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Exploitation and Exploration of Advanced Technology in Financial Institutions

By

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Abstract

As the use of information technology becomes more and more pervasive, it is important to understand the use of technology in technology intensive organisation and firms that intensively use technology. Using a particular set of financial institutions, this study seeks to understand how forms and structures of advanced technology are used in organisations that intensively use technology such as financial institutions. This research is conducted through the lens of exploitation and exploration of advanced technology in financial institutions and aims to gain a better understanding between the trade-off of these two forms of organisational adaptation.

Following an extensive review of the literature in this field, we analyse the forms and structure of advanced technology in organisations. We propose a conceptual framework, based on disaggregation, to understand and categorise various levels of technological sophistication in organisations, and propose layers that are better suited for exploration and exploitation, respectively. We propose that technology can be used to transform financial services and products into bits of data and information, combined in a variety of ways, which can be disseminated via a plethora of distribution channels.

Qualitative research methods including 87 interviews and thirteen case studies of financial institutions have indicated that substantial benefits are attributable to the innovation of financial products and services, although these often accrue in intangibles such as reputation. However, the windows of opportunity may be narrow as digital financial services and products are relatively easy to modify and copy and thus the time span left to exploit value from innovation may be limited.

Virtual exchange often tends to be seen as merely one more cheap distribution channel for the online replication of the existing branch experience. Efforts like these, however, miss the opportunities afforded by electronic commerce to rethink the entire value proposition of a financial institution. Conversely, new entrants vary in their focus, but all are pursuing a business model unlike that of the traditional financial institutions. In general, these entrants fall into two groups: those that are focusing on a specific customer segment and those that are focusing on a specific transaction category. The goal of targeting specific customer groups is to develop a trust based relationship with these customers in helping them obtain a wide range of financial services. Thus, these new players are becoming a new form of intermediary that unbundle the relationship management element of the financial services provision business from the product manufacturing and processing elements. Hence, the distinctive value proposition of segmentation will be to develop a deep understanding of a specific customer's needs and to provide access to the best mix of financial services from a multitude of "manufacturers". On the contrary, many banks are still only offering their own products and services. Thus, entrants enjoy the advantage over traditional banks of developing an integrated profile of their customers' preferences. The second group of new entrants is targeting individual product and services categories within financial services and seeks to become the preferred location for the exchange thereof. Instead of trying to own customers, these entrants target specific types of transactions and assume that no bank will be able to match their economies of scale or scope of choice in a specific transaction category. However, they welcome banks' participation in their transaction environments as manufacturers of specific products and services.

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1 Research Questions and Structure of the Work

1.1 Abstract

This chapter introduces the research questions and positions this work among the existing literature of strategy, technology, services, and electronic commerce followed by an overview of the structure of the thesis.

We analyse the different and relevant strands of academic literature and subsequently position this work among the distinct schools of thought. We then provide an overview of the structure of the thesis. We introduce the logic and structural arrangements of the thesis and provide information about the topics and themes and the links between them.

The organisational environment has been subject to drastic changes in a large number of areas. Although, political, social, and economic changes have significantly contributed to the reshaping of the competitive landscape, advances in technology have been of paramount importance in this process. Yet, at the same time, there is little agreement on the definition and measurement of technology and no compelling evidence on the precise role and nature of technology in organisations. Thus, a better understanding of the relationship between strategy and technology change within an integrated framework are of tremendous value for organisations in technology intensive industries and firms that intensively use technology. Therefore, this research aims to assess the exploitation and exploration of advanced technology in a technology intensive environment; namely within financial institution.

1.2 Introduction

Interorganisational relations and economic exchange, that rely on trust[1] under conditions of high environmental uncertainty, may be created using newer types of co-ordination

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[1] For purpose of this discussion, Sabel's (1993) definition of trust has been adopted: trust is the mutual confidence that no party to an exchange will exploit another's vulnerabilities. According to Sable (1993), when parties to an exchange trust each other, they share a mutual confidence that others will not exploit any adverse selection, moral hazard, or any other vulnerability that might exist in a particular exchange. A definition of trustworthiness follows directly from Sabel's definition of trust (Barney and Hansen, 1994). An exchange partner is trustworthy when he is worthy the trust of others, thus an exchange partner worthy of trust is one that will not exploit other's exchange vulnerabilities. Note that while trust is an attribute of a relationship, trustworthiness is an attribute of individual exchange partners (Barney and Hansen, 1994). In this context then, trust can be understood as the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party (Mayer, Davies and Schoorman, 1995). This definition parallels that of Gambetta (1988), with the critical addition of vulnerability. Being vulnerable (Boss, 1978; Zand, 1972) implies that there is something of importance to be lost. Making oneself vulnerable is taking risk. Trust is not taking risk per se, but rather a willingness to take risk. Nevertheless, trust needs to be understood in the context of the specific social system (Barber, 1983; Lewis and Weigert, 1985). It is important to distinguish between various forms of trust, arising

