meetings. These were structured along a predefined agenda, which outlined the areas and stages of development. Once the project specifications were established, the team continued to co-operate through impersonal communications. That is, the two team managers co-jointly drafted a communication schedule detailing the time and date of videoconferences, which had to be attended by all team members. Typically, the team conducted two videoconferences per week always on Tuesday morning and Friday afternoon. The observed data pattern suggests high standardization and effective teamwork in a project phase of high complexity, corresponding to Proposition 5. The project was terminated during the initiation phase (e.g. initiation). The lack of fluctuations towards lesser complexity allows no inference regarding Proposition 6.

6.2.8 Case 8: Deutsche Bank

Deutsche Bank is one of the leading international financial service providers and Germany's largest bank. While maintaining subsidiaries throughout the world, the group's home market is Europe with a strong position in the German and English market. The business culture is reported to have changed recently towards a highly entrepreneurial culture. A very rapidly implemented restructuring programme in combination with extensive redundancies has led to a working climate described as competitive, uncertain, and stressful. Innovation and NPD/NSD are neither nurtured internally nor recognized as being of particular importance.

Deutsche Bank: the higher performing team

This involved the development of a particularly complex service for Expamet International Ltd that combined a public to private transfer with acquisition requirements. The project was initiated in early 2002 and completed in May 2002, on time and on budget to the satisfaction of senior management and the client. However, the team was less than satisfied with team performance. The project involved the close cooperation between DB Capital Mezzanine Partners London and Paris, DB Capital Private Equity London, and 3i Birmingham. It was co-jointly supervised by the Managing Director of DB Capital Partners London and his counterpart at 3i Birmingham.

Formalization: Respondents asserted that for virtual teamwork the work process was stronger formalized than for traditional, departmental project work. That is, each project function had to distribute a brief, written progress report by e-mail to all members and to the client on a weekly basis. Conversely, the team manager circulated instruction to his team every morning by e-mail, detailing the most pressing issues at hand and commenting on general progress. These instructions varied in detail according to the complexity and importance of the current project task as well as the overall project progress. For example, when the team was executing a project stage that was less complex and overall progress was satisfactorily, the team manager's memos were limited to brief advice. However, when the project stage was difficult and overall progress was slow, the memos contained several pages of detailed instructions. During the highly

complex development phase, the team manager continuously distributed daily memos and requested daily progress reports from each project function. The newly joined external team members, however, submitted reports infrequently and delayed, which the internal, incumbent members perceived as highly disturbing. For the implementation phase the team size was reduced to 5 core members. However, approximately 20 non-core members participated sporadically, many joining the project for only a short duration to execute an expert task. To coordinate the participation of the many non-core members, the team manager requested written reports from each collaborator to be submitted after task execution. Conversely, the team manager circulated detailed progress reports throughout the entire team on a daily basis. Overall the data indicate that strong formalization can yield teamwork effectiveness to the extent that the team size is large and the team is intricately structured comprising various functions, locations, and hierarchies. However, the case also demonstrates that strong formalization needs to be carefully implemented. At the start of the project the team manager established strong lines of formalization, which were mutually agreed with all internal team members. However, once external members joined the team the existing lines of formalization were imposed on them rather than newly negotiated. Reportedly, such authoritative conduct turned into a source of conflict and caused the external members to infringe. The emerging data pattern shows no cohesive pattern in relation to Proposition 1. The observed data pattern suggests higher formalization and effective teamwork in a project phase of higher complexity (e.g. implementation), contradicting Proposition 1. Yet, in another highly complex project phase (e.g. development) the data pattern indicates higher formalization and ineffective teamwork, due to the aforementioned discrepancies with the external collaborators. Further, the emerging data pattern differs from the pattern predicted in Proposition 2. The observed data pattern suggests lower formalization and effective teamwork in a project phase of lower complexity (e.g. initiation).

Centralization: Respondents asserted that team members had great leeway in deciding independently upon minor decisions that were related to their area of expertise. However, for major issues that affected other task areas, the team manager had to be consulted. Typically, the team manager would listen to the arguments and then agree to the proposed

conclusions. Quite regularly, however, he would insist on a different solution or confer with senior management before taking the final decision. This centralized decision-making structure was maintained throughout the entire project execution. However, due to a general lack of cooperation during development, the team manager was not contacted for several important decisions. That is, the external team members proactively made decisions on their own without requesting the authorization of the team manager. Overall, the data indicate patterns of centralization to the extent that single team members conferred with the team manager on major issues, while the final decision rested solely with the team manager. The data further indicate that the entire team debated extensively about important and complex decisions before devising several potential solutions. However, the final decision what solution to implement was made in a centralized manner by the team manager. In addition, the case displays an interesting pattern: During development the data suggest high complexity and strong centralization but merely moderate teamwork effectiveness. Respondents asserted that teamwork was perceived as less effective partly because the external team members made unauthorized decisions without consulting the team manager or other team members. This infringement led to inadequate information distribution as well as problems in task execution. It was asserted by respondents that strong centralization was rejected for the same reason as strong formalization: because it was imposed on the external team member rather than mutually agreed. The emerging data pattern differs from the pattern predicted in Proposition 3 and Proposition 4. Complexity fluctuated throughout the project. Contrary to the propositions, the data pattern suggests that centralization remained unaltered throughout the project, despite fluctuations in complexity.

Standardization: The team's communication incidents were organized through regular coordination meetings with very structured and full agendas. These meetings followed a predefined communication schedule that listed the date and time, the communication mode deployed, the attendees, as well as the task agenda. Throughout project execution team meetings were always held on Monday morning at 10 o'clock. However, the communication modes deployed for these meetings varied from phase to phase. During initiation the team conducted weekly face-to-face meetings at the London premises of

Deutsche Bank. The client, represented by four senior executives, attended some of these meetings to be updated on progress. During development the team size had increased from 17 members to 32 members including experts from DB Capital Mezzanine Partners Paris, DB Capital Private Equity London, and 3i Birmingham. To account for the international dispersion of team members, the team manager substituted the weekly face-to-face meetings with weekly video-conferenced meetings still held on Monday morning. However, initial cooperation between all divisions proved problematic with some team members not attending meetings or not returning phone calls and e-mails in a timely manner. The situation escalated when two team members from Paris and Birmingham failed to attend a video-conferenced meeting with the client. During implementation, the team maintained weekly videoconferences that were still conducted on Monday morning and with all core team members participating on a mandatory basis. Non-core members joined these meetings when requested. These communication incidents were also intensively scheduled. The emerging data pattern differs from the pattern predicted in Proposition 5 and Proposition 6. Complexity fluctuated throughout the project. Contrary to the propositions, the data pattern suggests that standardization remained unaltered throughout the project, despite fluctuations in complexity. However, the case further illustrates that standardized communication incidents are effective only when all team members are willing and able to adhere to the communication protocols and to attend team meetings.

Deutsche Bank: the lower performing team

This involved the development of an acquisition project for Bakkavor Group. The project was initiated in December 2001 and discontinued in March 2002. Supervised by the Managing Director of DB Capital Partners London, it involved the close cooperation between DB Capital Mezzanine Partners London, DB Capital Private Equity London, DB Capital Partners Germany and two other European banks. Within 8 working days of the introduction, DB Capital Partners had received initial credit approval as well as support from the Loans Distribution team for a £80m sole underwrite. The other banks contacted responded later and were not prepared to offer this commitment. However, problems started when the external transaction advisers insisted on a Deutsche Bank-led co-

underwrite along with another bank. Unfortunately, this other bank was unable to obtain final credit approval for more than 50% of their proposed commitment, so a third bank was introduced. When the third bank also failed to obtain final credit approval, the project was temporarily discontinued. After four months of suspension Bakkavor Group commenced the acquisition but with a different consortium of banks excluding DB Capital Partners. Despite the ultimate project failure, teamwork was perceived as highly effective throughout the short but intense initiation period of one week. The case provides another example for a team that attained high teamwork effectiveness but failed nonetheless for reasons beyond the team's control.

Formalization: Facing a highly competitive situation, the team manager was aware of the need to deliver fast results. Nonetheless, he had to be careful to warrant a proper risk analysis. To ensure fast and efficient project execution, the team manager restricted the team size to 7 members and selected the most experienced experts available. Since all of these were busy professionals, already engaged in other projects, the team manager offered good words as well as substantial bonuses to secure their participation. The team comprised 5 members from DB Capital Partners London and 2 analysts, well informed about the client's industrial area, from DP Capital Partners Germany. To structure the work process during the highly complex initiation phase, the team manager established three telephone-conferences per day with all team members participating. These meetings were called 'snap-shots', designed as very brief and very focused incidents that addressed the most important issues at hand. To keep the team focused, the team manager tasked an assistant with drafting a structured agenda prior to every meeting. That is, the assistant created the agenda in close cooperation with the team manager and then distributed the document with illustrating material one hour before every meeting through e-mail. In that way, all members were able to prepare for the meeting by formulating questions and contemplating suggestions. This effort was maintained for each of up to four teleconferences per day. The emerging data pattern differs from the pattern predicted in Proposition 1. The observed data pattern suggests high formalization and effective teamwork in a project phase of high complexity (e.g. initiation). The project was

terminated during the initiation phase. The lack of fluctuations towards lesser complexity allows no inference regarding Proposition 2.

Centralization: Throughout the complex initiation phase, decision-making was purely consensus-driven, with all team members contemplating about possible solutions before reaching a collective conclusion. According to the team manager, a purely decentralized approach was established for three reasons. First, all participants were highly experienced experts. Second, the team manager was well acquainted with all team members and trusted their sound judgement. Third, the team harmonized well and was able to reach rapid, consensus-driven conclusions. Overall, the data then suggest that low centralization enabled effective teamwork due to the small and settled team configuration as well as the familiarity of team members with the work tasks and with each other. The emerging data pattern corresponds to the pattern predicted in Proposition 3. The observed data pattern suggests low centralization and effective teamwork in a project phase of high complexity (e.g. initiation). The project was terminated during the initiation phase. The lack of fluctuations towards lesser complexity allows no inference regarding Proposition 4.

Standardization: The team cooperated for only 8 days before the project was suspended. Facing a highly competitive situation, the team manager was aware of the need to deliver fast results. To structure interaction, the team manager established up to four teleconferences per day with all team members participating. These meetings were called 'snap-shots', designed as very brief and very intense incidents that addressed the most important issues at hand. To keep the team focused, the team manager tasked an assistant with drafting a structured agenda prior to every meeting. These teleconferences followed a predictable temporal pattern with each conference scheduled every day at the same hour. To be able to participate in all telephone conferences the team members used their mobile phones calling from remote places like Hong Kong and Shanghai, from various locations such as airplanes and restaurants, and at very odd hours. During this short but effective period of intense collaboration all communication incidents were planned and sequenced through intensive scheduling. The emerging data pattern corresponds to the pattern predicted in Proposition 5. The observed data pattern suggests high

standardization and effective teamwork in a project phase of high complexity (e.g. initiation). The project was terminated during the initiation phase. The lack of fluctuations towards lesser complexity allows no inference regarding Proposition 6.

6.3 Cross-case data themes

The previous section provided an overview of the single-case data analysis. Each of the eight cases was analyzed and emerging data patterns were subjected to the initial conceptual framework and propositions. Table 6.2 provides the cross-case meta-matrix, which assembles all emerging data patterns across cases in relation to the initial propositions.

Overall, the case data strengthen the proposition that high teamwork effectiveness has a positive impact on the tangible and intangible dimensions of team performance. However, the data weaken the propositions concerning the association of teamwork effectiveness and managerial structure. In cross-case comparison the data suggest the following data themes:

In relation to *formalization*, the data theme suggests higher formalization and effective teamwork in project phases of higher complexity. Conversely, the data theme indicates lower formalization and effective teamwork in project phases of lower complexity (Figure 6.1).

In relation to *centralization* the data theme suggests higher centralization and effective teamwork in project phases of higher complexity. Conversely, the data theme indicates lower centralization and effective teamwork in project phases of lower complexity (Figure 6.2).

Last, in relation to *standardization* the data theme suggests that standardization in effective teams remained unaltered throughout project execution, despite fluctuations in complexity (Figure 6.3). These emerging data themes are further discussed in the next chapter.

Table 6.2: Emerging data patterns subjected to propositions

	Higher Task Complexity: P1: Lower formalization of the work process is positively associated with teamwork effectiveness.	*Lower Task Complexity:* P2: Higher formalization of the work process is positively associated with teamwork effectiveness.	*Higher Task Complexity:* P3: Lower centralization of decision-making is positively associated with teamwork effectiveness.	*Lower Task Complexity:* P4: Higher centralization of decision-making is positively associated with teamwork effectiveness.	*Higher Task Complexity:* P5:Higher standardization of communication incidents is positively associated with teamwork effectiveness.	*Lower Task Complexity:* P6: Lower standardization of communication incidents is positively associated with teamwork effectiveness.	*Tangible Performance* P7: Teamwork effectiveness is positively associated with the tangible dimension of team performance.	*Intangible Performance* P8: Teamwork effectiveness is positively associated with the intangible dimension of team performance.
Case 1, Team 1 Goldman Sachs Higher Performing Team	(-) Data pattern differs: Higher formalization and effective teamwork in project phases of higher complexity.	(-) Data pattern differs: Lower formalization and effective teamwork in project phases of lower complexity.	(-) Data pattern differs: Higher centralization and effective teamwork in project phases of higher complexity.	(-) Data pattern differs: Lower centralization and effective teamwork in project phases of lower complexity.	(-) Data pattern differs: Complexity fluctuated throughout the project. Standardization remained unaltered throughout the entire project, despite fluctuations in complexity.	(-) Data pattern differs: Complexity fluctuated throughout the project. Standardization remained unaltered throughout the entire project, despite fluctuations in complexity.	(+) Data pattern corresponds: Teamwork was highly effective throughout project execution. Project was on time and on budget.	(+) Data pattern corresponds: Teamwork was highly effective throughout project execution. Respondents reported high individual and collective satisfaction.
Case 1, Team 2 Goldman Sachs Lower Performing Team	(-) Data pattern differs: Lower formalization and ineffective teamwork in project phases of higher complexity.	(0) No cohesive data pattern	(-) Data pattern differs: Lower centralization and ineffective teamwork in project phases of higher complexity.	(0) No cohesive data pattern	(-) Data pattern differs: Lower standardization and ineffective teamwork in a project phase of higher complexity.	(0) No cohesive data pattern	(+) Data pattern corresponds: Teamwork effectiveness fluctuated throughout project execution. Project was delayed and over budget.	(+) Data pattern corresponds: Teamwork effectiveness fluctuated throughout project execution. Respondents reported low individual and collective satisfaction.
Case 2, Team 3 Schroders Higher Performing Team	(-) Data pattern differs: Higher formalization and effective teamwork in project phases of higher complexity.	(-) Data pattern differs: Lower formalization and effective teamwork in project phases of lower complexity.	(-) Data pattern differs: Higher centralization and effective teamwork in project phases of higher complexity.	(-) Data pattern differs: Lower centralization and effective teamwork in project phases of lower complexity.	(+) Data pattern corresponds: Higher standardization and effective teamwork in project phases of higher complexity.	(+) Data pattern corresponds: Lower standardization and effective teamwork in project phases of lower complexity.	(+) Data pattern corresponds: Teamwork was highly effective throughout project execution. Project was on time and on budget.	(+) Data pattern corresponds: Teamwork was highly effective throughout project execution. Respondents reported high individual and collective satisfaction.
Case 2, Team 4 Schroders Lower Performing Team	(-) Data pattern differs: Higher formalization and effective teamwork in a project phase of higher complexity. Conversely, lower formalization and ineffective teamwork in a project phase of higher complexity.	(0) No cohesive data pattern	(-) Data pattern differs: Higher centralization and effective teamwork in a project phase of higher complexity.	(0) No cohesive data pattern	(+) Data pattern corresponds: Higher standardization and effective teamwork in a project phase of higher complexity. Conversely, lower standardization and ineffective teamwork in a project phase of higher complexity.	(0) No cohesive data pattern	(+) Data pattern corresponds: Teamwork effectiveness fluctuated throughout project execution. Project was delayed and over budget.	(+) Data pattern corresponds: Teamwork effectiveness fluctuated throughout project execution. Respondents reported low individual and collective satisfaction.