mechanisms and exchange vehicles (Litwak and Hylton, 1962). The assertion that advanced ICTs are critical to the success, if not the survival, of an organisation has been made by a number of scholars[2]. The integration of ICT with organisational strategy as a means for achieving sustainable competitive advantage has been raised as one of the most important issues facing management in the 1990s (Scott Morton, 1991, 1995). Recent studies, however, have shown that ICT systems often fall short of their promised overall performance increase (Hammer, 1990). One of the main reasons for the slow manifestation of the benefits of information and communication systems has been attributable to the lack of organisational change and adaptation, expressed in terms of exploitation and exploration, accompanying the introduction of new technology (Scott Morton, 1991). Simultaneously, however, the increasing global interdependencies and the accelerating pace of change demand more flexible and adaptive organisations. According to Drucker (1988, 1993), an organisation may be defined as a structure in which (digital) information serves as the axis and as the central structural support. Accordingly, in this context we define organisational flexibility in terms of vulnerability and

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from numerous sources. Different mechanisms are implied in the creation of each from. Sociologists such as Zucker (1986) have identified three from: [1] characteristic based trust, which is formed within a group on the basis of factors such as ethnicity; [2] process based trust, which results from past and expected future exchanges; and [3] institutional based trust, which stems from embedded social practices (Dore, 1987; Jarillo, 1988). The extensive psychological and sociological literature on trust has also distinguished between affective, cognitive, and behavioural dimensions of trust (Lewis and Weigert, 1985). Williamson (1993a) makes a further distinction between calculative, personal, and institutional trust. The first refers to a rational form of trust fostered by mutual hostages and built upon reputation effects (Kreps, 1990). Williamson (1993a) suggests that this type of trust is similar to risk. Personal trust, on the other hand, is akin to altruistic behaviour – it does not depend on calculations of self-interest for its formation or continuation, and applies only in close personal relations. The third form of trust, institutional trust, derives from the social and organisational embeddedness, but in fact, according to Williamson (1993a), is calculative as well. Consequently, the rationale for the key role of trust is straightforward: in the extreme case, it does away with formal contracts, which are costly to write, monitor and enforce (Bromiley and Cummings, 1991). Thus, trust acts to reduce transaction costs by reducing or eliminating both ex ante and ex post opportunism.

[2] See, for example, Child (1987); Clemons and Row (1992); Clemons, Reddi and Row (1993); Davenport (1993); Davidow and Malone (1992); Hammer (1990); Hammer and Champy (1993); Henderson and Venkatraman (1994); Heygate (1994); Kauffman (1995); Mathe and Dagi (1996); McFarlan (1984); Miles (1989); Molloy and Schwenk (1995); Nohria and Berkley (1994); Porter and Millar (1985); Price (1996); Quinn (1992a,b); Ramarapu and Lado (1995); Rockart and Scott Morton (1984); Rockart and

adaptability. Therefore, we project that the effective implementation of advanced ICT, or the maintenance of an optimal balance between exploitation and exploration of advanced technology, would decrease vulnerability by reducing the cost of expected failures and hence improve organisational adaptability by reducing the cost of dynamic adjustment. Correspondingly, we believe that not enough attention has been paid to the proactive management of corporate exploitation and exploration of advanced technology – especially in technology intensive industries and in firms that intensively use advanced technology. Consequently, the maintenance of a dynamic balance between organisational exploitation of existing technological capabilities and the exploration of new and/or emerging technological capabilities over time and space has not received the attention it deserves (March, 1991, 1995). Organisations using advanced ICTs often perceive organisational prosperity and profit to be concerned with the successful deployment of the latest available technology. This may however be in sharp contrast with the relevance of that technology to the long-term mission of a specific organisation (Whyte and Bytheway, 1996). Thus, based on the previous works of March (1991, 1995), Orlikowski (1992), and Tyre and Orlikowski (1993, 1994), the initial research questions have been centred around the paradigm of exploitation and exploration of advanced technologies (Huber, 1990) in the context of organisational adaptation of financial institutions. Therefore, this **exploratory research** is aimed at augmenting our understanding the organisational adaptation process of financial institutions, expressed in terms of exploitation and exploration. The financial industry has been selected based on a survey[3] conducted by the author in 1995, the recent literature on financial institutions

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Short (1989); Scott Morton (1991, 1995); Tan (1995); Tushman and Nelson (1990); Venkatraman (1991, 1994); Venkatraman, Henderson and Oldach (1993); Zhao (1995).

[3] The author sent out an anonymous questionnaire, as part of the transfer panel, addressed to the director of corporate strategy, to Fortune 500 companies in 1995. The response rate was 35 percent. The objective, among others, was to assess the implications of advanced ICTs and identify the industries that are

that indicates the significant changes the industry[4] is facing, and secondary data that confirm the intensive long-time use of advanced technology in the financial industry. Financial institutions have been analysed from various perspectives. The customer firm relationship has been analysed from the perspective of the marketing and services literature and more recently from a regulatory perspective. The distribution of financial services and products and the "packaging and bundling" thereof has recently been analysed in the general banking literature and the more specific works on the distribution of financial services. The finance literature has extensively analysed and promoted the innovation of financial products and services. The corporate finance literature has extensively analysed issues related to the role of mergers, acquisitions, cross shareholdings, and capital structures. A distinct literature on risk management has emerged that incorporates elements of various strands of the finance literature including derivatives, financial- and capital markets regulation and insurance. Although, various perspectives on financial services, products and institutions note the importance of technology, there is relative scarcity in the strategy literature, on the role of advanced technology within financial institutions. Furthermore, with the advent of VE or EC systems, the financial industry is likely to undergo significant changes as most of the products and services can be replicated in digital form (or already exist in bits and bytes), which in turn can be disseminated via digital- or electronic distribution channels. Accordingly, the relative scarcity of research on advanced technology within financial institutions has been a major force to promote the conduct of this research in an attempt to fill this gap in the literature.

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most significantly affected from these changes. The findings from the questionnaires confirmed that the financial services sector was at the forefront of the application of advanced and basic forms of ICTs. Secondary sources have further confirmed our findings (e.g., *Business Week*, 1994 [May 2; June 13; December 12a,b]; Legg, 1994; Morgan, Cronin, and Severn, 1995; Steiner and Teixeira, 1990).

In summation, advanced ICTs have provided an opportunity to lower considerably the cost of information processing while maintaining or increasing the overall corporate performance. Moreover, the economics of advanced ICTs have shifted the cost benefit balance in favour of increased and enhanced information-processing capabilities of organisations at a competitive price. Additionally, ICTs have increased the options of information codification and diffusion, respectively. The availability of these options makes a significant contribution to the emergence of the organisational multisource value network – comprising both the traditional physical component and the emerging virtual component. The former is driven by the exploitation of existing organisational capabilities, which eventually sustains existing economies of scale and scope. Conversely, the latter is driven by the organisational desire to explore new possibilities and innovations and lay the foundations for tomorrows ability and hence to ultimately exploit newly devised or emerging organisational capabilities and resources.

1.3 Positioning of this Work – Filling the Gap

March (1991) in his seminal work provides a theoretical investigation of the allocation of organisational resources between exploitation and exploration under consideration of the distribution of costs and benefits across time and space in the context of organisational learning. March (1991) further conjectures that adaptive processes in the context of knowledge – by refining exploitation more rapidly than exploration – are likely to become effective in the short run but self-destructive in the long run. March (1995)

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[4] See, for example, Hunt (1995); James and Houston (1996); Jaque and Hawawini (199?); Rajain (1996); *The Economist* (1996, October 26); Tufano (1995, 1996).

further extends his analysis, in a theoretical investigation that speculates on the future of organisations based on an interpretation of the environments that may shape organisational survival. The predications emphasise the adaptiveness of organisations in an environment characterised by high levels of uncertainty and volatility, global linkages among constituents, ICTs, the emergence of knowledge based forms of competition, and increased political uncertainty. These factors emphasise the paramount importance of organisational adaptation – expressed as a form of exploitation and exploration of scarce resources – to ensure organisational survival and profit maximisation. Accordingly, organisations that fail to adapt – or maintain a healthy balance between exploitation and exploration – seem destined to expire as the world around them continues to change. Although the model put forward by March (1991, 1995) is theoretically plausible, it has not been subject to empirical scrutiny.

Orlikowski (1992), and Tyre and Orlikowski (1993, 1994) provide some empirical results about the role of technology in organisations, and more specifically on the interactions between genuine technologies and organisations. Yet, they do not explicitly address effects of exploitation and exploration and issues related to maintaining a dynamic balance between the two over time and space. Orlikowski (1992) examines the interaction between technology and organisations using a structuration model of technology. This methodology – a reconceptualisation of technology – takes into account both deterministic and human aspects of technology to allow for a deeper and more dialectic understanding of the interactions between technology and organisations. The results are discussed and analysed in the context of the data of a single software firm. The paper suggests that the reformulation of the technology concept and the structurational model of technology allow for a deeper and more dialectic understanding of the interaction between technology and organisations. Tyre and Orlikowski (1993, 1994)

argue that technological improvement is seldom a steady process but instead alternates between short episodes of intensive change activity and longer periods of routine use. The authors argue that the process of technological adaptation is not gradual and continuous, as often argued in the innovation literature, but instead highly discontinuous. Tyre and Orlikowski (1993, 1994) further examine new process technologies and the opportunities related to these improvements in organisations. They argue that technology must be adapted to fit the organisation and its strategy based on the fact that technological improvement is seldom a steady process but rather one that alternates between short episodes of intensive change activity and longer periods of routine use. These results have been gained in a study including three manufacturing and services firms with the focus of the investigation resting on the implementation and use of process technologies (note that one of the case studies is the same software firm that has been analysed in Tyre (1992)). Finally, DeSanctis and Scott Poole (1994), in their theoretical exposition of the use of advanced technology, focus on adaptive structuration theory as a viable approach for studying the role of advanced information technology in situations of organisational change. Adaptive structuration theory examines the organisational change process from two vantage points: first, on the type of structure provided by the technology in question and second, on the structures that actually emerge in human action as people interact with these technologies. Thus, the focus of adaptive structuration theory rests primarily on social structures. DeSanctis and Scott Poole (1994) have "considered" a hypothetical small group using a group decision support system for their theoretical examination of the phenomena in question.