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	Higher Task Complexity: P1: Lower formalization of the work process is positively associated with teamwork effectiveness.	*Lower Task Complexity:* P2: Higher formalization of the work process is positively associated with teamwork effectiveness.	*Higher Task Complexity:* P3: Lower centralization of decision-making is positively associated with teamwork effectiveness.	*Lower Task Complexity:* P4: Higher centralization of decision-making is positively associated with teamwork effectiveness.	*Higher Task Complexity:* P5:Higher standardization of communication incidents is positively associated with teamwork effectiveness.	*Lower Task Complexity:* P6: Lower standardization of communication incidents is positively associated with teamwork effectiveness.	*Tangible Performance* P7: Teamwork effectiveness is positively associated with the tangible dimension of team performance.	*Intangible Performance* P8: Teamwork effectiveness is positively associated with the intangible dimension of team performance.
Case 3, Team 5 NM Rothschild Higher Performing Team	(-) Data pattern differs: Higher formalization and effective teamwork in project phases of higher complexity.	(-) Data pattern differs: Lower formalization and effective teamwork in project phases of lower complexity.	(-) Data pattern differs: Higher centralization and effective teamwork in project phases of higher complexity.	(-) Data pattern differs: Lower centralization and effective teamwork in project phases of lower complexity.	(-) Data pattern differs: Complexity fluctuated throughout the project. Standardization remained unaltered throughout the entire project, despite fluctuations in complexity.	(-) Data pattern differs: Complexity fluctuated throughout the project. Standardization remained unaltered throughout the entire project, despite fluctuations in complexity.	(+) Data pattern corresponds: Teamwork was highly effective throughout project execution. Project was on time and on budget.	(+) Data pattern corresponds: Teamwork was highly effective throughout project execution. Respondents reported high individual and collective satisfaction.
Case 3, Team 6 NM Rothschild Lower Performing Team	(-) Data pattern differs: Low formalization and ineffective teamwork in a project phase of high complexity.	(0) No data pattern: Lack of fluctuations towards lesser complexity allows no inference regarding P2.	(-) Data pattern differs: Low centralization and ineffective teamwork in a project phase of high complexity.	(0) No data pattern: Lack of fluctuations towards lesser complexity allows no inference regarding P4.	(-) Data pattern differs: Low standardization and ineffective teamwork in a project phase of higher complexity.	(0) No data pattern: Lack of fluctuations towards lesser complexity allows no inference regarding P6.	(0) No data pattern: Tangible performance dimensions are not applicable	(+) Data pattern corresponds: Teamwork effectiveness fluctuated throughout project execution. Respondents reported low individual and collective satisfaction.
Case 4, Team 7 Barclays Capital Higher Performing Team	(-) Data pattern differs: Higher formalization and effective teamwork in project phases of higher complexity.	(-) Data pattern differs: Lower formalization and effective teamwork in project phases of lower complexity.	(-) Data pattern differs: Higher centralization and effective teamwork in project phases of higher complexity.	(-) Data pattern differs: Lower centralization and effective teamwork in project phases of lower complexity.	(-) Data pattern differs: Complexity fluctuated throughout the project. Standardization remained unaltered throughout the entire project, despite fluctuations in complexity.	(-) Data pattern differs: Complexity fluctuated throughout the project. Standardization remained unaltered throughout the entire project, despite fluctuations in complexity.	(-) Data pattern differs: Teamwork was highly effective throughout project execution. Project was on budget, but delayed.	(+) Data pattern corresponds: Teamwork was highly effective throughout project execution. Respondents reported high individual and collective satisfaction.
Case 4, Team 8 Barclays Capital Lower Performing Team	(0) No cohesive data pattern	(-) Data pattern differs: Lower formalization and effective teamwork in project phases of lower complexity.	(0) No cohesive data pattern	(-) Data pattern differs: Lower centralization and effective teamwork in project phases of lower complexity.	(0) No cohesive data pattern	(0) No cohesive data pattern	(+) Data pattern corresponds: Teamwork effectiveness fluctuated throughout project execution. Project was delayed.	(+) Data pattern corresponds: Teamwork effectiveness fluctuated throughout project execution. Respondents reported low individual and collective satisfaction.

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	Higher Task Complexity: P1: Lower formalization of the work process is positively associated with teamwork effectiveness.	*Lower Task Complexity:* P2: Higher formalization of the work process is positively associated with teamwork effectiveness.	*Higher Task Complexity:* P3: Lower centralization of decision-making is positively associated with teamwork effectiveness.	*Lower Task Complexity:* P4: Higher centralization of decision-making is positively associated with teamwork effectiveness.	*Higher Task Complexity:* P5:Higher standardization of communication incidents is positively associated with teamwork effectiveness.	*Lower Task Complexity:* P6: Lower standardization of communication incidents is positively associated with teamwork effectiveness.	*Tangible Performance* P7: Teamwork effectiveness is positively associated with the tangible dimension of team performance.	*Intangible Performance* P8: Teamwork effectiveness is positively associated with the intangible dimension of team performance.
Case 5, Team 9 Abbey National Higher Performing Team	(-) Data pattern differs: Complexity fluctuated throughout the project. Formalization remained unaltered throughout the entire project, despite fluctuations in complexity.	(-) Data pattern differs: Complexity fluctuated throughout the project. Formalization remained unaltered throughout the entire project, despite fluctuations in complexity.	(-) Data pattern differs: Complexity fluctuated throughout the project. Centralization remained unaltered throughout the entire project, despite fluctuations in complexity.	(-) Data pattern differs: Complexity fluctuated throughout the project. Centralization remained unaltered throughout the entire project, despite fluctuations in complexity	(-) Data pattern differs: Complexity fluctuated throughout the project. Standardization remained unaltered throughout the entire project, despite fluctuations in complexity.	(-) Data pattern differs: Complexity fluctuated throughout the project. Standardization remained unaltered throughout the entire project, despite fluctuations in complexity.	(+) Data pattern corresponds: Teamwork was highly effective throughout project execution. Project was on time and on budget.	(+) Data pattern corresponds: Teamwork was highly effective throughout project execution. Respondents reported high individual and collective satisfaction.
Case 5, Team 10 Abbey National Lower Performing Team	(-) Data pattern differs: Lower formalization and ineffective teamwork in project phases of higher complexity. Further, higher formalization and effective teamwork in project phases of higher complexity.	(0) No data pattern: Lack of fluctuations towards lesser complexity allows no inference regarding P2.	(-) Data pattern differs: Lower centralization and ineffective teamwork in project phases of higher complexity. Further, higher centralization and effective teamwork in project phases of higher complexity.	(0) No data pattern: Lack of fluctuations towards lesser complexity allows no inference regarding P4.	(+) Data pattern corresponds: Higher standardization and effective teamwork in project phases of higher complexity. Further, lower standardization and ineffective teamwork in project phases of higher complexity.	(0) No data pattern: Lack of fluctuations towards lesser complexity allows no inference regarding P6.	(+) Data pattern corresponds: Teamwork effectiveness fluctuated throughout project execution. Project was delayed and over budget.	(+) Data pattern corresponds: Teamwork effectiveness fluctuated throughout project execution. Respondents reported low individual and collective satisfaction.
Case 6, Team 11 Lloyds TSB Higher Performing Team	(-) Data pattern differs: Complexity fluctuated throughout the project. Formalization remained unaltered throughout the entire project, despite fluctuations in complexity.	(-) Data pattern differs: Complexity fluctuated throughout the project. Formalization remained unaltered throughout the entire project, despite fluctuations in complexity.	(-) Data pattern differs: Higher centralization and effective teamwork in project phases of higher complexity.	(-) Data pattern differs: Lower centralization and effective teamwork in project phases of lower complexity.	(-) Data pattern differs: Complexity fluctuated throughout the project. Standardization remained unaltered throughout the entire project, despite fluctuations in complexity	(-) Data pattern differs: Complexity fluctuated throughout the project. Standardization remained unaltered throughout the entire project, despite fluctuations in complexity	(+) Data pattern corresponds: Teamwork was highly effective throughout project execution. Project was on time and on budget.	(+) Data pattern corresponds: Teamwork was highly effective throughout project execution. Respondents reported high individual and collective satisfaction.
Case 6, Team 12 Lloyds TSB Lower Performing Team	! (-) Data pattern differs: High formalization and effective teamwork in a project phase of high complexity.	(0) No data pattern: Lack of fluctuations towards lesser complexity allows no inference regarding P2.	(0) No cohesive data pattern	(0) No data pattern: Lack of fluctuations towards lesser complexity allows no inference regarding P4.	(+) Data pattern corresponds: High standardization and effective teamwork in a project phase of high complexity.	(0) No data pattern: Lack of fluctuations towards lesser complexity allows no inference regarding P6.	(-) Data pattern differs: Teamwork was highly effective throughout project execution. Project was terminated.	(-) Data pattern differs: Teamwork was highly effective throughout project execution. Project was terminated.

Continued overleaf

	Higher Task Complexity: P1: Lower formalization of the work process is positively associated with teamwork effectiveness.	*Lower Task Complexity:* P2: Higher formalization of the work process is positively associated with teamwork effectiveness.	*Higher Task Complexity:* P3: Lower centralization of decision-making is positively associated with teamwork effectiveness.	*Lower Task Complexity:* P4: Higher centralization of decision-making is positively associated with teamwork effectiveness.	*Higher Task Complexity:* P5:Higher standardization of communication incidents is positively associated with teamwork effectiveness.	*Lower Task Complexity:* P6: Lower standardization of communication incidents is positively associated with teamwork effectiveness.	*Tangible Performance* P7: Teamwork effectiveness is positively associated with the tangible dimension of team performance.	*Intangible Performance* P8: Teamwork effectiveness is positively associated with the intangible dimension of team performance.
Case 7, Team 13 Bank of Scotland Higher Performing Team	(-) Data pattern differs: Complexity fluctuated throughout the project. Formalization remained unaltered throughout the entire project, despite fluctuations in complexity.	(-) Data pattern differs: Complexity fluctuated throughout the project. Formalization remained unaltered throughout the entire project, despite fluctuations in complexity.	(-) Data pattern differs: Higher centralization and effective teamwork in project phases of higher complexity.	(-) Data pattern differs: Lower centralization and effective teamwork in project phases of lower complexity.	(-) Data pattern differs: Complexity fluctuated throughout the project. Standardization remained unaltered throughout the entire project, despite fluctuations in complexity.	(-) Data pattern differs: Complexity fluctuated throughout the project. Standardization remained unaltered throughout the entire project, despite fluctuations in complexity.	(+) Data pattern corresponds: Teamwork was highly effective throughout project execution. Project was on time. On budget was non applicable.	(+) Data pattern corresponds: Teamwork was highly effective throughout project execution. Respondents reported high individual and collective satisfaction.
Case 7, Team 14 Bank of Scotland Lower Performing Team	(-) Data pattern differs: High formalization and effective teamwork in a project phase of high complexity.	(-) Data pattern differs: High formalization and effective teamwork in a project phase of high complexity.	(-) Data pattern differs: Higher centralization and effective teamwork in project phases of higher complexity.	(0) No data pattern: Lack of fluctuations towards lesser complexity allows no inference regarding P4.	(+) Data pattern corresponds: High standardization and effective teamwork in a project phase of high complexity.	(0) No data pattern: Lack of fluctuations towards lesser complexity allows no inference regarding P6.	(-) Data pattern differs: Teamwork was effective throughout project execution. Project was terminated.	(-) Data pattern differs: Teamwork was effective throughout project execution. Project was terminated.
Case 8, Team 15 Deutsche Bank Higher Performing Team	(0) No cohesive data pattern	(-) Data pattern differs: Lower formalization and effective teamwork in project phases of lower complexity.	(-) Data pattern differs: Complexity fluctuated throughout the project. Centralization remained unaltered throughout the entire project, despite fluctuations in complexity.	(-) Data pattern differs: Complexity fluctuated throughout the project. Centralization remained unaltered throughout the entire project, despite fluctuations in complexity.	(-) Data pattern differs: Complexity fluctuated throughout the project. Standardization remained unaltered throughout the entire project, despite fluctuations in complexity.	(-) Data pattern differs: Complexity fluctuated throughout the project. Standardization remained unaltered throughout the entire project, despite fluctuations in complexity.	(-) Data pattern differs: Teamwork effectiveness fluctuated throughout project execution. Project on time and on budget.	(+) Data pattern corresponds: Teamwork effectiveness fluctuated throughout project execution. Respondents reported low individual and collective satisfaction.
Case 8, Team 16 Deutsche Bank Lower Performing Team	(-) Data pattern differs: High formalization and effective teamwork in a project phase of high complexity.	(0) No data pattern: Lack of fluctuations towards lesser complexity allows no inference regarding P2.	(+) Data pattern corresponds: Low centralization and effective teamwork in a project phase of high complexity.	(0) No data pattern: Lack of fluctuations towards lesser complexity allows no inference regarding P4.	(+) Data pattern corresponds: High standardization and effective teamwork in a project phase of high complexity.	(0) No data pattern: Lack of fluctuations towards lesser complexity allows no inference regarding P6.	(-) Data pattern differs: Teamwork was effective throughout project execution. Project was terminated.	(-) Data pattern differs: Teamwork was effective throughout project execution. Project was terminated.

Figure 6.1: Emerging data theme, formalization

Data Patterns: Formalization

(I) In project phases of higher complexity:

Predicted Data Pattern:

P1: Lower formalization of the work process is positively associated with teamwork effectiveness.

P1 observed in 0 project teams

Differing Data Patterns:

➡ *Pattern A: Higher formalization of the work process is positively associated with teamwork effectiveness.*

Pattern A observed in 9 project teams: 1H, 2H, 2L, 3H, 4H, 5L,6L, 7L, 8L

Pattern B: Lower formalization of the work process is negatively associated with teamwork effectiveness.

Pattern B observed in 4 project teams: 1L, 2L, 3L, 5L

Pattern C: No fluctuations in formalization throughout project execution, despite fluctuations in complexity.

Pattern C observed in 3 project teams: 5H, 6H, 7H

No cohesive pattern / No pattern due to lack of data

Observed in 2 project teams: 4L, 8H

(II) In project phases of lower complexity:

Predicted Data Pattern:

P2: Higher formalization of the work process is positively associated with teamwork effectiveness.

P2 observed in 0 project teams

Differing Data Patterns:

➡ *Pattern A: Lower formalization of the work process is positively associated with teamwork effectiveness.*

Pattern A observed in 6 project teams: 1H, 2H, 3H, 4H, 4L, 8H

Pattern B: No fluctuations in formalization throughout project execution, despite fluctuations in complexity.

Pattern B observed in 3 project teams: 5H, 6H, 7L

No cohesive pattern / No pattern due to lack of data

Observed in 7 project teams: 1L, 2L, 3L, 5L, 6L, 7L, 8L

Symbol Key (e.g.):

1H = Case 1, Higher Performing Team

2L = Case 2, Lower Performing Team

➡ Most frequent observed patterns

Source: Case Data

Figure 6.2: Emerging data theme, centralization

Data Patterns: Centralization

(I) In project phases of higher complexity:

Predicted Data Pattern:

P3: Lower centralization of decision-making is positively associated with teamwork effectiveness.

P3 observed in 1 project team: 8L

Differing Data Patterns:

➡ *Pattern A: Higher centralization of decision-making is positively associated with teamwork effectiveness.*

Pattern A observed in 9 project teams: 1H, 2H, 2L, 3H, 4H, 5L, 6H, 7H, 7L

Pattern B: Lower centralization of decision-making is negatively associated with teamwork effectiveness.

Pattern B observed in 3 project teams: 1L, 3L, 5L

Pattern C: No fluctuations in centralization throughout project execution, despite fluctuations in complexity.

Pattern C observed in 2 project teams: 5H, 8H

No cohesive pattern / No pattern due to lack of data

Observed in project 2 teams: 4L, 6L

(II) In project phases of lower complexity:

Predicted Data Pattern:

P4: Higher centralization of decision-making is positively associated with teamwork effectiveness.

P4 observed in 0 project teams

Differing Data Patterns:

➡ *Pattern A: Lower centralization of the decision-making is positively associated with teamwork effectiveness.*

Pattern A observed in 7 project teams: 1H, 2H, 3H, 4H, 4L, 6H, 7H

Pattern B: No fluctuations in centralization throughout project execution, despite fluctuations in complexity.

Pattern B observed in 2 project teams: 5H, 8H

No cohesive pattern / No pattern due to lack of data

Observed in project 7 teams: 1L, 2L, 3L, 5L, 6L, 7L, 8L

Symbol Key (e.g.):

1H = Case 1, Higher Performing Team

2L = Case 2, Lower Performing Team

➡ Most frequent observed patterns

Source: Case Data

Figure 6.3: Emerging data theme, standardization

Data Patterns: Standardization

(I) In project phases of higher complexity:

Predicted Data Pattern:

P5: Higher standardization of communication incidents is positively associated with teamwork effectiveness.

P5 observed in 6 project teams: 2H, 2L, 5L, 6H, 7L, 8L

Differing Data Patterns observed:

Pattern A: Lower standardization of communication incidents is negatively associated with teamwork effectiveness.

Pattern A observed in 4 project teams: 1L, 2L, 3L, 5L

➡ *Pattern B: No fluctuations in standardization throughout project execution, despite fluctuations in complexity.*

Pattern B observed in 7 project teams: 1H, 3H, 4H, 5H, 6H, 7H, 8H

No cohesive pattern / No pattern due to lack of data

Observed in 1 project team: 4L

(II) In project phases of lower complexity:

Predicted Data Pattern:

P6: Lower standardization of communication incidents of decision-making is positively associated with teamwork effectiveness.

P6 observed in 1 project team: 2H

Differing Data Patterns observed:

➡ *Pattern A: No fluctuations in standardization throughout project execution, despite fluctuations in complexity.*

Pattern A observed in 7 project teams: 1H, 3H, 4H, 5H, 6H, 7H, 8H

No cohesive pattern / No pattern due to lack of data

Observed in 8 project teams: 1L, 2L, 3L, 4L, 5L, 6L, 7L, 8L

Symbol Key (e.g.):

1H = Case 1, Higher Performing Team

2L = Case 2, Lower Performing Team

➡ Most frequent observed patterns

Source: Case Data

6.4 Conclusion

This chapter provided an overview of the single-case findings and highlighted the key findings in relation to managerial structure, teamwork effectiveness, and project complexity. These findings were derived from the data analysis provided in Appendix V where each of the eight cases was examined individually and emerging data patterns were subjected to the initial conceptual framework and propositions. Further, the chapter provided a meta-matrix that assembled all emerging data patterns across cases in relation to the propositions. Subsequently, the most frequent data themes across cases were identified. The next chapter will provide a discussion on the cross-case data themes, reformulate the propositions, and revise the initial conceptual model.

CHAPTER 7

DISCUSSION OF THE FINDINGS, REFORMULATION OF PROPOSITIONS, AND REVISION OF CONCEPTUAL MODEL

7.1 Introduction

This chapter builds on the data analysis provided in Appendix V, where each of the eight cases was first examined individually and then in cross-case comparison to explore the initial conceptual framework and propositions. The following discussion provides a synthesis of the cross-case findings and is organized in two parts. First, the findings are discussed in reference to the initial propositions and variables formulated. Second, the propositions are reformulated and the conceptual framework is revised.

7.2 Discussion of the findings

7.2.1 Findings: managerial structure

Overall, the case data underline the initial argument that virtual NSD teams operate within a highly complex and dynamic environment. The situation facing these teams frequently is complex in terms of both the tasks that they must perform and the environment with which they must cope. Managers of virtual teams are particularly challenged, as they have to cope with contextual complexity as well as manage a group of geographically dispersed individuals who rarely meet in person. In particular, managers of virtual teams are challenged to coordinate and organize the NSD process to ensure effective virtual teamwork and attain high team performance. This study examined the organization and coordination of virtual teamwork with reference to managerial structure (see 3.4.3 and 4.3). Managerial structure was analyzed along three dimensions: *formalization,* the existence of written directives and reports to mandate and control the work process; *centralization,* the centrality of decision-making authority; and *standardization*, the extent to which communication incidents are planned and sequenced through intensive scheduling (see 4.5.2.2).