While Orlikowski (1992) and Tyre and Orlikowski (1993, 1994) provide some empirical evidence, the results are based on a sample of one firm and a sample of three organi-

sations, respectively (one of them being the same case as in the study of Tyre (1992)). Moreover, the phenomena under investigation do not directly address the question of what technologies are more beneficial for exploitation and exploration, respectively. Likewise, there is no distinct being made between technology and advanced ICT. Conversely, the work of DeSanctis and Scott Poole (1994) and the seminal work by March (1991, 1995) examine the problem from a theoretical point of view. Although the former analyse the problem using a hypothetical group decision support system and the use of knowledge in the context of organisations. Accordingly, we attempt to investigate the role of advanced technology as a means of exploitation and exploration of organisational capabilities in organisations and explore its role on the organisational adaptation process. This analysis is performed in a technology intensive industry within firms that intensively use technology, namely the area of financial institutions. We believe the lack of a clear understanding of exploitation and exploration of advanced technology, as a means of organisational adaptation, in an information intensive environment such as financial institutions represents a serious gap in the strategy literature.

1.4 Summary – Research Question

Technology has long lost its invisible character – instead it has become an all pervasive force that continues to shape connections across social, organisational, and environmental domains. Blurring and convergence – the tentacle of digital technology – have demolished the barriers between distinct industries, organisations and activities. Advances in technology, we have argued, have significantly contributed to the reshaping of the organisational environment. The newly emerging competitive landscape is largely the result of the transition from atoms to bits and bytes. Thus, the digitalisation of

products and services is likely to introduce the most radical changes in technology intensive industries and within firms that intensively use advanced technology. Yet, there is no precise definition and measurement of technology in the context of the organisation. Accordingly, we set out to explore the role of advanced technology in financial institutions. More specifically, this research sets out to assess the role of exploitation and exploration of advanced technology in a technology intensive environment such as financial institutions. Digitised information, we have argued, allows financial institutions to identify new product and service requirements and act thereupon. The exploitation and exploration of these new capabilities, we propose, are likely to introduce radical changes for financial institutions. Within this context, the essence of exploitation is the refinement and extension of existing competencies, technologies, and paradigms. Conversely, the essence of exploration is the experimentation with new alternatives. We conjecture that in the context of organisational adaptation, to be understood as a balance between exploitation and exploration, there is a tendency to substitute exploitation of relatively low risk alternatives for the exploration of uncertain and high-risk alternatives. We have introduced the concept of the organisational value network. We identified value networks as a possible path financial institutions may follow to a profitable future. We defined these networks as a group of bundled or assorted financial services and products delivered through conventional channels, new digital distribution outlets, and via established business partnerships. Thus, value networks are formed when financial institutions collaborate to offer their customers comprehensive packages of financial services, which are delivered via a plethora of conventional and digital distribution channels. Conversely, this framework can be understood as taking into account both sources of physical and virtual value creation by balancing the explorative and exploitative use of advanced technology and organisational activities. Thus the

theme of the next chapter is to analyse in more depth the relationship between exploitation and exploration. Subsequently, the theme of chapter three is to think about an adequate research methodology to analyse the exploitative and explorative use of advanced technology in financial institutions.

1.5 Roadmap and Structure of the Thesis

This work – *The Exploitation and Exploration of Advanced Technology in Financial Institutions* – is structured in two main parts. The first part analyses issues related to the exploitation of advanced technology while the second part is concerned with issues related to the exploration of advanced technology in financial institutions. However, the phenomena being investigated do not allow a clear separation between issues associated with exploitation and exploration to be maintained throughout this work. The structure of this work, as depicted in Figure 1, has evolved during the investigation as two main topics, associated with the use of advanced technology in financial institutions, have crystallised. The first topic, forming part one of this work, is primarily concerned with use of existing forms of technology in financial institutions. We identify areas that are well positioned for exploitation and analyse the use of advanced technology within these areas. The second topic, forming part two of this work, is centred on the exploration of advanced technology and thus investigates the exploratory use of technology in an information intensive environment.