It was suggested that research on managerial structure must be sensitive to the use of multiple structural dimensions as well as the contextual characteristics of tasks and of the

virtual team itself. Based on the literature that informs this study, it was concluded that the simplistic notion of a homogeneous managerial structure inhibits understanding of the complex and dynamic process of virtual teamwork (see 4.3). It was therefore proposed that the management of virtual teams requires different levels of managerial looseness or tightness under varying levels of task complexity to yield high teamwork effectiveness. In particular, it was proposed that higher task complexity in combination with lower formalization of the work process, lower centralization of decision-making but higher standardization of communication incidents would be associated with higher teamwork effectiveness. Conversely, it was proposed that lower task complexity in combination with higher formalization, higher centralization but lower standardization would be associated with higher teamwork effectiveness. In the following the findings are discussed in regards to these propositions. However, for a better understanding it is helpful to first address the concept of task complexity.

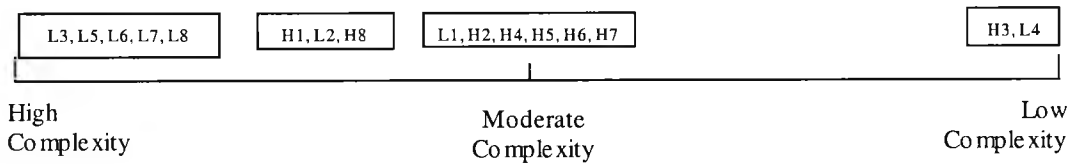
7.2.1.1 Task complexity

In order to address the propositions, this thesis investigated perceived task complexity at certain phases of the NSD process. Based on previous research it was expected that team members perceive the work tasks in NSD as more and less complex at different points in time. For example, the early stages of the development process were assumed to be particularly complex because of the lack of clearly defined project boundaries, objectives, and responsibilities (see 4.3.3). In preparing the interviews for data collection the development process was therefore divided into three generic phases, (initiation, development and implementation) and the same questions were posed regarding task complexity for each of the three phases (see 5.3.2.8.1). These questions were formulated in accordance with task complexity being defined as the level of task predictability, problem analyzability, and team interdependence inherent in the work process (see 4.5.2.4).

Overall, the findings indicate that members of virtual teams do perceive fluctuations in the complexity of the NSD process. For example, some teams considered the initiation phase to be more complex than the implementation phase, while other teams perceived

the development phase as more complex than the initiation phase. While the data display inconsistent patterns across projects, they display strong and consistent patterns *within* projects. That is, in each of the eight cases respondents not only perceived fluctuations in complexity, but also agreed on the level of complexity for each of the three project phases. It was encouraging to note this general agreement in perceptions of task complexity among team members, suggesting a considerable level of intra-group convergence. The data further suggest that respondents perceived project phases rarely as low in complexity, but mainly as moderately complex or highly complex. This comes of little surprise, since the teams under investigation executed highly complex work tasks and operated within a highly complex and dynamic environment. Further, the case data suggest that most lower performing teams perceived overall task complexity as high, whereas most higher performing teams evaluated overall task complexity as moderate (Figure 7.1).

Figure 7.1: Cross-case pattern, overall task complexity[1]



The findings further indicate that there are several variables in addition to task-related factors that appear to impact on perceived complexity. That is, the nature of the task being performed does indeed determine perceived complexity though the level of task predictability, problem analyzability and team interdependence. However, in addition to these task-related factors there are several internal factors that also impact on complexity such as the size of the team, the number of experts involved, or the experience of the team members. For example, the team may feel comfortable with the execution of a familiar task such as the drafting of a contract (e.g., low task complexity because of high

[1] Source: Case Data
Symbol Key (e.g.): H1 = Higher performing team, Case 1; L2 = Lower performing team, Case 2

task predictability, high problem analyzability, low team interdependence). Yet, the team may find the overall work process highly complex nonetheless because some members are not adept with virtual teamwork and have no experience with the videoconference device. Alternatively, an unreliable, external collaborator may add significantly to perceived work process complexity. While the internal factors that have shown to impact on overall work process complexity are examined at a later stage, at this point of the discussion three important findings should be highlighted: First, virtual teams did perceive fluctuations in the complexity of the work tasks. Second, task complexity was rarely perceived as low but as moderately complex or highly complex. Third, high complexity derived not only from factors related to the work tasks, but also from factors related to the internal environment in which the teams operated.

7.2.1.2 Formalization of the work process

It was proposed that higher task complexity would necessitate lower formalization to yield high teamwork effectiveness. Conversely, it was proposed that lower task complexity would necessitate higher formalization to yield high teamwork effectiveness (see 4.4.1). The case data weaken these propositions. The data indicate the opposite pattern (see 6.3). In cross-case analysis a strong theme emerges suggesting that the more complex the task the more formalization is evident in effective teams. The high formalization of a highly complex work process tends to enable effective virtual teamwork by providing coordination, continuity, and long-term stability for the team. Conversely, lesser complexity is associated with lower formalization in effective teams. When complexity is less, the team members often know what to expect because they have encountered the situation before. Accordingly, they are more able to rely on their self-organization and require less written directives that provide organization and coordination. Also, when complexity is less the team manager feels less pressure for controlling project progress on a constant basis. Indeed, the weakest lines of reporting and directing were observed in project phases, where the team was small, settled and all team members were well acquainted with the work tasks as well as with their peers. Under such stable circumstances, the team was able to yield high teamwork effectiveness through lower formalization (Case 7 Bank of Scotland).

Further, the case data suggest that teams characterized by effective teamwork display data patterns of higher formalization than teams characterized by ineffective teamwork. In effective teams the complex work process is formalized through detailed instructions, agendas and memos. These are distributed throughout the team on a daily or at least weekly basis and specify the team manager's directives as well as project progress and tasks at hand. Distribution occurs either in writing through e-mail and collaboration software or verbally through voicemail and telephone. Also, the originator of these memos is always the team manager or, in larger teams, a very close associate. In general, the case data suggest three forms of formalization: (a) formalization of task execution, (b) formalization of information distribution, and (c) formalization of communication incidents.

(a) Formalization of task execution: this involves the precise description of *what* task needs to be executed, suggestions as to *how* to execute the task, and a reminder of *who* is going to execute the task. For example, a memo would list the task of drafting a contract, suggest the inclusion of a highly important clause and mention the name of the lawyer charged with task execution. However, this directive is rarely imposed by the team manager alone but collectively conceived and determined by the team. That is, the team cooperatively lists the imminent tasks at hand, debates about the nature and requirements of the task and selects the most appropriate member or members for execution. After approving both, the suggested task as well as the person in charge of execution, the team manager then circulates the summary throughout the team.

(b) Formalization of information distribution: in addition to formalizing work tasks in the form of memos, effective teams also formalize the process of memo distribution. That is, memos and agendas are distributed through a predefined scheme on a set time and in strict periodical patterns. For example, the team manager circulates memos always through e-mail, every day and strictly between 10 and 12 in the morning. In another team, the team manager leaves a verbal brief on a voicemail platform every morning before 9am. This predictability of information distribution not only ensures that information is delivered in a timely manner, but also gives team members a sense of

stability and confidence to work alone or in ever-changing sub-groups. It reduces ambiguity in the task by structuring expectations and making response times predictable. However, it is less the frequency of information distribution that seems to be most important, but the predictability and reliability of distribution.

(c) Formalization of communication incidents: while the standardization of communication incidents is discussed at a later stage, it needs to be stressed that, when teamwork is perceived effective, communication incidents are highly formalized as well. That is, communication incidents in the form of group meetings are meticulously prepared through memos before the meeting, detailed agendas during the meeting, and summaries after the meeting. This was observed for all types of group meetings either face-to-face or technology mediated. For example, a memo announcing a team meeting would establish the content of the meeting, while the meeting itself would be structured along an exhaustive agenda detailing all subjects and task areas. After the meeting, a brief would be circulated throughout the team as well as to external parties summarizing the points discussed and the decisions made. It must be stressed that this pattern of formalization was not only evident in particularly important team meetings, but also in regular coordination meetings held on a daily or weekly basis. One higher performing team even maintained this effort for each of up to four coordination meetings per day (Case 8 Deutsche Bank).

In addition to the above, the case data suggest highly formalized reporting lines between team members and team manager. That is, team members are requested to submit a written progress report to the team manager on a daily or at least weekly basis. This report typically comments on the status of work progress, the problems encountered in task execution, and the solutions implemented. It also comments on the overall project development and provides suggestions with regard to problems encountered by other team members. In some teams, these progress reports are directly and confidentially sent to the team manager, who may circulate some of the points raised in his next memo. In other teams, progress reports are openly distributed throughout the team either through e-mail, voicemail, or collaboration software. Again, the case data suggest a predictable

temporal pattern in reporting, set by a predefined schedule that details the time and frequency of reporting. For example, reporting might occur by individuals or a task group, every day or every week, through e-mail or telephone, but it always occurs at the same time, the same day, through the same source and the same medium.

While there are many factors, as discussed later, that may impact on the perceived effectiveness of virtual teamwork, lower teamwork effectiveness is found to be associated with a general lack of the type of formalization described above. That is, virtual teams characterized by lower formalization tend to complain about inadequate inter-team communication, deficiencies in information distribution, and poor task execution. Indeed, teams where team members have great autonomy in executing their work and where formal lines of directing and reporting are eliminated generally have considerable difficulties in attaining effective coordination of their work processes. The lack of clear directives leaves members with much guesswork how to execute their tasks, which in turn results in confusion, uncertainty and, eventually, the incompatibility of their work with the work of other members. Members of virtual teams, characterized by lower formalization, frequently described teamwork as "frustrating", admitting they "had no clue what the others were up to" and "had a sense of general chaos and confusion". On the other hand, teams characterized by higher formalization were able to work efficiently and confidently, alone or in task groups, attaining high quality in task execution. These findings then indicate that higher formalization of a complex work processes does enable effective virtual teamwork by providing coordination, continuity, and long-term stability for team members.

7.2.1.3 Centralization of decision-making

It was proposed that higher task complexity would necessitate lower centralization to yield higher teamwork effectiveness. Conversely, it was proposed that lower task complexity would necessitate higher centralization to yield higher teamwork effectiveness (see 4.4.1). Yet again, the case data weaken these propositions. Quite to the contrary, the emerging data theme indicates that higher task complexity resulted in more important decisions being made, which prompted higher centralization (see 6.3).

Conversely, when complexity was less, fewer important issues needed to be addressed and decision-making remained more consensus-driven. That is, the more complex the work-process, the more important the decisions and the more centralized decision-making. A centralized decision-making process in complex situations enabled effective virtual teamwork by supporting information sharing within the team and shortening response-time.

In particular, the case data indicate that in teams characterized by effective teamwork decision-making remained centralized on either the team manager alone or the team manager and senior management when complexity was high. However, one must distinguish between minor decisions, decisions of moderate importance, and major decisions. In general, minor decisions are left to the discretion of each team member or task group without the need for first conferring with the team manager. For example, a task force charged with the asset analysis of an acquisition target is free to make all the decisions related directly to the analysis. However, if this task force detects an irregularity that might affect other areas of the project, it has to confer with the rest of the team. Typically, the entire team then collectively addresses issues of moderate importance and makes a consensus-driven decision. However, if the team manager finds the matter highly important because it could seriously affect the overall project outcome, he adopts a more centralized approach. That is, in effective teams decision-making on highly complex issues tends to be centred on one central authority such as the team manager alone or the team manager and senior management.

Caution is advised, however, with the term 'centralization'. In effective teams decision-making is rarely centralized to the extent that one authority makes the final decision without conferring with other team members. On the contrary, the data indicate that all of the team members debate extensively about important and complex decisions before devising several possible solutions. The final decision about what solution to implement is then made in a centralized manner by one central authority (e.g., the team manager alone and/or senior management and/or the client). The case data indicate that centralization of decision-making is closely linked to information distribution and

control. Since managers of virtual team are not physically present to oversee work execution, they have to rely on being informed on emerging problems in an accurate and timely manner. However, every team member might have a different understanding of what constitutes an important matter and what not. Therefore, the majority of team managers voiced a deep concern of being left in the dark about potential problems, insisting on formalized reporting lines and centralized decision-making. The centralization of decision-making requires team members to contact and inform the team manager on a constant basis. This has the beneficial effect of the team manager being continuously supplied with information, which in turn adds to his confidence and strategic intelligence. Also, in particularly difficult situations a quick decision from a determined and well-informed leader can save a project from failure. Indeed, in two of the cases team members attributed the successful completion of the project to the willingness of the team manager to make a fast and purely centralized decision in a critical situation (Case 3 NM Rothschild and Case 4 Barclays Capital). However, one must point out to the difference between centralization of decision-making and centralization of knowledge. While knowledge and information need to be evenly distributed throughout the team for effective teamwork, decision-making may be restricted to one central authority.

The case data further indicate that lower teamwork effectiveness may result out of purely decentralized decision-making or decision-making centred on the wrong authority. In the former scenario, the team conferred for several weeks on a particular problem without reaching consensus, resulting in a costly project delay (Case 3 NM Rothschild). In the latter scenario, decision-making was centred on senior management instead of the team manger. Senior management, however, was first unavailable and then unable to reach a rapid conclusion, which caused the project to fail (Case 7 Bank of Scotland). Further, one cannot overestimate the importance of a structured approach towards decision-making. While both a centralized and decentralized approach can yield high teamwork effectiveness depending on the particular circumstances; the absence of a structured decision-making process will most certainly cause teamwork to suffer. Indeed, the data indicate that project teams frequently encountered problems with teamwork when the

team members had failed to establish a mutually agreed approach towards decision-making. In these cases, decision-making was neither centralized nor decentralized, but arbitrary, which resulted in deficiencies in information distribution and in poor task execution (Case 1 Goldman Sachs, Case 2 Schroders, Case 3 NM Rothschild).

Overall, the findings argue for a structured approach towards decision-making, where the process of decision-making and the focus of decision-making authority are collectively established from the outset. The data further indicate that strong centralization of decision-making for very important decisions can enable effective virtual teamwork by supporting information sharing and shortening response-time in critical situations.

7.2.1.4 Standardization of communication incidents

It was proposed that higher task complexity would necessitate higher standardization to yield higher teamwork effectiveness. Conversely, it was proposed that lower task complexity would necessitate lower standardization to yield higher teamwork effectiveness (see 4.4.1). Overall, the case data weaken these propositions. Instead, the emerging data theme suggests continuously high standardization throughout project execution without notable variations in standardization (see 6.3). That is, the majority of teams under investigation planned and sequenced all communication incidents through intensive scheduling. This pattern of high standardization was evident for all personal and impersonal communication incidents and in all project phases notwithstanding fluctuations in work process complexity.

Overall, the case data suggest that communication incidents are standardized in three ways: (a) standardization of the frequency of incidents, (b) standardization of the group of participants, and (c) standardization of the type of communication mode deployed:

(a) Standardization of the frequency of incidents: effective teams are distinguished by a strong, repeating temporal pattern of communication incidents. That is, communication incidents in the form of team meetings may be scheduled once per week or once per month, but they are always scheduled at the same weekday and at

the same time. Also, the time lapse between incidents is sequenced at a constant pace. For example, communication incidents are scheduled every fortnight or every three weeks. It is this sense of continuity that enables members to work efficiently and confidently alone or in ever-changing subgroups. Team members know well in advance, when the team is going to reunite again to discuss critical issues and to check on progress. As such, they are working persistently towards the set date. Also, the predictability of communication incidents adds to the confidence of the team manager by providing a reoccurring occasion to check on project progress.

(b) Standardization of the group of participants: the case data further indicate that communication incidents involve the same group of participants throughout project execution. That is, in smaller teams all team members are obliged to attend incidents on a mandatory basis. In larger teams, a small group of core members are required to participate in each incident, while non-core members join when requested. The predictability of which participants will attend the meeting enables team members to prepare meticulously for each incident by devising a detailed agenda. Knowing beforehand the circle of attendees, each member has the opportunity to contemplate what information to exchange and which issues to clarify. Further, the mandatory attendance of all team members greatly facilitates inter-team communication and information distribution.

(c) Standardization of the type of communication mode deployed: the data further indicate that effective teams decide collectively upon the communication mode to be deployed for communication incidents and adhere to the selected mode throughout project execution. That is, teams might conduct incidents through face-to-face meetings or through meetings mediated by Information Communication Technology such as teleconferences and videoconferences. However, once a suitable communication mode is determined, effective teams tend to deploy the same type of mode for every communication incident. For example, some teams tend to conduct incidents rarely through face-to-face meetings and prefer technology-mediation such as teleconferences. Alternatively, some teams conduct incidents that involve the

core-team always through face-to-face meetings and incidents involving the entire team always through videoconferences. Yet again, it is this sense of predictability and stability that helps reduce confusion and complexity within the highly dynamic virtual context. Team members know what to expect in each communication incident, which reduces ambiguity in the process by structuring expectations and making interaction predictable. Effective teams tend to adhere to the selected communication mode throughout project execution and only alter the mode in response to major structural changes such a drastic increase in team size or the advent of external collaborators.

The data further indicate that teams tend to encounter problems with teamwork when there is a lack of the type of standardization described above. Virtual teams that follow no predefined communication protocol and where all incidents are left to evolve arbitrarily out of the work process tend to encounter deficiencies in the quality of inter-team communication and the quality of information distribution. The absence of standardized cues that regulate the flow of communication incidents can lead to many topics being active at the same time, and team members making contributions at different times on different topics. This lack of synchronicity can lead to discontinuous and disjointed discussions and serious coordination problems. In addition, it may encourage some members to abstain from communication and go along passively with what others want, which destroys dynamism and shifts project execution to the few active participants (Case 3 NM Rothschild, Case 8 Deutsche Bank). While impromptu discussions through e-mail or telephone do occur in both effective and ineffective teams, the former are distinguished by standardized communication incidents in addition to ad hoc communication. As discussed above, standardized incidents are structured in temporal, social, and technological patterns, while unstructured ad hoc interaction between these standardized incidents tends to be mainly in response to the previous incident or in anticipation of the next one.

Further, the case data indicate that both effective and ineffective teams conduct frequent personal communication incidents in addition to impersonal communication incidents. Of

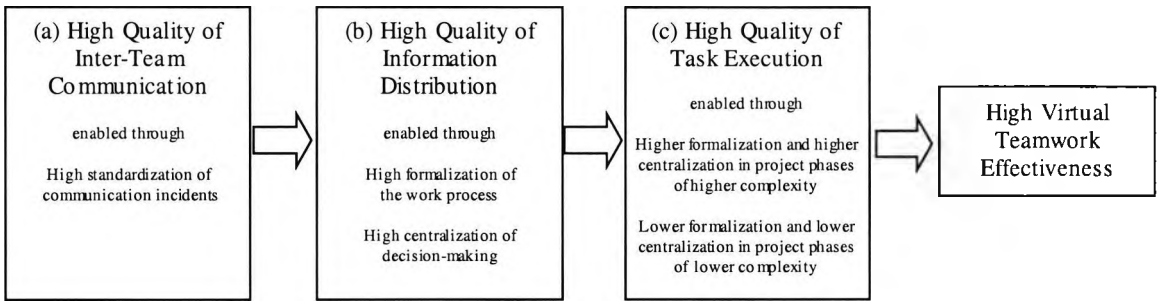
the 16 project teams investigated, only two teams limited interaction to purely impersonal communications mediated through ICT. That is, the vast majority of the sample arranged personal face-to-face meetings several times throughout project execution. This finding is quite remarkable given the fact that one major benefit of virtual teamwork is assumed to be cost and time-related efficiencies resulting out of *not* having to co-locate an internationally dispersed group of people. Yet, several teams arranged face-to-face meetings as frequently as once per week or twice per month. Indeed, most teams reportedly incurred considerable expense to unite their members in the same location and on a regular basis. Respondents asserted that face-to-face meetings provide a unique platform to address highly complex and risky issues, they allow for relationship building with other members, and facilitate the exchange of tacit knowledge. In particular, respondents emphasized the benefit of face-to-face communication to allow for synchronous dialogue among all members with a very fluid structure and intense interaction. In that way miscommunications from the past are clarified, major decisions are made, and implementation details are worked out.

7.2.2 Findings: teamwork effectiveness and managerial structure

Having discussed the three dimensions of managerial structure, the following section further examines the association between managerial structure and teamwork effectiveness. For the purpose of this study virtual teamwork was defined as *the joint interaction of team members to execute the work process.* Also, the difference was highlighted between teamwork and team performance. Teamwork refers to team interaction *during* the project, whereas team performance refers to the ultimate project outcome (see 4.4.3). Teamwork effectiveness was assessed along three dimensions: (a) quality of inter-team communication, (b) quality of information distribution, and (c) quality of task execution (see 4.5.2.3).

Figure 7.2 illustrates the findings with regard to the association between the three dimensions of teamwork effectiveness and the three dimensions of managerial structure. This association is discussed in the following.

Figure 7.2: Emerging data theme, managerial structure and teamwork effectiveness[2]



(a) Quality of inter-team communication and standardization

The findings indicate that high quality of communication between members of a virtual team is the very foundation for effective teamwork. Without ongoing communication, both personal and impersonal, there is no way of attaining high teamwork effectiveness. In virtual teams high quality of inter-team communication can be achieved through standardized communication incidents (Figure 7.5). That is, communication incidents are planned and sequenced through intensive scheduling. This scheduling dictates the frequency of meetings, the group of participants, and the type of communication mode deployed. Unscheduled and unstructured interaction occurs between standardized incidents and is mainly in response to the previous standardized incident or in anticipation of the next one. However, high quality of inter-term communication is necessary for high teamwork effectiveness, but not sufficient.

(b) Quality of information distribution and formalization/centralization

The findings indicate that effective teams are further distinguished by high quality of information distribution. This can be achieved though a formalized work process and centralized decision-making (Figure 7.5). A formalized work process with frequent written directives and written reports ensures that information is evenly and timely distributed throughout the entire team. This is particular important in virtual teams, where the team members are geographically dispersed and impromptu discussions rarely occur. Likewise, the manager of a virtual team is not physically present to oversee work execution and has to rely on being informed on emerging problems in an accurate and

[2] Source: Case data

timely manner. The centralization of decision-making requires team members to contact and inform the team manager on a constant basis. This has the beneficial effect of the team manager being continuously supplied with information, which in turn adds to his confidence and strategic intelligence. However, high quality of both, inter-team communication and information distribution, is still no guarantee for effective task execution and, ultimately, overall teamwork effectiveness.

(c) Quality of task execution and contingency theory perspective

Last, the findings indicate that teams attaining all three dimensions of teamwork effectiveness (high quality of inter-team communication, information distribution, *and* task execution) are distinguished by varying levels of managerial looseness or tightness under varying levels of task complexity (Figure 7.5). While the findings show that effective teams display continuously strong standardization throughout the NSD process, they suggest varying levels of formalization and centralization. In particular, highly effective teams are distinguished by stronger formalization and stronger centralization in project phases of higher task complexity. When tasks are perceived as highly complex, uncertainty and ambiguity are high and team members require particularly strong organization and coordination. The tightly structured work process provides coordination, continuity, and long-term stability for the team. It is this sense of predictability and constancy that helps reduce confusion and complexity within the highly dynamic virtual context. Conversely, when complexity is less team members are more able to rely on their self-organization and require less written directives. Once a team member recognizes a work task as being familiar and predictable, his/her expert judgment is the most valuable source for executing the task. Also, when complexity is less, the team manager feels less pressure for controlling project progress on a constant basis.

It must be stressed, however, that in addition to standardization, formalization, and centralization several other factors were detected that helped or hindered teamwork effectiveness. For example, having rules and procedures in place to organize and coordinate the work process is one thing. Having team members who actually follow these, is quite another. Repeatedly it was observed that a common lack of shared values

(e.g., the lack of total commitment of all participants) resulted in instructions being ignored, which in turn generated a deep sense of dissatisfaction among members. In particular, team members external to the developer organization such as consultants or joint developers often failed to observe established patterns of formalization and centralization. This negligence then led to a breakdown in communication, information distribution, and, eventually, to poor task execution. Please note that the impact of shared values and other internal factors on teamwork effectiveness will be discussed in more detail at a later stage (see 7.2.5).

Having established the association between managerial structure and teamwork effectiveness, the question emerges whether high teamwork effectiveness also yields high overall team performance? This question is addressed below.

7.2.3 Findings: teamwork effectiveness and team performance

The previous section has discussed the findings with regard to managerial structure, task complexity and teamwork effectiveness. The following section discusses the association between teamwork effectiveness and team performance.

As mentioned previously, teamwork refers to the joint interaction of team members to execute the work process, while team performance relates to the ultimate project outcome. Team performance was assessed along two performance dimensions, namely the tangible dimension and the intangible dimension (see 4.5.2.1). The tangible dimension refers to task outcomes and comprises two performance objectives: (a) completed the project on time; and (b) completed the project on budget. The intangible dimension refers to psychosocial outcomes and involves the following objectives: (c) attained individual satisfaction with project; (d) attained collective satisfaction with project. Teams were considered higher performing if they had attained at least three out of the four objectives. Teams were considered lower performing if they had attained two or less objectives.

It was proposed that teamwork effectiveness is associated with the tangible dimension of team performance. Further, it was proposed that teamwork effectiveness is associated with the intangible dimension of team performance. The case data strengthen these propositions. Indeed, a strong data theme suggests that higher teamwork effectiveness did impact positively on both dimensions of team performance, the tangible and intangible. Conversely, lower teamwork effectiveness did impact negatively on both, the tangible and the intangible dimension (see 6.3).

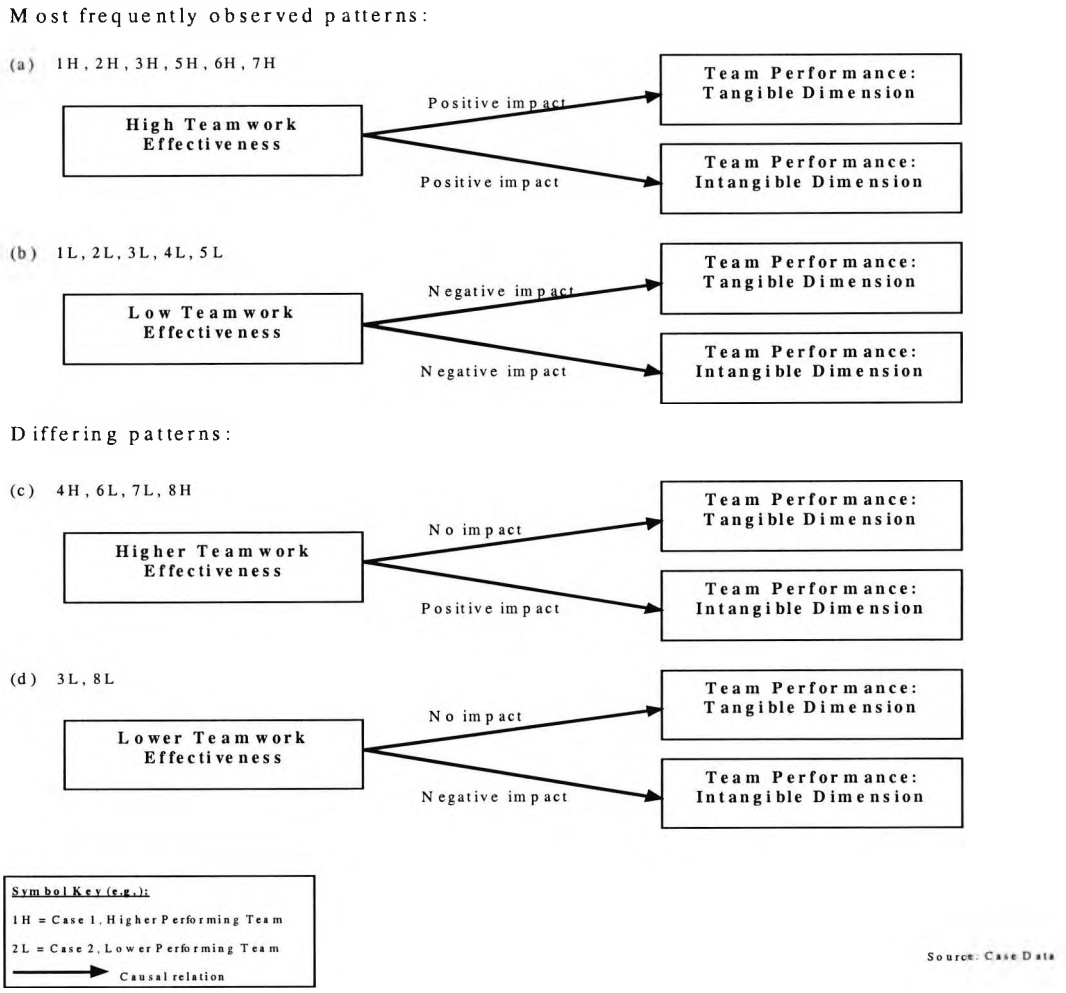
However, some cases display differing data patterns. First, in some cases higher teamwork effectiveness did positively affect only the intangible dimension but not the tangible dimension. This scenario was observed when respondents voiced great satisfaction with the project, but the project had failed nonetheless for reasons beyond the team's control. Second, lower teamwork effectiveness did negatively affect only the intangible dimension but not the tangible dimension. This situation occurred when the team perceived teamwork as strenuous and ineffective resulting in great dissatisfaction with the project. However, the project was nonetheless completed on time and on budget due to the great effort of few team champions (Figure 7.3).

The above findings then suggest that teamwork effectiveness is essential for a team to meet the intangible dimension of project performance. Without teamwork effectiveness team members will most probably be dissatisfied with the project, perceiving project execution as strenuous and problematic. However, the above findings also suggest that teamwork effectiveness is important but not essential for a team to meet the tangible dimensions of project performance. Even without effective teamwork a team might be able to deliver the project on time and on budget, given the fact that there is a determined project leader or champion who pushes the project through despite difficult contextual conditions.

Furthermore, the case data indicate another interesting pattern: respondents perceived teamwork not always as continuously effective or ineffective throughout project execution. That is, perceived teamwork effectiveness fluctuated in both the higher and the

lower performing teams. For example, a higher performing team perceived teamwork as effective during the initiation and the implementation phase of a project. Yet, over the development phase this team perceived teamwork as strenuous and ineffective due to disturbing factors such as an unreliable collaborator or lack of crucial information. The reason why the team attained high overall performance nonetheless was based on the fact that these disturbing factors were not critical enough to affect the final project outcome. In lower performing teams, however, these disturbing factors were serious enough to affect more than just one project phase and, eventually, the overall team performance. Factors that have shown to impact on teamwork effectiveness, aside from managerial structure, are shared values, skill, physical team structure, and leadership style. These are discussed in the next section.

Figure 7.3: Emerging data theme, teamwork effectiveness and team performance



7.2.4 Findings: additional internal factors of major relevance

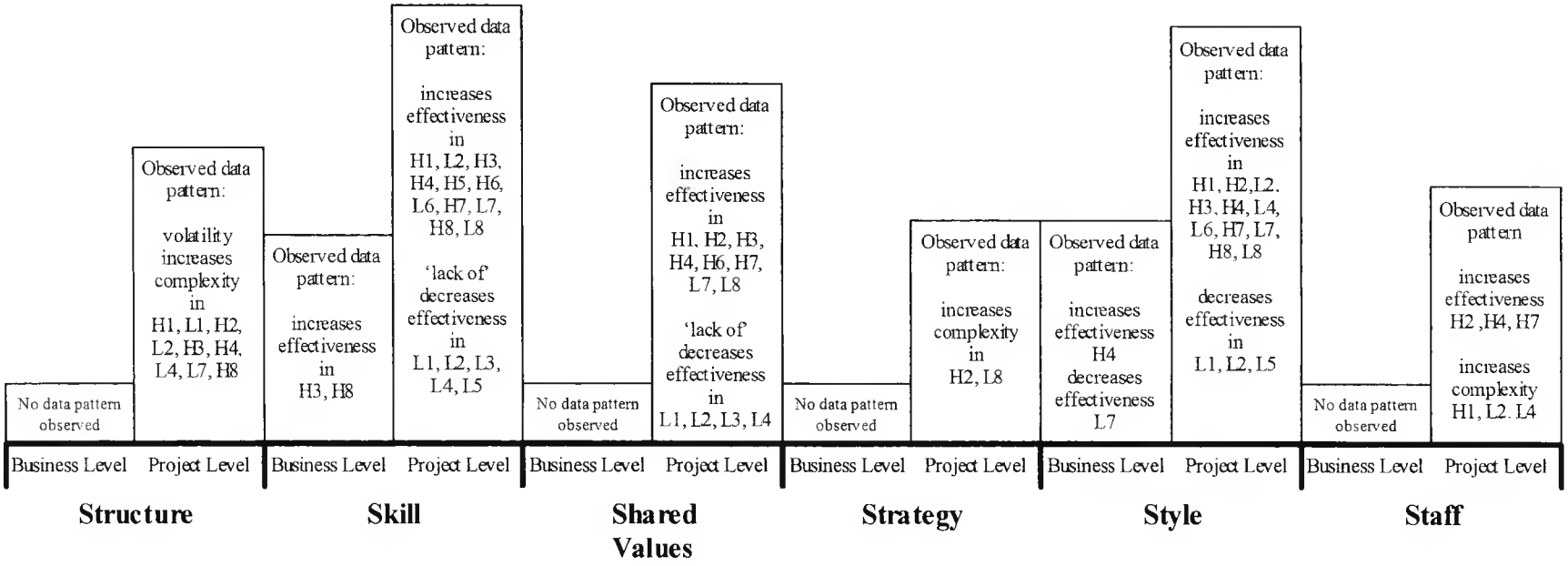
As mentioned repeatedly throughout this chapter, several internal factors were observed in addition to managerial structure that have shown to impact on perceived work process complexity and teamwork effectiveness. To facilitate an analysis of these internal factors this study deploys the McKinsey '7Ss' framework, as introduced in section 3.2.4, further discussed in section 4.5.1, and defined in section 4.5.2.5. While it is not claimed that the '7Ss' capture the full diversity of what underlies the NSD process, the framework proved highly valuable in assessing relevant internal organizational factors in addition to the primary independent variables. The following section first discusses those internal factors that have shown to be of particular importance: (physical) structure, shared values, style, and skill. Subsequently, internal factors of lesser importance are examined: staff and strategy (Figure 7.4).

7.2.4.1 Physical Team Structure

While this study focuses on the managerial structure of virtual teams (e.g., the way virtual teams organize and coordinate the work process) the research framework also allowed for examining the physical structure of teams. As discussed in section 3.4.3 the 'physical structure' of a team refers to its physical characteristics, such as size, functions involved, or hierarchical levels involved. In contrast, 'managerial structure' refers to policies and activities occurring within the team that prescribe or restrict the behaviour of team members.

As discussed in Chapter 3, proponents of virtual teamwork tend to exalt the potential flexibility and adaptability of virtual teams. However, the findings of this study indicate that flexibility and adaptability is mainly evident in the physical structure of teams. That is, the physical structure of the virtual team can accommodate vast fluctuations in team size, organizations involved, functions involved, and geographic locations involved (Case 3 NM Rothschild & Sons; Case 4 Barclays Capital; Case 7 Bank of Scotland; Case 8: Deutsche Bank). For example, Case 4 Barclays Capital commenced with a team size of eight members over the initiation phase, involved more than one hundred members at mid-stream, and shrank to thirty members over implementation.