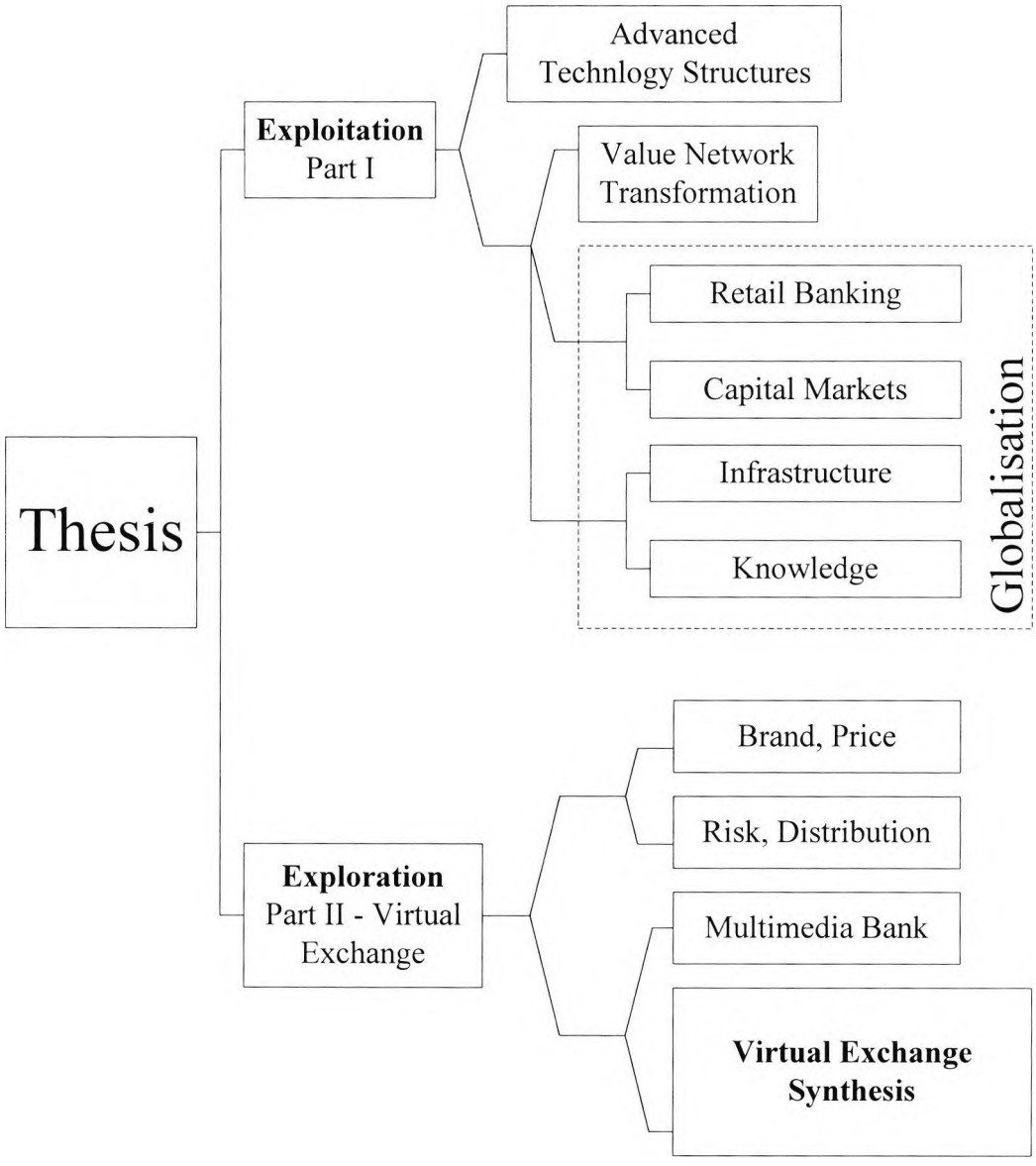

Figure 1 Thesis Roadmap – Exploitation and Exploration

We conjecture based, on our fieldwork data, that electronic commerce, the virtual domain of organisational value networks, is poised to significantly alter the industry structure and introduce a new exchange paradigm for products and services. However, we believe that these systems bear significant risks. Accordingly, we examine the risks in interorganisational exchange systems and explore the new and modified role of intermediaries in such systems. We refrain from arguing that there is no longer room for

intermediation – on the contrary, we propose that digital exchange networks will benefit and require a new trust and information concentric form of intermediation[5]. The exploratory and explanatory nature of this work – investigating emerging phenomena – requires a certain compromise as far as the investigation is concerned. We have analysed the themes that have been mentioned most frequently by workshop participants and respondents during the early stages of this research and the pilot case study. These themes are listed in Appendix 4. These themes have further been corroborated with the various literatures on technology, financial institutions, exchange and the popular press to amend the themes whenever necessary.

While this chapter discusses the research questions and outlines the research design and the overall structure of the thesis, chapter two introduces the topic and sets the scene. Chapter three explains and discusses the research methodologies deployed in this research project. We review and discuss the literature on qualitative and quantitative research methodologies in the context of strategy and management research. Furthermore, we argue that case study methodology is best suited to carry out this research. Chapter four reviews the literature on technology. We then provide a framework to distinguish and analyse the various technological components of an organisation. This concept provides an elegant solution for an assessment of technologies that are more suitable for exploitation and exploration, respectively. The exploitation of advanced technology forms the theme of chapter five. We examine four areas that have been identified as suitable for further exploitation of existing organisational capabilities.

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[5] According to Dasgupta (1988), trust is associated with expectations regarding the other's choice of actions that have a bearing on one's own choice of action. Such expectations may have a strong or weak basis, ranging from assurance from objective facts and logical reasons, through belief, which is less firmly based on experience and argument, to unsubstantive faith. Gambetta (1988) summarised different views on trust as the subjective probability that one assigns to action by another agent, which affects one's own action. Luhmann (1988) emphasised that in trust there is an element of choice. If there is no

These four value network elements, all embedded in a dynamically changing environment, comprise retail banking, infrastructure, capital markets, and knowledge management.

The commencement of the second part of this thesis is based on a detailed discussion about virtual exchange as outlined in chapter six. Within the Virtual Exchange Framework (VEF), we analyse the effects of advanced technology on the mode and governance structure of virtual exchange. We further evaluate the role of communities as surrogates for the lack of regulatory institutions that should govern virtual exchange. The advent of transparent virtual exchange systems suggests that prices will ultimately be more standardised across the entire exchange platform (or at least narrow the existing price spreads). Conversely, direct interaction between the supply and demand side requires the plethora of available data to be analysed and evaluated as a preparatory part of the purchase decision and ultimately the exchange. Within this context, we propose that an intermediary's value added may no longer be tied to bringing together demand and supply, but rather in the collation, evaluation, interpretation and dissemination of information that will be entrusted to consumers upon request. Risks in interorganisational exchange systems are analysed in the second part of the chapter six. These risks arise out of opportunistic renegotiations and non-compliance. We scrutinise the property of risk in various virtual exchange settings and propose that risks are high in biased virtual exchange situations where one firm controls the mode of exchange. Conversely, unbiased EC platforms, or pure electronic markets, bear the lowest risk potential. We further distinguish between organisational and environmental risks. The credence character of information poses a further problem and eventually a new risk – namely the dif-

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choice, and one simply has to surrender to the powers that be, the belief that no harm will occur is a matter of confidence, not trust.

ficult to assess quality of a specific information concentric product or service. Thus, a new form of intermediation based on trust and information analysis promises to alleviate some of the deficiencies of these early forms of virtual exchange. Chapter seven provides a taxonomy of virtual exchange systems. We examine the links between structure, technology and the organisational value network. Three proponents and modes of virtual value networks or platforms for virtual interaction and exchange are analysed in turn, namely, the Extranet, the virtual organisation, and the virtual community. Although, advanced technology can deal with extensive geographic distances and the associated asynchrony across time zones, we argue that advanced technology often falls short of successfully bridging cultural idiosyncrasies.

Chapter eight provides an overview and summary of the empirical findings and highlights our contributions to the field. First, we provide an amendment of the scarce literature on advanced technology in information rich and technology intensive environments such as financial institutions. We explicitly explore the workings of virtual exchange systems and their impact on financial institutions. Second, we provide a detailed account of how technology is used, in terms of exploitation and exploration, in financial organisations. Accordingly, we unravel a number of areas that explicitly reveal the exploitative and explorative use of advanced technology in financial institutions. Third, the exploratory second part of the thesis provides a detailed account of virtual exchange and electronic commerce systems with special reference to information concentric organisations such as financial institutions. We supply a framework – the organisational value network – that takes into account both sources of physical and virtual value creation by balancing explorative and exploitative efforts of an organisation. In the final chapter nine we discuss the limitations of this research and accordingly provide ideas and discuss implications for further research.

Technology is rapidly altering the nature of competition and strategy in the late 20th century, moving us toward a "new competitive landscape" in the 21st century.
Bettis and Hitt (1995)

2 Introduction – Setting the Scene

2.1 Abstract

The blurring and converging of industries and the formation of new ones at the intersection of existing ones is the subject of the discussion in the first part of this chapter. We further investigate the relationship between technology and the newly emerging commercial environment. We explore the role of technology in financial institutions and discuss the concept of advanced technology.

We introduce the concept of an organisational value network – comprising elements of both marketplace and marketspace activities – in the second part of this chapter. In the context of the organisational value network – a characteristic of the new competitive landscape – we further analyse the relation between the exploitation of old certainties and the exploration of new possibilities in the context of advanced technology in financial institutions. We examine some complications in allocating resources between the two; particularly those related to balancing exploitation and exploration of organisational capabilities across time and space.

2.2 Introduction

A number of scholars have recently pointed to the profound changes – economic, technological, and social – that contemporary organisations are facing[6]. Thus, in response to these changes many firms are developing new approaches and strategies to deal with these complex interlinked contingencies. Some of the requirements may be the use the latest technology, the development of new technology, active participation in global markets, an organisational structure to gain advantage in these markets, and/or high levels of strategic flexibility. In addition, a long-term vision should be established that allows managers to balance short-term performance and exploitation of organisational

[6] See, for example, Bettis and Hitt (1995); Castells (1996); Drucker (1988, 1992); Handy (1995a); Hitt, Keats and DeMarie (1995); Lewin and Stephens (1993); Malone and Rockart (1991); Moore (1993); Nalebuff and Brandenburger (1996); Prahalad and Hamel (1994).

resources with long-term requirements and the exploration of new organisational capabilities. In summary, firms must develop the ability to effectively navigate in the new competitive landscape.