Figure 7.4: Emerging data themes, most and least important additional internal factors under control of management



Symbol Key (e.g.):

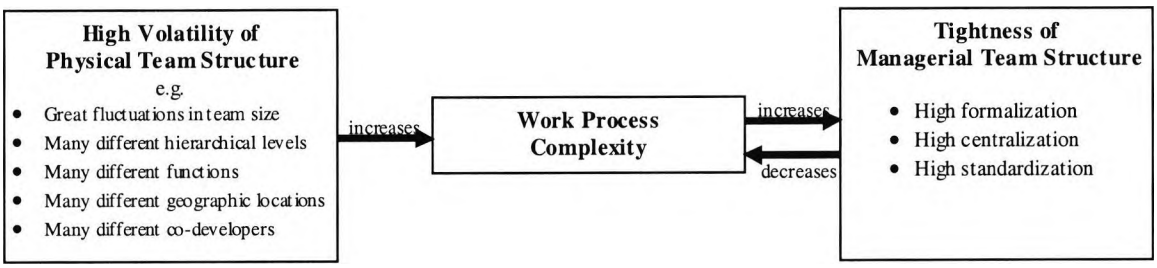
1H = Case 1, Higher Performing Team

2L = Case 2, Lower Performing Team

Source: Case data

Also, a multitude of dispersed experts, hierarchies, functions, organizations, and locations were involved with great variations throughout project execution. However, such flexibility was often accompanied by the team members' perception of increased complexity of the work process. That is, a highly volatile physical team structure necessitated rapid and abrupt changes in the team's interaction patterns, which added to the uncertainty and confusion of team members. To counterbalance work process complexity and to ensure effective teamwork, the team manager then applied particularly tight managerial mechanisms to facilitate the team's interaction processes. Overall, the case data indicate a reciprocal relationship between physical structure, work process complexity and managerial structure. The more volatile and flexible the physical structure, the higher perceived complexity and the tighter managerial structure through stronger formalization and stronger centralization (Figure 7.5). Conversely, the more stable and settled the physical structure, the lower perceived complexity and the looser managerial structure.

Figure 7.5: Physical team structure, work process complexity, and managerial structure[3]



7.2.4.2 Shared values among team members

Further, the case data indicate that shared values among team members are one of the most influential internal factors on teamwork effectiveness. Shared values refer to whether or not all team members are fully committed to the project and whether or not the team holds a common belief in the need to pursue the development project (see 3.2.4.5 and 4.5.2.5). The case data suggest that the lack of shared values among team

[3] Source: Case data

members leads inevitably to low perceived teamwork effectiveness and, in some cases, to project failure. For example, formalization, centralization, and standardization may reflect valuable managerial mechanisms to coordinate and organize. However, managerial mechanisms are effective tools only when team members are willing to accept and observe them. Respondents repeatedly reported that team members ignored rules and procedures, rejected established lines of reporting and decision-making, and failed to attend communication incidents. Such disregard then created great confusion among the rest of the team and resulted in inadequate inter-team communication, desolate information distribution, and poor task execution. While such behaviour diminished perceived teamwork effectiveness in the short run, it also affected the overall team performance when it continued for too long and when it originated from crucial contributors.

The question emerges who displayed such conduct and for what reasons? The case data indicate that most frequently team members external to the developer organization failed to show total commitment to the project. These defectors were mainly external joint-developers as well as internal and external task groups in charge of minor parts of the project. In particular, those team members not under direct supervision of the team manager displayed a general lack of commitment. Unfortunately, over the course of data collection there was no opportunity to talk personally to such proclaimed 'troublemakers' and testimonies were received only from their peers. Bearing in mind the tentative nature of these testimonies, the case data suggest the following patterns:

First, the lack of time appears to be often responsible for the less than satisfying participation of some members. A highly formalized work process with strong lines of reporting and frequent communication incidents is very time-consuming for participants. Yet, most team members are working simultaneously on a series of projects and simply have not the time to file a progress report on a daily basis or to attend face-to-face meetings in another country every fortnight. Second, a lack of interest in the particular project may cause members to defect. Quite often development projects in corporate banking require the participation of sought-after experts who have busy schedules and

may require much persuasion, both verbally and financially, before taking on new assignments. If a project fails to capture their interest they may be inclined not to engage fully.

Third and most importantly, managerial mechanisms need to be mutually agreed with all participants rather than imposed from the top. Typically, at the start of a project the team manager establishes managerial mechanisms reflected by formalization, centralization, and standardization. These mechanisms are established from the outset in agreement with those team members internal to the developer organization. However, when external members join the project at a later stage the existing mechanisms are often imposed on them rather than newly negotiated. Such authoritative conduct frequently turns into a source of conflict and causes the external members to infringe. It may also lead to indirect rivalry between the team manager and the external team members. This tends to be the case when a project is co-jointly supervised by the developer organization and an external co-developer. Even when the lines of responsibility between the two are clearly established from the start of the project, the external party may be inclined not to readily accept instructions or decisions received from the team manager.

Overall, one cannot overestimate the importance of nurturing shared values among the members of a project team. Shared values are specifically crucial for ensuring the adherence to established lines of organization and coordination. In particular, managerial mechanisms need to be mutually agreed rather than autocratically imposed to ensure the full commitment of all members.

7.2.4.3 The leadership style of the team manager

Obviously the managerial structure of a team and the leadership style of the team manager are closely related. This is particularly true for the sample of this study where the team managers frequently established the managerial mechanisms to organize and coordinate. Clearly, the degree of managerial looseness or tightness deployed reflects the leadership style of the team manager. The literature generally divides leadership styles into two groups (see 3.2.4.4). One group argues for a loose, 'hands-off' leadership style.

In essence, its supporters argue for managers to let project members get on with the development activities and not to get involved in a 'hands-on' way in order to prevent over-meddling and project micro-managing. The other group argues for a tight, 'hands-on' leadership style and control. Its supporters posit that managers need to provide definition and control to attain high project performance. The case data suggest that, in effective teams, tight managerial structures were combined with 'hands-on' leadership styles deployed by the team managers. However, the pressing question emerges whether this type of leadership was a reflection of the overall management approach of the team managers, also applied for traditional co-located teams, or whether this style was exclusively deployed for virtual teams?

One has to be cautious in addressing this question, since this study never directly compared a co-located team with a dispersed team effort. However, the comments made by team managers suggest that a tight, hands-on leadership style was adopted particularly for virtual teams. Indeed, some team managers reported a learning curve when dealing with virtual teams. That is, when team managers supervised a virtual team for the very first time, they deployed a rather loose, hands-off leadership style building on their experience with traditional, co-located teams. However, the geographic dispersion of members in combination with the heavy reliance on impersonal communications made a loose leadership style unwieldy and resulted in lower team performance. Consequently, these team managers adopted a more tight and hands-on style for managing virtual teams, which apparently led to better performance. This pattern was also confirmed by team members who cooperated with the team manager in both virtual teams and co-located teams. These members stated that the team manager insisted on a more formalized and more centralized work process for virtual teamwork. In particular, it was reported that managers of virtual teams adopted a highly hands-on approach in phases of higher work process complexity.

In sum, the findings indicate that managers of effective teams adopt a proactive leadership style. It is further suggested that this 'hands on' management approach is

deployed particularly for virtual teams and does not necessarily reflect the team manager's style for managing traditional, co-located units.

7.2.4.4 The skill of the team members

The last factor, suggested to be of major importance, relates to the skill and experience of the team manager and the team members. Originally, skill was defined as the skill of individual team members in developing new services and their experience with virtual teamwork (see 3.2.4.2 and 4.5.2.5). Undoubtedly the skill of team members in their area of expertise and their experience with NSD are fundamental factors for high teamwork effectiveness. However, all team managers and team members in the sample of this study were highly skilled individuals, very well adept with the demands of NSD in corporate banking. As such, the lack of skill, as far as professionalism is concerned, never appeared to be a source of concern. Instead, the findings indicate that a lack of experience concerning virtual teamwork repeatedly caused disturbance.

In particular, team managers who supervised a virtual team for the first time reported problems in adapting to the specific requirements of virtual teamwork. Relating to their experience with traditional, co-located teams these team managers adopted a loose, hands-off management style at first. As mentioned previously, their fear of micro-managing the project and interfering with team members caused them to dismiss highly formalized and centralized work processes. Only when the particular project encountered difficulties due to ineffective teamwork and lower team performance, did the team managers adopt a far more proactive style, which apparently led to better performance. Building on their learning curves, the team managers found supervising virtual teams less problematic in subsequent development projects.

In similar vein, team members described their first encounter with virtual teamwork as strenuous and difficult. Reported problems include troubling software applications, desolate information distribution and inaccessible peers. Overall, the more experienced team members became the better they coped with technology and the dispersion of

colleagues. Also, highly experienced members felt better prepared to manage unforeseen events and to push the project through despite difficult contextual conditions.

Overall, the findings indicate that the skill and experience of both team manager and team members contribute greatly to teamwork effectiveness. However, it is not only the proficiency and skill in NSD that is of major relevance, but also the experience with the special demands of virtual teamwork.

7.2.5 Findings: additional internal factors of minor relevance

Having identified structure, shared values, style and skill at the project level of analysis to be of major relevance to teamwork effectiveness, there are two further factors that appear to be of minor importance. These are staff and strategy. While it is by no means suggested that these factors are irrelevant to successful virtual teamwork in NSD, there is simply no emerging data pattern indicating their major relevance in the context of this study. Furthermore, while the main level of analysis was the project level, the adopted case-study design also afforded an examination of factors at the business level of analysis. Perhaps not surprisingly, the overall business context has shown to be highly influential on several secondary variables at the project level. However, there is no emerging data pattern suggesting an association between the overall business context and the managerial structure and teamwork effectiveness of a virtual team. Also, it must be stressed that an exhaustive examination of the overall business context would have far exceeded the scope of this study.

Bearing in mind that the following findings are highly suggestive, the present section briefly discusses all remaining factors at the project and business level of analysis that have shown to be of lesser relevance to teamwork effectiveness and team performance.

Strategy at the project and business level

Strategy was defined as the overall strategy of the business concerning NSD as well as the strategy of the team towards the particular development project. Undoubtedly, a well-defined development strategy, itself driven by the corporate strategy and objectives, is

essential to any approach to new service development. However, the case data indicate neither a clear association between strategy and teamwork effectiveness nor between strategy and team performance. Instead, the findings suggest that strategy was associated with the range of experts (staff) deployed for the project. In addition, the findings indicate that some teams adopted a strategy based on development speed (e.g., the rapid development of the new service). However, the faster the pace of development the more increased perceived work process complexity. Higher complexity then led to a tighter managerial structure and a more proactive leadership style of the team manager. This echoes the findings offered earlier concerning the volatility of physical team structure and work process complexity (see 7.2.5.1).

Staff at the project and business level

Staff was defined as the availability and accessibility of experts for NSD within the business. Staff also referred to the range of experts deployed for and their contribution to the NSD project. In general, all developers maintained a rich pool of professional talent. Yet, massive reductions in headcount from the year 2000 to 2003 have led to the dismissal of numerous experts across many functions of corporate banking. As a result, the remaining members of staff complained about work overload and severe time constraints. This had profound implications not only on the overall business culture but also on the shared values of team members in NSD projects, as discussed in section 7.2.5.2. In addition, respondents criticized the lack of internal experts for some highly specialized areas of development. This caused team managers to hire external talent, who occasionally created integration problems.

Structure at the business level

The majority of banks under investigation were described by respondents as bureaucratic with highly structured and hierarchically managed business processes. Nonetheless, at the time of data collection all organizations were undergoing or had emerged from extensive restructuring exercises, which reflects the industry's urgent desire to change. However, despite much effort to adopt a more entrepreneurial approach and flatter organizational structures, many respondents described their firm as still highly bureaucratic with strong

remnants of a large, old-established corporation. This situation had several implications for the teams under investigation. First, extensive restructuring combined with heavy reductions in headcount had a negative impact on shared values as well as the quality and quantity of staff available. Second, much organizational change combined with an uncertain business climate caused many NSD projects to be abandoned while putting much pressure on managers in NSD to reach successful conclusions. Third, the existing hierarchical structure made it mandatory for team managers to confer with senior management throughout development. Yet, the uncertain internal and external climate made senior management reluctant to assume responsibility, which resulted in crucial decisions being deferred or outright ignored.

Style at the business level

The above discussion also relates to style at the business level, which was defined as senior management's involvement and support for NSD. While the team manager frequently held the position of Managing Director, the senior manager typically occupied one hierarchical level above the team manager being Head of the department. The case data indicate that the involvement of senior management was frequently limited to the initiation phase of the NSD project. Typically, the senior manager would get closely involved in the early phases of development either to initiate the project or to approve the project proposal. The senior manager then forwarded the entire development process to the team manager, being updated on progress on a regular basis. Over development, the senior manager only got actively involved on request of the team manager when major discrepancies or severe problems had to be resolved. In such critical situations, the senior manager then assumed the role of the mediator or decision maker. However, respondents frequently indicated that senior management had been reluctant to take a decisive position, shying away from accepting responsibility. This in turn influenced the shared values of the team as well as the leadership style of the team manager.

Skill at the business level

The final factor refers to the skill of the business in fostering innovation and developing successful new services. There is a common understanding among practitioners in

corporate banking that there are no more or less successful innovators, only more and less successful innovations. That is, due to the complexity and uniqueness of services and products it is difficult to compare single developments, let alone single developers. However, the case data suggest that those banks that considered innovation as core to their business strategy, also considered themselves to be more innovative than the competition. These banks also had task forces in place to foster and support innovation. Nonetheless, in regard to the actual development process the data indicate no difference between banks that considered innovation an organizational strength and those who did not. Also, no difference was detected concerning the quantity and quality of new developments. It seems that all banks under investigation are active developers of continuous, incremental innovations. One could speculate that the reason for banks to emphasize or underplay their competence in NPD/NSD is rooted in the particular business culture of each firm and whether or not the buzzword 'innovation' is culturally acceptable.

7.3 The revised model and propositions

The previous section subjected the findings to the conceptual framework and propositions formulated in Chapter 4. The following section reformulates these propositions and revises the conceptual framework to accommodate the four most relevant findings (Figure 7.6). First, it is posited that a proper fit between managerial structure and work process complexity leads to work process complexity reduction and, therefore, to superior teamwork effectiveness. As such, the framework relates work process complexity reduction to teamwork effectiveness. Second, it is proposed that the level of work process complexity is determined by both the complexity of the project tasks and the nature of the internal organizational contingencies. The more complex the project tasks and the more complex the internal environment, the higher work process complexity. Third, it is suggested that both managerial structure and teamwork effectiveness are influenced by an amalgam of internal organizational contingencies. Last, the framework relates the level of teamwork effectiveness to the level of overall team performance.

7.3.1 Propositions: managerial structure, complexity, and teamwork effectiveness

This study examined the association between managerial structure, work process complexity, and teamwork effectiveness. Overall, the findings suggest that effective teams, compared to ineffective teams, are distinguished by tighter managerial structures to organize and coordinate teamwork within the highly complex virtual context. Results further indicate that the match between managerial structure and work process complexity affects the perception of teamwork effectiveness. The better the match between managerial structure and work process complexity, the greater work process complexity reduction and, therefore, the more effective teamwork through high quality of inter-team communication, information distribution, and task execution. In quantitative research the notion of 'match' between two variables is often referred to as the notion of 'fit'[4]. This study then proposes fit between work process complexity and three distinct dimensions of managerial structure: (a) formalization of the work process, (b) centralization of decision-making, and (c) standardization of communication incidents.

(a) Formalization of the work process

The findings indicate that the more complex the work process the more formalization is evident in effective teams. The high formalization of a complex work process tends to enable effective virtual teamwork by providing coordination, continuity, and long-term stability for the team. Also, the highly formalized work process with frequent written directives and written reports ensures that information is evenly and timely distributed throughout the entire team. This is particular important in virtual teams, where the team members are geographically dispersed and impromptu discussions rarely occur.

[4] In the extant literature on organization structure, the notion of fit between two variables was first proposed by Joyce et al. (1982) in their general congruency concept. The general congruency concept was further developed by Van de Ven and Drazin (1982), Alexander and Randolph (1985), as well as David et al. (1989) and suggests that for each value of complexity, there exists a best value of group structural variable to yield highest performance. David et al. (1989), as well as Alexander and Randolph (1985), define the congruence fit as the absolute difference between the value of a pair of structure (Si) and task complexity (Ti) variables. The closer the group structure value is to task complexity value, the better the fit:

$$Fit = | Si - Ti |$$

Researchers who may wish to test the following conceptual framework through quantitative research are encouraged to utilize this concept of fit.

Conversely, lower complexity is associated with lower formalization in effective teams. When complexity is less, the team members often know what to expect because they have encountered the situation before. Accordingly, they are more able to rely on their self-organization and require less written directives to provide organization and coordination. Overly strong formalization in project phases of lower complexity tends to increase work process complexity and can lead to poor teamwork effectiveness. It is therefore proposed:

P1a: In a virtual team, higher work process complexity coupled with higher formalization will be positively associated with work process complexity reduction and, therefore, will be positively associated with teamwork effectiveness.

P1b: In a virtual team, lower work process complexity coupled with lower formalization will be positively associated with work process complexity reduction and, therefore, will be positively associated with teamwork effectiveness.

(b) Centralization of decision-making

The findings further indicate that higher work process complexity resulted in more important decisions being made, which prompted higher centralization. Conversely, when work process complexity was lower, fewer important issues needed to be addressed and decision-making remained more consensus-driven. That is, the more complex the work-process, the more important the decisions and the more centralized decision-making. Since the leader of a virtual team is not physically present to oversee work execution, she/he has to rely on being informed on emerging problems in an accurate and timely manner. The centralization of decision-making requires team members to contact and inform the team leader on a constant basis. This has the beneficial effect of the leader being continuously supplied with information, which in turn adds to her/his confidence and strategic intelligence. It is therefore suggested that centralized decision-making in complex situations enables effective virtual teamwork by supporting information sharing within the team and shortening response-time. Conversely, when the work process is perceived as less complex, effective teams deploy decentralized decision-making to utilize each team member's know-how and expertise. Overly strong centralization in

project phases of lower complexity tends to increase work process complexity and can lead to unnecessary delays in decision-making. It is therefore proposed:

P2a: In a virtual team, higher work process complexity coupled with higher centralization will be positively associated with work process complexity reduction and, therefore, will be positively associated with teamwork effectiveness.