In response to these changes, many firms are further attempting to exploit and explore their structural arrangements and processes. For example, a number of Swiss universal banks started to sell life insurance – conversely insurance companies begun to sell basic savings products and thus blurring the distinction between banks and insurance companies. Likewise, a number of retail and entertainment organisations (e.g., Virgin) have recently started to offer basic financial services. These changes are, in part, driven by recent advances in information and communication technologies (ICTs) that provide the impetus to exploit existing customer information and explore further possibilities for cross-selling financial products and services. These advanced technologies provide fast, accessible, and ubiquitous electronic networks that support computer mediated forms of data and information exchange. The new global information infrastructure (e.g., the Internet) combines all information into a manipulable digital form and makes it available almost instantaneously. Accordingly, the Internet has become a symbolic and substantive engine driving the technological revolution (Hitt, Keats and DeMarie, 1995). Such information and communication networks are expected to provide efficient and effective platforms for virtual, or non-physical, exchange between organisations, to span organisational boundaries and facilitate interorganisational collaboration[7]. These technological changes can be characterised by an increasing rate of technological diffusion, an increasing knowledge intensity, and the emergence of positive feedback loops (Arthur, 1996; Bettis and Hitt, 1995). These expecta-

[7] See for example Davidow and Malone (1992); Malone and Rockart (1991); and Malone, Yates and Benjamin (1987, 1989).

tions are widely shared (Orlikowski, Yates, Okamura and Fujimoto, 1995). For example, traditional retail banking is slowly substituted for cost effective electronic forms of interaction (e.g., Citibank offers free integral electronic banking services for customers). Yet, as Daft and Lewin (1993) correctly have pointed out, we still have much to learn about the interactions and interdependencies among advanced ICTs and their aggregated implications for the organisation.

2.3 The New Environment

Historically, industry boundaries were relatively stable, as were rules of competition within any particular industry (Porter, 1980, 1985, and 1986). However, during the last decade certainties have given way to new rules (Bettis and Hitt, 1995). In industry after industry, the terrain is changing so fast as to make past experience irrelevant, or even dangerous (Hamel and Prahalad, 1996). Industry boundaries are in a constant state of flux (Bettis and Hitt, 1995; Prahalad and Hamel, 1994). Convergence, blurring and disintermediation simultaneously reshape traditional industries while organisational activities are being established along non-traditional areas of value creation and economic exchange (e.g., virtual exchange [VE] and electronic commerce [EC]).

Just where then does one industry begin and end? For example, the incumbents in the financial services industry increasingly face new competitors from a number of "other" industries. Intuit, the provider of financial management software, for instance, has established a number of electronic links with banks – in this context then, who is the actual services provider: the bank or the software company? Moreover, as industry boundaries meld, industry specialisation (or the exploitation of existing capabilities) may be a handicap. Thus, the capacity to think across industry boundaries – to spot and

explore new opportunities at the juncture of numerous industries – might be as valuable as deep experience in a single sector. How much corporate energy and resources should be put to the exploration of new possibilities, conversely how much attention should be paid to the exploitation of existing organisational capabilities? Simultaneously, an international or global perspective rapidly supplants the traditional national thinking. Most industries, and especially services, are in the "process of globalising" and this is often driven and/or facilitated by advanced ICTs. Globalisation has changed the boundaries of competition (Kay, 1993; Ohmae, 1990, 1995a,b). Thus, it has become easier to leverage a unique business idea without regard to national boundaries as a consequence of advanced technology[8]. However, the task is not simply to share knowledge and information across organisational entities, but to share learning within an extant network of a globally operating organisation. This process requires an organisation to access, assimilate and integrate a set of different national skill and preference sets (Choi and Kelemen, 1995; Trompenaars, 1993). This globalisation process is further impacted by the current transition from a world of atoms to a world of bits and bytes (Negroponte, 1995). Complex technological developments such as these are altering the nature of strategy in many industries (Bettis and Hitt, 1995; Butler et al., 1997). Organisations in technology intensive environments and organisations that intensively use technology must develop a better understanding of the interdependencies between strategy, technology and change. Therefore, the exploitation and exploration of advanced technologies during the organisational adaptation process – as a means of organisational change – is of paramount importance.

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[8] The "virtual" bookstore Amazon [www.amazon.com] on the World Wide Web (WWW), for example, is not confined by national boundaries because its operations are located in the marketspace as opposed the marketplace.

2.3.1 Technology and the Environment

The technological trends discussed above have major implications for competition and strategy. The new competitive landscape requires a significantly different approach to strategy than was common in the past (Bettis and Hitt, 1995).