P2b: In a virtual team, lower work process complexity coupled with lower centralization will be positively associated with work process complexity reduction and, therefore, will be positively associated with teamwork effectiveness.

(c) Standardization of communication incidents

The findings further show that effective teams display continuously high standardization of communication incidents throughout the NSD process. That is, the majority of teams under investigation planned and sequenced all communication incidents through intensive scheduling. This scheduling dictates the frequency of meetings, the group of participants, and the type of communication mode deployed. The pattern of high standardization was evident for all personal communication incidents (e.g., face-to-face team meetings) and impersonal communication incidents (e.g., video-conferences) and in all project phases notwithstanding fluctuations in work process complexity. Yet again, high standardization provided a sense of predictability and stability that helped reducing ambiguity and uncertainty within the highly dynamic virtual context. Unscheduled and ad hoc interaction occurred between standardized incidents and was mainly in response to the previous standardized incident or in anticipation of the next one. It is therefore proposed:

P3: In a virtual team, higher and lower work process complexity coupled with high standardization will be positively associated with work process complexity reduction and, therefore, will be positively associated with teamwork effectiveness.

Overall then, it is proposed that fit between managerial structure and work process complexity enables teamwork effectiveness by reducing the complexity inherent in the

work process. The findings further suggest that work process complexity is a function of both the complexity of the project tasks and the nature of internal organizational contingencies. Work process complexity will be higher the more complex the project tasks; the more volatile the physical team structure; the weaker shared values among team members, and the lower the skill of team members. Conversely, work process complexity will be lower the less complex the project tasks; the less volatile the physical team structure; the stronger shared values among team members, and the higher the skill of team members. These associations are proposed in the following.

7.3.2 Propositions: work process complexity

Initially, this study limited the notion of work complexity to the complexity inherent in the work task. Task complexity was defined as the level of task predictability, problem analyzability, and team interdependence. However, during the course of data collection and analysis it was found that task complexity represents only one of several factors that affect the overall complexity of the work process. Work process complexity refers to the level of complexity inherent in the processes of inter-team communication, information distribution, and task execution. The findings indicate that team members may perceive the complexity of the work task as low and yet they perceive the process of inter-team communication, information distribution, and task execution as highly complex due to complex contextual conditions. In particular, the findings indicate four relevant factors to be associated with work process complexity, namely (a) task complexity; (b) physical team structure; (c) shared values among team members, and (d) skill of team members.

(a) Task complexity

Task complexity relates to the complexity of the particular work task being executed. In general, the higher perceived complexity of the work task, the higher perceived complexity of the overall work process. Conversely, when task complexity is less the perceived complexity of the work process is reduced accordingly. It is therefore proposed:

P4a: In a virtual team, higher task complexity is associated with higher work process complexity.

P4b: In a virtual team, lower task complexity is associated with lower work process complexity.

(b) Physical team structure

Physical team structure relates to the physical configuration of the team such as team size, functions involved, or locations involved. The findings indicate that the more volatile the physical structure of a team the higher perceived work process complexity. For example, the work process is perceived as highly complex when there are great fluctuations within the team in regards to size, levels of hierarchies involved, or number of functions involved. Conversely, when the physical structure of a team is stable and settled, perceived work process complexity is less. It is therefore proposed:

P5a: In a virtual team, higher volatility of physical team structure is associated with higher work process complexity.

P5b: In a virtual team, lower volatility of physical team structure is associated with lower work process complexity.

(c) Shared values

Shared values refer to whether or not all team members are fully committed to the project and whether or not the team holds a common belief in the need to pursue the development project. The findings indicate that lack of shared values can cause individual team members to dysfunction by showing low individual commitment and social indolence. Such infringement can lead to discontinuous and disjointed interaction between team members and to serious overall coordination problems. In general, weaker shared values among team members tends to increase work process complexity, while stronger shared values among members tends to reduce work process complexity. It is therefore proposed:

P6a: In a virtual team, weaker shared values among team members is associated with higher work process complexity.

P6b: In a virtual team, stronger shared values among team members is associated with lower work process complexity.

(d) Skill

Further, the findings indicate that the skill and experience of both team manager and team members contribute to the perceived complexity of the work process. Team members, who lack the skill and experience to work within a virtual context, will most probably perceive the work process as highly complex. For example, team managers who supervised a virtual team for the first time reported problems in adapting to the specific requirements of managing virtual teamwork. Likewise, team members described their first encounter with virtual teamwork as strenuous and difficult. Overall, the more experienced team members became the better they coped with technology and the geographic dispersion of colleagues. Conversely, the lack of skill in managing or working within a virtual context contributed greatly to the perceived complexity of the work process. It is therefore proposed:

P7a: In a virtual team, lower skill of team members is associated with higher work process complexity.

P7b: In a virtual team, higher skill of team members is associated with lower work process complexity.

7.3.3 Propositions: additional internal factors of relevance

Further, the findings suggest three internal factors that are associated with managerial structure and teamwork effectiveness:

First, shared values are associated with teamwork effectiveness. As mentioned previously, the lack of shared values among team members can cause individual team

members to dysfunction by showing low individual commitment. Such negligence can create great confusion among the rest of the team and may lead to inadequate inter-team communication, desolate information distribution, and, eventually, poor task execution. It is therefore proposed:

P8a: In a virtual team, stronger shared-values among team members is associated with higher teamwork effectiveness.

P8b: In a virtual team, weaker shared-values among team members is associated with lower teamwork effectiveness.

Second, the findings suggest that the skill and experience of both, team manager and team members, is associated with teamwork effectiveness. As noted before, the lack of skill and experience in managing and working within a virtual context can seriously invalidate effective teamwork by hindering inter-team communication, information distribution, and task execution. It is therefore proposed:

P9a: In a virtual team, higher skill of team members is associated with higher teamwork effectiveness.

P9b: In a virtual team, lower skill of team members is associated with lower teamwork effectiveness.

Third, the findings indicate that the managerial structure of a team and the leadership style of the team manager are closely related. That is, the type of leadership deployed reflects the level of managerial looseness or tightness for organizing and coordinating the work process. It is therefore proposed:

P10: In a virtual team, the leadership style of the team manager is associated with the managerial mechanisms in place for organizing and coordinating the work process.

7.3.4 Propositions: teamwork effectiveness and team performance

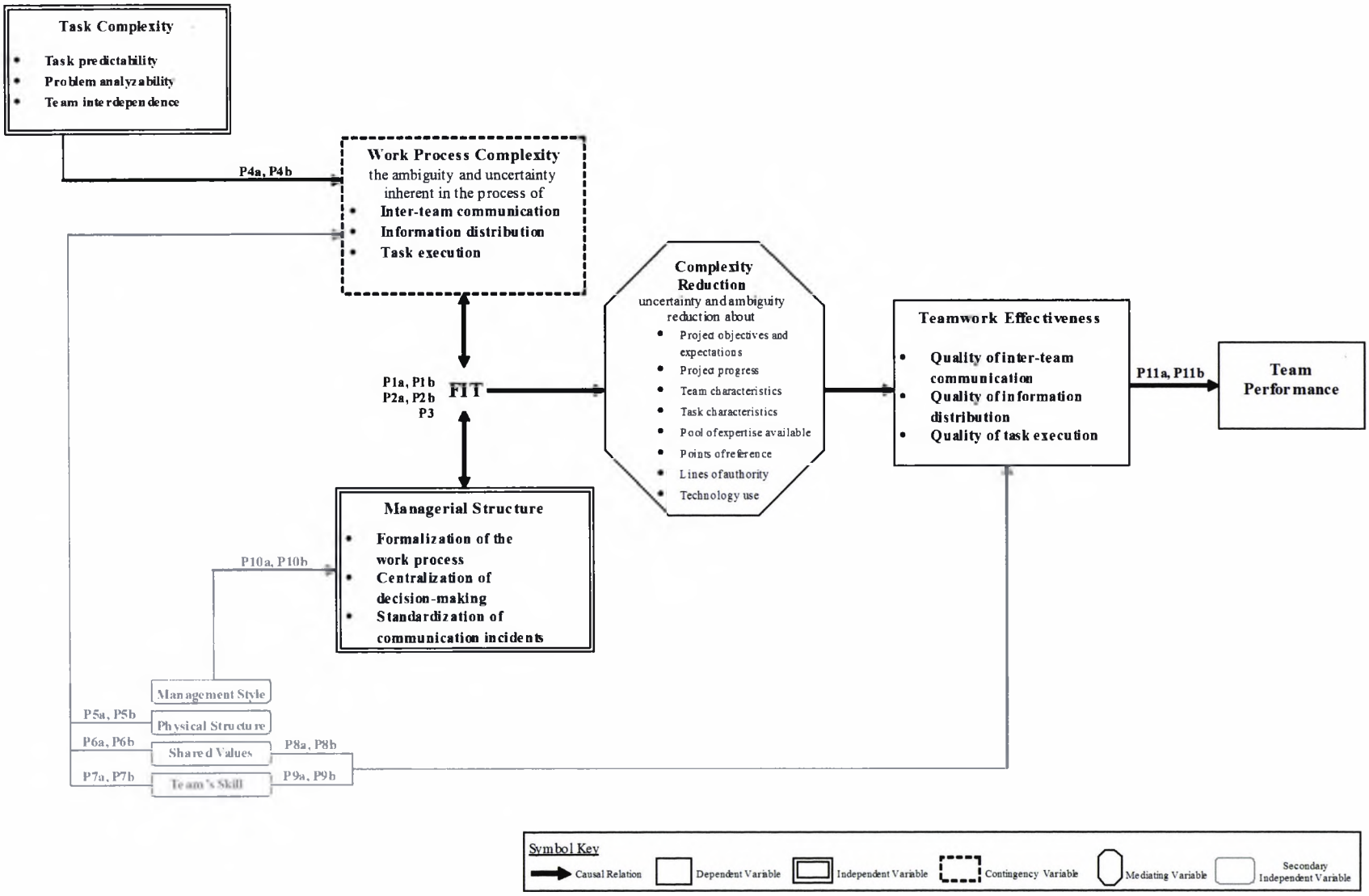
Lastly, the proposed conceptual framework relates work process complexity reduction to teamwork effectiveness, and, subsequently, teamwork effectiveness to overall team performance. The findings indicate that high teamwork effectiveness contributes to high team performance. In particular, the findings suggest that high teamwork effectiveness is essential for a team to meet the intangible, psychosocial dimensions of team performance. Without high teamwork effectiveness team members will most probably be dissatisfied with the project, perceiving project execution as strenuous and problematic. In similar vein, the findings show that effective teamwork has a positive impact on the tangible, task-related dimensions of team performance. It is maintained, however, that high teamwork effectiveness is important but not essential for a team to meet the tangible, task-related dimensions of team performance. Even without effective teamwork a team might be able to deliver the project to specifications, given there is a determined project leader or champion who pushes the project through despite difficult contextual conditions. It is therefore proposed:

P11a: Teamwork effectiveness is positively associated with the tangible dimension of team performance.

P11b: Teamwork effectiveness is positively associated with the intangible dimension of team performance.

Figure 7.6 includes Propositions 1 through 11 and illustrates the fully revised conceptual model

Figure 7.6: The revised conceptual model of the organization and coordination of teamwork in a virtual NSD team



7.4 Conclusion

The present chapter drew on the data analysis and provided a synthesis of the findings. Further, the propositions were reformulated and the conceptual model revised. The next chapter examines the study's contribution to theory and provides suggestions for further research.

CHAPTER 8

CONTRIBUTION TO THEORY

AND SUGGESTIONS FOR FURTHER RESEARCH

8.1 Introduction

This chapter examines the contributions to theory and provides suggestions for further research. First, the chapter focuses on the contributions to the area of organization and coordination of virtual teamwork in NSD, also providing suggestions for further research. Second, the chapter broadens the discussion, examining contributions and suggestions to research on virtual teamwork in a more general sense. Last, the chapter comments on the experience gained with qualitative case study research.

8.2 Contribution to theory and suggestions for further research

This study makes several contributions to organizational research and research in marketing. Most obviously, it provides a conceptual model for the further study of virtual teamwork in general and virtual teamwork in NSD/NPD in particular. The model's internal validity now needs to be assessed in more settings, and its generalizability evaluated by extending it to other types of work processes, teams, and contexts. The model suggests that tight managerial mechanisms are required for virtual teams to attain high teamwork effectiveness and high team performance. It implies that virtual teams, charged with a complex work task and operating within a highly dynamic environment, require tight managerial organization and coordination. A tight managerial structure reflected by high formalization, centralization and standardization provides stability and confidence to both team members and team manager. These findings shed new light on the dynamics and efficiencies of virtual teams.

Proponents of virtual teamwork have exalted the potential flexibility and adaptability of virtual teams (Henry and Hartzler, 1997; Mayer, 1998; Fisher and Fisher, 2000; Jude-York et al., 2000; Lipnack and Stamps, 1997, 2000; Duarte and Snyder, 2001; Willmore, 2001; Gibson and Cohen, 2003; Rad and Levin, 2003). However, the findings of this study provide little evidence for flexibility and adaptability in relation to the managerial

structure of virtual teams. Rather, the managerial structure of effective virtual teams tends to be characterized by tight and rigid structural designs. It is mainly the physical structure of teams that is highly fluid and adaptive to changing contextual conditions. However, the more fluid and adaptive the physical structure becomes the more mechanistic the managerial structure has to be to control for increased work process complexity and to facilitate virtual teamwork. These findings contribute to emerging research showing that the adoption and on-going adaptation of novel, loosely-coupled organizational forms requires tight managerial structures to organize and coordinate. In particular, this study makes contributions to the following areas:

8.2.1 Standardization of communication incidents

In regards to standardization the findings suggest that virtual teams ensure high quality of inter-team communication through strongly standardized communication incidents throughout project execution. That is, communication incidents are planned and sequenced through intensive scheduling. This scheduling dictates the frequency of meetings, the group of participants, and the type of communication mode deployed. Unscheduled and unstructured interaction occurs between standardized incidents and is mainly in response to the previous standardized incident or in anticipation of the next one. These findings are echoed by O'Sullivan (2003) who studied a virtual NPD team in a large aerospace company. O'Sullivan concluded from his observations that virtual collaboration was facilitated because the company, during the initial co-location period, worked closely with its suppliers to develop a common set of highly standardized work procedures. The company also set up a process in which demonstrated adherence to these standards was a prerequisite to being able to collaborate virtually with the suppliers after they returned to their own companies. In addition, O'Sullivan asserts that the social structure of the virtual team was constituted by face-to-face interaction of representatives from each subsystem team in the early phases of the development effort, a shared understanding and use of time, and extensive pre-defined administrative standards for work content. The author concludes that the lead firm's imposition of administrative standards for work content and timing provided an efficient basis for the resolution of task interdependencies, thereby allowing integrative work patterns to emerge. While

O'Sullivan limited his investigation to the initiation phase of a NPD project, this study examined the entire development process. This study concurs with O'Sullivan's findings but adds that standardization was observed throughout the *entire* NSD process, not only over initiation.

8.2.2 Standardization of personal communication incidents

Further, the findings indicate that virtual teams conduct standardized face-to-face meetings frequently throughout project execution. These meetings are conducted in addition to impersonal communication incidents such as videoconferences and teleconferences. This finding is quite remarkable given the fact that one great benefit of virtual teamwork is assumed to be cost and time-related efficiencies resulting out of *not* having to co-locate an internationally dispersed group of people. Various authors have described or predicted team effectiveness without the members ever meeting in person (Jarvenpaa and Leidner, 1998; Canney and Ward, 1999; Lipnack and Stamps, 1997, 1999, 2000). Other studies have suggested that a combination of media including face-to-face outperformed one without face-to-face (Ocker et al, 1998; Bolisani and Scarso, 1999; Maznevski and Chudoba, 2000; O'Sullivan, 2003). Although the teams of this study took advantage of videoconference and teleconference devices as well as collaboration software to enrich their impersonal interactions, they additionally arranged for regular face-to-face meetings. Face-to-face meetings allowed for synchronous dialogue among all members with a very fluid structure and intense interaction. In that way miscommunications from the past were clarified, major decisions made, and implementation details worked out.

However, the data patterns described above were observed in effective and ineffective project teams. Notwithstanding the degree of teamwork effectiveness, the majority of teams under investigation adhered to strongly standardized communication incidents throughout project execution. Also, the majority of teams conducted personal communication incidents in addition to impersonal communication incidents. This study concurs with Maznevski and Chudoba (2000) and suggests that conducting regular meetings in person is essential to virtual team effectiveness to the extent that the work

task is highly complex, the work process requires a high degree of interdependence and there are geographic, organizational, and functional boundaries that must be spanned. However, the findings further indicate that personal communications, while being essential in highly complex work environments, are no warrant for high teamwork effectiveness, let alone high team performance. In addition, this study cautions that frequent face-to-face meetings among members of a dispersed team require two vital resources: time and money. Organizations need to be prepared to cover the direct and indirect costs associated with frequently co-locating a virtual team. In addition, team members need to be given enough time to attend meetings in far-flung places. It is therefore admonished that the observed need for frequent face-to-face meetings in a highly complex and dynamic work environment may thwart some of the potential efficiencies of virtual teamwork. Further research should instigate a comparison between a virtual team and a co-located team, both operating in a dynamic environment and charged with a complex task, on the basis of time and cost efficiencies.

8.2.3 Standardization and temporal rhythms

Further, the findings suggest that effective teams are distinguished by a strong, repeating temporal pattern of communication incidents. That is, interaction incidents such as personal or impersonal group meetings as well as information distribution in the form of reports and memos are scheduled in stable patterns. It is this sense of continuity that enables members to work efficiently and confidently alone or in ever-changing subgroups. In his in-depth study of a virtual team O'Sullivan (2003) reports of similar synchronized and sequenced communication incidents and work processes, which the authors describes as "highly standardized". Likewise, Maznevski and Chudoba (2000) observe so-called 'temporal rhythms' in the way that effective virtual teams sequence face-to-face meetings. The authors assert that the rhythm of meetings over time was as critical to effectiveness as the meetings themselves by providing continuity and long-term stability. Also, Orlikowski and Yates (1994) report potential temporal rhythms in the evolution of an electronic community. Further, in research unrelated to virtual teamwork several authors describe the importance of temporal patterns in the work processes of project teams (Gersick, 1994; Brown and Eisenhardt, 1997).

This study concurs with the above authors, adding that temporal patterns were observed throughout project execution. However, these temporal patterns were stable only within project phases not throughout the entire project. That is, effective virtual teams generally sequenced interaction in predictable temporal patterns. Hereby the pattern of interaction was kept constant for a given time period. This pattern only changed in response to major changes to the group's task or context that also affected perceived work process complexity. Major changes to the group's task or context occurred predominantly when the team transferred from one development phase to the next. Therefore, temporal patterns were observed in the interaction of effective virtual teams but only within not across project phases. In their conclusion Maznevski and Chudoba (2000) assert that several streams of research have separately uncovered strong rhythms of interaction and call for more research on the phenomenon. The findings of this study confirm the importance of temporal rhythms for effective virtual teamwork. Further qualitative, longitudinal research is encouraged on the origination and evolvement of temporal rhythms and their adaptation to changing contextual conditions.

8.2.4 Formalization and centralization

Further, the findings support emerging research showing that particular loose and flexible organizational forms require formalization and centralization (Argyres, 1999; Galunic and Eisenhardt, 2001; Schilling and Steensma, 2001). While the standardization of communication incidents enables high quality of inter-team communication, the formalization of the work process and the centralization of decision-making ensure high quality of information distribution and, eventually, effective task execution. The high formalization and high centralization of a complex work process provides coordination, continuity, and long-term stability for the team. In place of what would otherwise have been "unstructured interaction" (Monteverde, 1995) or no interaction, the formalized and centralized work process reduced the range of possible interpretations of the timing and content of work outputs and allowed unfamiliar individuals drawn from widely varying organizational contexts to form accurate and convergent expectations about each other's work progress. However, this study cautions against imposing formalization and centralization from the top. Instead, it agrees with Galunic and Eisenhardt (2001) that a

mutual agreement between team and team manager regarding the degree of formalization and centralization is necessary to constitute a high performing virtual team. Otherwise, team members may become dysfunctional due to work overload, disinterest, or indirect rivalry.

In relation to the above, this study further adds that managers of virtual teams worry about controlling virtual teamwork adequately. Team managers articulated the need for solid controlling mechanisms to monitor member participation and work progress in a group that rarely meets in person. Being aware of the danger of micromanaging the project, team managers voiced concern as to how to detect low individual commitment, role ambiguity, and social loafing without adopting a too obtrusive management style. Practitioners and researcher alike have neglected the controlling and monitoring function of NPD/NSD management in recent years, carefully avoiding the term 'control' at all (Bonner et al., 2002). However, the findings suggest that dimensions and functions of control attain new relevance in virtual teamwork and should be addressed in future research on virtual team management. In particular, future research could examine formal and interactive control mechanisms (e.g., process control, output control, team reward systems) available to team managers in controlling virtual project teams and the relationship between these mechanisms and NPD project performance.

8.2.5 Managerial structure and contingency theory

The literature on contingency theory and structure-performance relationships is among the most vexing and ambiguous in the field of management and organizational behaviour. Evaluations and generalizations concerning the nature and directions of these relationships are tenuous. This study underscores the problem of generalizability of research in the area. Overall, the findings indicate that a certain context necessitates a certain type of managerial structure and, that the fit between the two facilitates interaction within a team. More specifically, the findings suggest that the higher the complexity of the work process the tighter the managerial structure in the form of higher centralization, higher formalization, and continuously high standardization.

As expected, team members perceive fluctuations in the complexity of the work process. This complexity, however, was never perceived as low but as moderately high to very high. Contrary to expectations, higher complexity was associated with higher formalization and higher centralization. That is, directives rules and regulations in complex situations provided team members with continuity and long-term stability adding to their confidence in executing the work. Conversely, centralization of decision-making in complex situations contributed to the confidence of the team manager giving him the assurance of being both, well informed and in control. These findings contradict previous research (Tushman, 1979; David et al., 1989; Carley, 1992; Ahuja and Carley, 1998; Forte and Hoffman, 2000) as well as the initial propositions of this study, which suggested that higher complexity would be associated with lower formalization and lower centralization.

Two reasons are offered for the contradictory nature of the findings. First, 'complexity' is an abstract concept and most authors have assessed the degree of complexity based on task-related factors such as task analyzability, task predictability, or team interdependence (David et al., 1989; Carley, 1992; Ahuja and Carley, 1998). In quantitative research such narrow definitions might be necessary, but they limit the potential spectrum of the phenomenon. Following the qualitative approach this study embraced more contextual variables, detecting that work process complexity was comprised of more than merely task-related factors. For example, within a virtual team a small sub-group of lawyers charged with the drafting of a contract may find this task relatively simple, because they are highly experienced and need only few people for task execution (high task predictability, high problem analyzability, low team interdependence). Yet, this group may find the work process highly complex nonetheless, because they are inexperienced in virtual teamwork and have to cope with a highly volatile physical team structure. Therefore, the quantitative researcher examining this group may conclude that they are operating under low complexity, when in fact the work process complexity is perceived as very high. Second, the project teams of this study operated under conditions, which could be described as 'hyper-complex'. That is, the teams had to cope with a complex virtual context, had to execute a complex work task,

and were embedded in a highly complex organizational environment characterized by much change and uncertainty. All these factors combined may have led to insecurity and risk-aversion among team members and may have necessitated particular tight organization and coordination.

While these findings could provide impetus and direction for investigating other structure-performance variables to determine effective matches under varying conditions in a virtual context, scepticism remains. Taking into account almost 40 years of contradictory evidence in the area of contingency research one is tempted to suggest that there are simply too many potentially relevant variables, both at the project and the business level of analysis, to reach broad, generalizable conclusions on the relationships between context, structure, and performance in work groups.

8.2.6 Teamwork effectiveness and team performance

Further, this study examined team performance along two performance dimensions, namely task outcomes and psychosocial outcomes. The findings suggest that a NPD project may meet all tangible performance criteria such as on time or on budget and still may fail on the basis of intangible measures such as the satisfaction of team members. Conversely, a project may fail on tangible grounds and yet the team members may consider it a worthwhile experience. It is accepted that the distinction of tangible and intangible performance dimensions may prove problematic in quantitative research. The dependence on subjective performance measures such as psychosocial outcomes may limit the generalizability and validity of the results. However, for the qualitative design of this study the distinction proved highly valuable, affording greater insight into the dynamics that constitute team performance. Also, it was encouraging to note a general agreement in perceptions of psychosocial outcomes among team members, suggesting a considerable level of intra-group convergence. This study therefore concurs with Hackman (1990) that purely objective and tangible criteria such as budget costs may too narrowly limit the determination of outcomes. Further qualitative research on the performance of work groups should incorporate tangible and intangible measures of performance.

8.2.7 Additional contributions

Further, this study reveals several additional internal factors that help or hinder effective virtual teamwork and high team performance. In particular, shared values among team members are suggested to be highly influential on teamwork effectiveness. Without the full commitment of all team members and a common belief in the need to pursue the project, established mechanisms for organization and coordination may get ignored. As a consequence, the communication and interaction processes within the team collapse, resulting in low teamwork effectiveness and, eventually, in project failure. Furthermore, the findings suggest that team managers of effective teams adopt a hands-on leadership style to provide definition and control. This tight management style was deployed particularly for virtual teams and did not necessarily reflect the team manager's general leadership approach. This finding relates to another observation suggesting that the skill and experience of team manager and team members contribute greatly to teamwork effectiveness and team performance. However, it is not only the proficiency and skill in NSD that is of major relevance, but also the experience with the unique challenges of virtual teamwork. All these suggestions give rise to new questions reminding us that there is much not yet understood about how to effectively collaborate virtually to facilitate NPD. Do people learn differently, interact differently, manage differently, and share perspectives differently in a virtual, as compared to a co-located, NPD effort? These are questions that provide avenues for further research.

Further, the finding that tight managerial mechanisms are required for virtual teams to perform effectively provokes the question whether a virtual team is suitable for highly innovative developments? Much previous research suggests that the rigidity and stringency of mechanistic structural designs hinders the free evolution of creativity and innovativeness (Might, 1984; Gupta and Wilemon, 1985; Moenart and Souder, 1990; Karagozoglus and Brown, 1993; Nemiro, 2000, 2002). In his work Csikszentmihalyi (1996) suggests that NPD requires both the generation of new knowledge and novel combinations of existing knowledge supported by combining and integrating existing but varying pools of knowledge and ideas. In other words, NPD team creativity requires teams to combine and integrate input from multiple NPD team members. Through

effective communication, building on the knowledge of the various team members, teams facilitate the exchange of information and create new knowledge and insights. To achieve innovation there must be ideas and these initially appear from among individuals in the team. A new idea dies unless it finds a breeding place. Developing, refining, testing, selecting, and in the end implementing these ideas further rests on interaction among the team members. Creativity does not happen inside people's heads, but in interaction (Csikszentmihalyi, 1996).

An increased level of interaction makes the cross-fertilization of ideas increasingly likely. Therefore, interaction is expected to lead to more and better new ideas (West, 1990). Yet, the findings of this study indicate that interaction in effective virtual teams is tightly structured through formalized, centralized and standardized procedures. One could speculate that this stringency may affect the creation of new ideas. Indeed, team members may find it difficult to be innovative and creative when they receive daily instructions on how to execute the work task. Likewise, centralized decision-making may hinder team members in sharing their ideas openly and freely. In their study Leenders et al. (2003) examined the effect of frequency of communication and communication centralization on creativity in virtual NPD teams. They find that creativity is fostered with moderate levels of communication (neither too much or too little) and low centralization in knowledge sharing. While this study concurs with the assertion of Leender's et al. (2003) that effective teams display decentralized information sharing, the findings further indicate that effective teams display centralized decision-making. It would be highly interesting to see how this observed tight managerial structure impacts on the creativity and innovativeness of virtual teams in NPD. Future research should examine the relationships between combinations of managerial structure and NPD creativity in virtual teams. In addition, further research should examine whether or not virtual project teams are suited for both radical and incremental developments. Judging from the findings of this study, virtual teams may be less suitable for development projects requiring much creativity and innovativeness, as these are qualities known to deteriorate under rigid structural designs.

Further, much research on virtual teamwork has built on Adaptive Structuration Theory (AST) examining how virtual teams adopt and adapt to information technology, communication technology and collaboration technology by recognizing misalignments between technology, task, organization, and the group and then devising appropriations to deal with them. First introduced by DeSanctis and Poole (1994) AST proposes that a complete understanding of social interaction requires incorporating explanation of both the structure of relationships and dynamics and processes of relationship. The processes both take place in social structures, and shape those structures over time. In short, the heart of AST is the role of advanced information technology and its appropriation by members of the organization as they work together. In recent years, several authors have applied AST to the context of virtual teamwork and examined technology use among members of virtual teams over time (DeSanctis and Jackson, 1994; Hinds and Kiesler, 1995; Jarvenpaa and Leidner, 1998; Majchrzak et al., 2000; Maznevski and Chudoba, 2000; Susman et al., 2003).

This study has not followed AST and therefore cannot comment on its validity, however it can comment on its underlying assumptions. According to DeSanctis and Poole (1994) and colleagues, an ideal technology appropriation occurs when a team resolves misalignments by modifying the organizational environment and group structures, leaving the technology structure largely intact. This appropriation process occurs over a longer period of time and may take several weeks or even months. However, this theory is based on the assumption that the physical configuration of a virtual team remains constant throughout the entire appropriation process. That is, a stable, congruent group of people is assumed to spend several weeks or months on appropriating the organizational environment, the group structure and their technologies until perfect alignment is obtained. However, the findings of this study suggest that in a dynamic work environment the structure of virtual teams is highly volatile. Team members are exchanged at such rapid pace that there may be no time for any appropriation processes. Also, it was observed that both the composition and the size of a virtual team varied considerably throughout project execution. This volatility in the team's physical structure would necessitate very fast adaptation processes, which may be difficult to achieve in

practice. Since the majority of studies on AST examined relatively stable virtual teams, operating under steady contextual conditions, future research should test the theory in teams that work in highly dynamic environments.

8.2.8 The research method

The findings of this study were derived out of data collection and analysis that followed a qualitative research approach. This section briefly comments on the researcher's experience with qualitative case study research, which may prove valuable for other investigators.

First, although this study is qualitative and descriptive in nature, a considerable amount of prior instrumentation was undertaken. A set of propositions was formulated from the beginning and a theoretical framework was constructed prior to the field study. Critics may argue that such preordained theoretical perspectives might bias or limit the findings. However, the author of this study concurs with Eisenhardt (1989), Yin (1996) and Perry (1998) that without prior instrumentation the researcher will get overwhelmed by the staggering volume of rich data, trying to capture everything and lacking the simplicity of overall perspective. Also, pure induction might prevent the researcher from benefiting from existing theory, just as pure deduction might prevent the development of new and useful theory (Perry 1998). Judging from the experience with this study, predefined constructs can only be omitted when concentrating on the in-depth study of one single case. However, caution is advised when going theory-free into data collection where the number of cases exceeds more than one. The researcher most certainly will get overwhelmed by the mass of rich contextual data and may find it unfeasible to detect emerging patterns. Eisenhardt (1989) recommends the examination of 4 to 10 cases. She asserts that with fewer than 4 cases, it is often difficult to generate theory with much complexity, and its empirical grounding is likely to be unconvincing, unless the case has several mini-cases within it. With more than 10 cases, it becomes very difficult to cope with the complexity and volume of the data. Assuming that 4 cases is the minimum number for solid case-study research, prior instrumentation becomes almost inevitable. Nonetheless, although early identification of the research question, propositions, and a

conceptual framework is helpful, it is equally important to recognize that these are tentative in qualitative research (Eisenhardt, 1989). Indeed, over the course of this study the propositions were frequently restated and the conceptual model was revised. However, without the initial definition of these the study would have shifted into confusion, vagueness and premature abstraction.

Second, in relation to the above the use of qualitative analysis software such as NUDIST (2002) is recommended. While the actual coding and analysis of data is still the responsibility of the researcher, qualitative analysis software greatly facilitates the task by organizing and classifying large chunks of data.

Third, for data collection and analysis the development project was divided into three project phases in order to examine each phase individually rather than the entire project. That is, in preparing the interviews for data collection the development process was split into three generic phases, (initiation, development and implementation) and the same questions were posed in each project phase. This procedure may appear repetitive and tedious. However, over the course of interviewing it became apparent that the nature of constructs varied greatly across project phases. Without dividing the interview into phases many of the most interesting insights would have been lost. Caution is therefore advised when analyzing a project in its entirety to identify complex processes. This tactic could force respondents into broadly generalized statements, which may greatly distort reality.

Last, there is no intent to instigate a discussion on the virtues of qualitative versus quantitative research. There are volumes of academic studies that have addressed the issue in great detail. However, an interesting observation from the field shall be reported. Many times throughout data collection respondents expressed their appreciation for being interviewed in person. These respondents were senior professionals in large multinational organizations. Their contention was that they were frustrated with being bombarded with loads of surveys, most of which were highly time-consuming, difficult to understand, and often perceived as "pointless". Also, these respondents voiced discontent with having to

administer and mail questionnaires without ever hearing form the originator again. As a consequence, the respondents did not administer surveys at all, or administer them in a hurry, or leave them to some junior assistant. In contrast, they appreciated the personal conversation with the researcher and went to great length to provide insights beyond the firm's policy of confidentiality. It is therefore maintained that the opportunity to visit people in their environment, communicate with them face-to-face, and revisit them to present insights is the most valuable attribute of qualitative research, which, quite literally, generates data of very high quality.

8.3 Conclusion

The present chapter examined the contributions to theory and provided suggestions for further research. Contributions were provided to organization research and research in marketing, concentrating on the organization and coordination of virtual NSD teams in particular and on virtual teamwork in general. Several suggestions for further research were forwarded. Most importantly, further research is encouraged on potential limitations to time and cost efficiencies in virtual teams; formal and interactive control mechanisms available to team managers in controlling virtual teamwork, and possible impediments to creativity and innovativeness of virtual NSD teams. Lastly, the chapter commented on the experience gained with qualitative case study research. The next and last chapter addresses the managerial implications and discusses the limitations of the study.

CHAPTER 9
MANAGERIAL IMPLICATIONS AND LIMITATIONS OF THE STUDY

9.1 Introduction

The present chapter offers the managerial implications and the limitations of the study. First, the discussion briefly revisits the practitioner-oriented literature on virtual teams and subjects common themes to the findings of this study. Subsequently, managerial recommendations are offered to practitioners involved in virtual teamwork. Last, the chapter re-examines the validity and reliability of this study and discusses its limitations.

9.2 Managerial implications

It is understood that practitioners in NPD/NSD may easily get impatient with yet another set of recommendations on how to manage for development success. Myriads of academic literature have identified hundreds of potential factors that may help or hinder successful innovation. Not only must developers be proficient in their area of expertise, they also must be adept with the dynamics of the development process. The product, the process, the market, the industry, the regulatory environment, they all produce numerous factors that may impact on the ultimate success of the new product or service. If that was not enough, this study has assessed yet another organizational form that promises to make the development process more efficient and effective: the virtual NSD team. Question is, does the virtual team really deliver all those benefits and efficiencies envisioned by eager business consultants and IT experts?

In the practitioner-oriented literature of the 1990s the notion of the 'virtual' became one of the most over-used concepts as its use spread as quickly as the supposed growth of e-commerce and the Internet. The concept of the 'virtual' was conceived to denote loose organizational forms designed to address major transformations in the social, economic and technological environment in which multinational organizations operate. These 'virtual' organizational arrangements were delineated as networks of workers and organizational units linked by information and communication technologies, which

would flexibly coordinate their activities, and combine their skills and resources in order to achieve common goals. This would, apparently, be accomplished without very much by way of traditional hierarchical modes of central direction or supervision. It was suggested that such arrangements would form and reform as problems arise so providing a flexibility of response to changing circumstances and organizational needs (Henry and Hartzler, 1997; Mayer, 1998; Fisher and Fisher, 2000; Jude-York et al., 2000; Lipnack and Stamps, 1997, 2000; Duarte and Snyder, 2001; Willmore, 2001; Gibson and Cohen, 2003; Rad and Levin, 2003).

The gist of the conception suggested that virtual forms of organization, unlike traditional ones, would enjoy greater flexibility and autonomy without the need for hierarchies of authority, centralized control, specialized roles, or bureaucratic stiffness of performance (Henry and Hartzler, 1997; Mayer, 1998; Jude-York et al., 2000; Lipnack and Stamps, 1997, 2000). Tied in with this overarching flexibility, virtual forms of organization were supposed to provide cost and time related efficiencies due to their ability to capture geographically and/or organizationally distributed expertise without having physically co-locate team members (Jude-York et al., 2000; Duarte and Snyder, 2001; Willmore, 2001; Gibson and Cohen, 2003).

Much literature and academic research as well as the findings of this study leave little doubt that a growing number of organizations deploy virtual teams for a multitude of business activities including NPD/NSD. For large multinational organizations the use of virtual teams is no matter of choice, it is a necessity. The shift from traditional competitive business environments toward strategic cooperation among co-developers necessitates a virtual connection between several dispersed organizations. Likewise, increased globalization of business activities requires intense cooperation and collaboration across broad geographical distances. However, the assumption that virtual arrangements require less managerial organization and coordination than their traditional, co-located alternatives is questionable. It is the contention of this study that there is an uneasy fit between the rhetoric of virtual flexibility and the day-to-day problems of managing a dispersed group of professionals. The deployment of forms of 'virtual'

teamwork places a heavy responsibility on middle and lower level managers to manage the concurrent changes in the practical day-to-day work of the teams. The findings of this study suggest that despite the hype surrounding virtuality, managerial work, managing personnel, resources, customers and so on remains very much 'business as usual' and that the problems that typically and persistently preoccupy managers do not simply disappear with the move towards the virtual organization or the virtual team. On the contrary, these problems might get aggregated. This study then makes the following important contributions to virtual team practice:

First, the findings suggest that virtual teams provide indeed much flexibility and adaptability in regard to their physical configuration. That is, the concept of the virtual team can accommodate vast fluctuations in team size, organizations involved, functions involved, and geographic locations. Virtual project teams have shown to commence with eight team members, involve more than one hundred members at mid-stream, and shrink to thirty members over implementation. Also, a multitude of dispersed experts, hierarchies, functions, organizations, and locations were involved with great variations throughout project execution. However, such flexibility was often accompanied by the team members' perception of increased complexity of the work process. That is, a highly volatile physical team structure necessitated rapid and abrupt changes in the team's interaction patterns, which added to the uncertainty and confusion among team members. To counterbalance work process complexity and to ensure effective teamwork, managers then applied particularly tight managerial mechanisms to organize and coordinate in order to facilitate the team's interaction processes.

The findings indicate that the managerial structure of effective teams reflects patterns of high standardization, formalization, and centralization. The standardization of communication incidents with team meetings being structured in predictable temporal, social, and technological patterns regulates the flow of communication, structures expectations and makes interaction predictable. The formalization of the work process through memos, agendas, written records and strong reporting lines reduces the range of possible interpretations of the timing and content of work outputs and allows team

members to form accurate and convergent expectations about each other's work progress. The centralization of decision-making, with important decisions being centred on the team manager, allows the team manager to collect strategic intelligence and maintain control over the team's work coverage. In that way, the tight organization and coordination of teamwork provides confidence, continuity, and long-term stability to both the team manager and the team members. The absence of tight managerial mechanisms may result in confusion, uncertainty, aggravation and, eventually, poor team performance.

Second, this study concurs with the common recommendation in the practitioner-oriented literature that a virtual team meet face-to-face throughout its existence (Merrick, 1996; Canny and Ward, 1999; Lipnack and Stamps, 1999, 2000; Pearlson and Saunders, 2001). In a virtual team chance encounters and informal discussions rarely occur and may not affect interactions and developing work relationships. In addition, managers may fear losing control when their employees are not readily observable. Because unobtrusive observation or impromptu discussions about work progress are rarely feasible for virtual teams, managers, as well as team members, must schedule formal face-to-face meetings to ensure sufficient clarifying communication incidents throughout project execution. While the frequency of face-to-face meetings clearly depends on the individual circumstance, some virtual teams in the sample of this study met in person as frequently as once per week over a particularly difficult project phase.

In relation to the above, the findings further highlight the importance of team interaction defining a standardized rhythm to structure processes and expectations over time. That is, interaction processes such as inter-team communication, information distribution, and formal reporting need to be sequenced in predictable temporal patterns. It is the predictability of reoccurrence that gives team members and the team manager stability and confidence to work geographically isolated from their peers. Although more evidence is needed, it seems that the importance of standardized interaction cannot be overestimated.

Third, the above suggestions that effective virtual teams require tight managerial mechanisms and frequent face-to-face meetings may seriously limit some of the potential benefits of virtual teamwork. Most obviously, co-locating a dispersed team in one location requires two crucial resources: time and money. It can be very cost intensive to unite the members of a virtual team in one location every fortnight. Likewise, inviting people from New York or Hong Kong to join a meeting in London is a time-consuming endeavour, particularly for busy professionals who suffer from severe time-constraints. In similar vein, filing a written progress report on a weekly or even daily basis requires much time and effort from participants. While more evidence is needed, one could speculate that potential strains to time and costs may impede the very reason why organizations want to establish a virtual team in the first place.

Even more critical to the context of NPD/NSD is that the rigidity and stringency of tight managerial mechanisms may hinder the free evolution of creativity and innovativeness. To achieve innovation there must be ideas and these initially appear from among individuals in the team. A new idea dies unless it finds a solid breeding place. This breeding place must leave the individual enough time, freedom and flexibility to develop the abstract idea into a concrete concept. Yet, the findings of this study indicate that interaction in effective virtual teams is tightly structured through strongly standardized and formalized procedures, which may limit the time, freedom and flexibility available to individuals. Indeed, team members may find it difficult to be innovative and creative when they receive daily instructions on how to execute the work task. Likewise, centralized decision-making may hinder team members in sharing their ideas openly and freely. Unless more conclusive research is provided, these findings give reason to speculate that virtual teams may be less suitable for development projects of high creativity and innovativeness, as these are qualities known to deteriorate under rigid structural designs.

Fourth, these potential limitations to the benefits of virtual teams should cause managers to evaluate carefully whether to deploy a virtual team rather than a traditional co-located work group. The advantage of a highly flexible and fluid physical team configuration

may be overshadowed by the resulting need for rigid managerial designs. Also, the theoretical efficiencies in time and cost may be impeded by the persisting need for frequent face-to-face interaction. However, it is acknowledged that in multinational organizations the geographical dispersion of key employees makes co-located teamwork unwieldy and often dictates the use of virtual teams. This is the very reason why virtual teams are no short-term fad, but lasting and increasingly used organizational forms. To those managers who have little choice but to engage internationally dispersed expertise through a virtual team, the following suggestions are offered:

- While tight managerial mechanisms are recommended to organize and coordinate, these must not be autocratically imposed from the top. Instead, a mutual agreement between team and team manager regarding the level of standardization, formalization and centralization is necessary to constitute high performance. Otherwise, team members may become dysfunctional due to work overload, indirect rivalry, and aggravation.

- Team managers must be aware that applying tight managerial mechanisms requires the adoption of a 'hands-on' leadership style. The findings indicate that team managers of effective virtual teams tend to adopt a management approach that is more proactive than the leadership style they apply for running their traditional, co-located departments. Indeed, some team managers reported a learning curve when dealing with virtual teams. That is, when team managers supervised a virtual team for the first time, they deployed a rather loose, hands-off leadership style building on their experience with traditional, co-located teams. However, the geographic dispersion of members in combination with a heavy reliance on impersonal communications made a loose leadership style unwieldy and resulted in low team performance. The second time, these team managers adopted a rather tight and hands-on style for managing virtual teams, which led to much better performance.

- One cannot overrate the need for shared values among team members. Whether or not all team members are fully committed to the project and whether or not the team

holds a common belief in the need to pursue the development project is crucial for high teamwork effectiveness and team performance. Indeed, having rules and regulations in place to guide and control the work process is one thing, having committed team members who actually follow procedures and who reliably attend team meetings is quite another. It is the commitment of team members, or the absence of it, that frequently decides upon project success or failure. Measures to strengthen shared values in a virtual team include (a) establishing mutually agreed managerial mechanisms for organization and coordination; (b) freeing participants from time constraints; (c) providing virtual teams with sufficient resources to conduct frequent face-to-face meetings; and (d) establishing unequivocal lines of authority from the outset, particularly with third parties such as joint-developers and suppliers.

- The experience of the team manager and team members with virtual teamwork is important. Assuming that all participants are highly skilled professionals who are well adept with their area of expertise as well as with NPD/NSD, there is still the need for having much experience with virtual teamwork. Repeatedly it was observed that the selection of less experienced team managers not only hampered the cooperation during the project, but also was the primary cause for a bad project start. In similar vein, inexperienced team members may find their first encounter with virtual teamwork as strenuous and difficult. Overall, the more experienced team members became the easier they coped with technology and the dispersion of colleagues. Also, highly experienced members felt better prepared to cope with unforeseen events and to push the project through despite difficult contextual conditions.

In sum, this research has exposed some of the varied tensions involved in managing virtual teams and, as a consequence, has highlighted some of the problems associated with the rush to 'virtualize' contemporary organizational forms in much of the practitioner-oriented literature. It the contention of this study that reliance upon notions of 'virtuality' might too often obscure the very real issues associated with managing a dispersed group of busy professionals. Respondents frequently described virtual teamwork as painful. It was depicted as slow, confusing and, at times, frustrating. Many

respondents voiced their preference for the traditional, co-located work group; "sitting down with peers at one table, getting the damn thing done and moving on". However, in large multinational organizations the co-located work group is often unfeasible and the virtual team remains the only option for uniting globally dispersed talent. Yet, organizations must be aware that what they get is the advantage of a highly flexible and fluid organizational form accompanied by the disadvantage of rigid managerial designs.

To highlight the complexity of these issues in contrast to the apparent simplicity of the transformation implied by the use of 'virtual teamwork' in some quarters is in no way to reject the notion of the virtual team out of hand. Nor is it to assert the unassailability of the *status quo*. Rather it is to take the notion extremely seriously, to see just what it looks like 'on the ground' and to come to an understanding of just how it works in the lived practice of virtual teamwork.

9.3 Limitations of the study

This study provides important contributions to theory and practice. However, it must be cautioned that different research methods produce different problems regarding the reliability and validity of the findings. A challenge in all research is to ensure reliability and validity, nowhere more so than in case research (Yin, 1996).

As explained in Chapter 5, the question of construct validity was addressed by using multiple sources of evidence in a manner that encouraged convergent lines of inquiry and triangulation. The study deployed in-depth interviews as well as documentation for data collection. Interviews were conducted with team managers as well as with respective team members. An additional tactic to increase the validity of the study was to have some of the draft case study reports reviewed by key informants (Miles and Huberman, 1994).

To ensure internal validity the analytic tactic of pattern matching was deployed as suggested by Yin (1996). That is, for data analysis an empirically based pattern was compared with a predicted one. The question of reliability was addressed by using a research protocol in which all informants were subject to the same procedure of data

collection. That is, the same research tools were applied to all interviewees by a single researcher who recorded the information during the interview and, subsequently, transferred these into verbatim transcripts. In addition, multiple levels of analysis and divergent patterns across multiple respondents on common topics minimized the risk of systematic bias in the findings. Also, to increase coding and analysis reliability coder training and inter-coder-reliability tests were conducted. The analytical tools used provided a structured analysis of results and a frame of reference for other researchers who may want to replicate this study.

Generalizability or the external validity of the findings of this study was approached through the multiple case design of the research: rather than a single firm, eight independent organizations have been studied. A larger number of cases helps counter concern that the findings are in some way limited to the special setting of research (Yin, 1996). Also, in each of the eight cases one higher performing virtual NSD team and one lower performing virtual NSD team was examined to obtain a fuller understanding of the differentiating factors that help or hinder teamwork effectiveness and team performance. Overall, 32 personal in-depth interviews were conducted.

Nonetheless, despite the attention given to the validity and reliability of this study several limitations arise. Please note that some of these limitations have already been mentioned in Chapter 5 and will be re-examined in the following.

1. Due to the exploratory nature of this research, in-depth field interviews were used in a small number of service firms. Further, no scales were used to measure variables. Therefore, the findings should be considered tentative.

2. Although the study is qualitative and descriptive in nature, a considerable amount of prior instrumentation was undertaken. A set of propositions was formulated from the beginning and a theoretical framework was constructed prior to the field study. Critics may argue that such preordained theoretical perspectives might bias or limit the findings. However, this study concurs with Eisenhardt (1989), Yin (1996) and Perry

(1998) that without prior instrumentation the researcher will get overwhelmed by the staggering volume of rich data, trying to capture everything and lacking the simplicity of overall perspective. Also, pure induction might prevent the researcher from benefiting from existing theory, just as pure deduction might prevent the development of new and useful theory (Perry 1998). Nonetheless, although early identification of the research question, propositions, and a conceptual framework is helpful, it is equally important to recognize that these are tentative in qualitative research (Eisenhardt, 1989). Indeed, during data analysis the propositions were restated and the conceptual model was revised. However, without the initial definition of these the study would have shifted into confusion, vagueness and premature abstraction.

3. The study focuses on a specific type of virtual project team that operates within a particular industry sub-sector. The question arises whether or not the findings are generalizable beyond the narrow context of virtual NSD teams in corporate banking? While it is accepted that qualitative research is concerned with analytic generalizations rather than statistical generalizations, it is believed that the findings can be generalized to other virtual project teams to the extent that the team is charged with complex tasks, operates within a highly dynamic environment, and forms part of a large multinational organization. Indeed, banks display characteristics similar to most global organizations that strive within a highly competitive marketplace. Also, just like many other virtual project teams the virtual NSD team is charged with a highly complex and demanding work task that requires much cross-functional and cross-organizational cooperation. This apparent 'limitation' of the study is at the same time its greatest strength. Much empirical research on virtual teams has examined stable virtual teams operating under steady contextual conditions. This research has shed new light on the dynamics and efficiencies of virtual teams coping with a highly competitive, dynamic, and complex business environment.

4. The study focuses on a particularly competitive and secretive industry, which could have led to problems in accessing sensitive data. However, initial concerns regarding access proved unfounded as respondents went to great length to provide insights.

Indeed, the informants were openly self-critical, and critical of their organizations and their operations as well. Their critiques were not cynical or unduly negative, but considered, specific, backed up with data, and articulate. Informants also provided various supporting documents such as project proposals, memos, agendas, and circulars. Despite having access to such multi-level perspectives, ideally additional insights into e-mail exchanges or collaboration software records would have been appreciated. However, obtaining such detailed and confidential information is hardly feasible in a highly competitive industry that needs to protect its own interests as much as that of its clients. To gain entry to such sensitive data would have necessitated a different research method based on experiments or ethnography. Yet, the former approach lacks practical immediacy, while the latter is protracted, resource hungry and lacks expediency for practitioners. Since it was the intention of this study to examine virtual teamwork in a dynamic 'real-life' business context it was decided to adopt a multiple case-study approach thereby accepting limitations to data access.

5. By the use of retrospective data, this study relies on managerial perceptions of virtual teamwork. Although this method is common in the extant literature, the problem of bias effect is always present. Additional problems are poor recall and poor, inaccurate articulation. Nevertheless, throughout the interviews, the respondents were asked for names of participants and dates of events to keep them grounded in the particulars and thus to aid their recall (Alam, 2002). Also, the problem of bias was addressed deploying the process of triangulation of evidence and triangulation of respondents.

6. The team managers were the first to be interviewed in every selected firm. They were free to choose the two teams they reported on. Successively, the respective team members were selected based on the team managers' accounts of events. This process of team selection again created the problem of bias because project managers might choose only those teams they thought would make their department 'look good'. However, this concern about respondent reliability was addressed by having the respondents select two projects, one where a team was higher performing and one where a team was lower performing. Also, using several key informants such as the

team manager as well as the team members allowed information to be crosschecked and verified.

7. The sample was a non-probability sample. The sampling procedure was purposive and not random. The aim of selecting the sample was to make sure that all companies were active in NSD in the last few years and deployed virtual project teams. Purposive sampling is a technique frequently used in qualitative research and helps in focusing qualitative data collection (Miles and Huberman, 1994).

9.4 Conclusion

This study developed a conceptual model of the organization and coordination of virtual teamwork in NSD, grounded both in previous literature and in qualitative, multiple case studies. The findings indicate that virtual teams, charged with a complex work task and operating within a highly dynamic environment, require strong managerial organization and coordination. While a volatile physical team structure tends to increase work process complexity, adding to overall project uncertainty, a tight managerial structure helps to reduce complexity by organizing and coordinating the work process. The tightly structured work process provides stability and helps reduce confusion and complexity within the highly dynamic virtual context. These findings contribute to emerging research showing that the adoption and on-going adaptation of novel, loosely coupled organizational forms requires tight managerial structures to organize and coordinate.

The managerial implications highlight some of the varied tensions involved in managing virtual teams. They underline the limitations of virtual teams and suggest that team leaders evaluate with great care whether to deploy a virtual team as opposed to a traditional co-located work group. In particular, the advantages of flexible physical team configurations may be diminished by the attendant need for rigid managerial mechanisms to organize and coordinate. Unless these mechanisms are skilfully implemented, their rigidity may curb efficiencies related to time and cost and may even hinder creativity and innovation. These potential limitations provide rich possibilities for further research.

Gristock (1997) once described the notion of the virtual as "*a huge vessel of semantic vacuity waiting to have meaning poured into it*". This study contributes to filling the vessel.

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