An inevitable consequence of the trends outlined above is the increase in risk and environmental uncertainty (March, 1991, 1995; Bernstein, 1996). Technological change is fast, pervasive and unpredictable, while the required investments are tremendous and the penalties for failure severe. The qualitative nature of uncertainty has changed in one further important manner. Industry dynamics have become increasingly non-linear as waves of technological change have swept organisations and industries (Hamel and Prahalad, 1996)[9]. Accordingly, the intertwined relationship between organisations and technology has become increasingly complex. Similarly, rapid technological change is making the traditional concept of industry obsolete. Traditionally, much of the development in economics and strategic management has been based on the concept of industry. An industry has usually been described as being composed of organisations that produce close substitutes and/or provide similar services. Thus, firms are considered to be part of an industry and the boundaries of this specific industry were relatively stable over time. In essence, though, the boundaries of industries begin to blur and converge, in part a result of the transition from atoms (physical marketplace) to bits and bytes (virtual marketspace). Advanced technologies fuse together to form new products and services across a number of organisations and industries. Furthermore, "digitalisation" has led to the substitution of existing products and services, often with

[9] A more detailed discussion about issues of complexity and chaos within the context of strategy, management and to a minor extent technology is provided in Beinhocker (1997); Butler (1990); Cartwright (1991); Craig and Douglas (1996); DeSanctis and Poole (1994); Glass (1996); Hsieh (1991); Lane and Maxfield (1996); Levy (1994); Stacy (1991, 1995, 1996); and Thietart and Forgues (1995).

new functions and features. Finally, an increasing number of intra-industry and inter-industry strategic alliances are being formed – although often anticipated to reduce environmental uncertainty, they often add to the dynamics and complexity of the environment. This emerging business environment has recently been described as co-opetition, a mixture of simultaneous competition and co-operation (Nalebuff and Brandenburger, 1996); or co-evolution of firms within a business ecosystem (Moore, 1993). Both of these concepts are based on organisations simultaneously co-operating and competing to support the development of new products and services and hence satisfy customer requirements. In fact, it is largely competition among business ecosystems, not individual organisations that is fuelling today's industrial transformation (Moore, 1993).

Advanced technologies continue to have significant impact on organisational exchange and design. Improvements in ICTs are decreasing transaction costs; likewise, the rate of technological change and diffusion, linked with the emergence of positive feedback systems and the associated lock-in phenomenon[10], are increasing the economic penalties for mistakes and hesitation. Simultaneously, increasing knowledge intensity and the information revolution are shifting the basis of competition to knowledge and the dissemination thereof via digital distribution channels (Bettis and Hitt, 1995; Hamel and Prahalad, 1996).

In summary, a new competitive landscape is currently being shaped – notably a result of the transition from the (atoms) physical marketplace to the (bits and bytes) virtual mar-

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[10] This concept in the context of competition and strategy implies that firms that are successful in an industry tend to become even more successful; conversely, firms that are unsuccessful tend to lose further competitive advantage. Thus, positive feedback and lock-in in this context refer to a situation whereby an advantage or disadvantage becomes self-reinforcing. Recent industrial examples of this phenomenon include Apple and Microsoft competing in the software industry, and Sony's Betamax and Matsushita's VHS competing in the video industry. For a more detailed discussion about feedback systems and the lock-in phenomenon see, for example, Arthur (1989, 1990, 1994, 1996); David (1985); Forrester (1961,

ketspace. Therefore, at this point no definitive view of the emerging competitive landscape is possible. It may be several years or even decades before an accurate picture can be developed – this is similar to the Industrial Revolution, which was not well understood until the twentieth century (Bettis and Hitt, 1995; Prahalad and Hamel, 1994).

2.4 The Transition of Financial Institutions

As one of the most compelling users of advanced technology, the financial services industry is undergoing drastic changes associated with new advanced ICTs and declining processing costs[11]. Additional factors that amplify the magnitude of change are the increased competition from non-traditional institutions; the erosion of constraints of time and space and globalisation; and less restrictive governmental regulations. As recently noted by James and Houston (1995), the three driving forces that have brought about significant changes in the financial industry can be consolidated into three variables, namely deregulation, advanced technology and globalisation. The combination of these three factors enlarges the range of opportunities for financial institutions while at the same time presenting them with the challenge of increased competition[12]. However, this now familiar list of factors does not provide a framework for understanding neither these changes nor a way to think about how the future may evolve. In the past, many financial institutions and especially banks delivered a specific set of largely unrelated products to different sets of customers. In response to the changing environment, how-

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1971); Golder (1994); Katz and Shapiro (1985, 1994); Kauffman (1995); Liebowitz and Margolis (1990, 1994, 1996a, 1996b); and Randers (1980).

[11] Based on workshops with Bank Cial, Goldman Sachs, Lehman Brothers, Oracle, and SBC.

[12] The definition of financial institutions, in the context of this research, includes traditional banks and insurance firms, mutual funds, financial advisors, asset management organisations, and organisations that have started to offer financial services although their core businesses are not directly linked to the provi-

ever, many financial institutions are pursuing strategies that strengthen an institution's ability to perform various rigid and *focused* financial functions.

Thus, based on the work of Merton (1990)[13], we adopt a functional view of the financial services industry, which argues that certain functions always need to be provided independent of institutional arrangements. Although the institutional arrangements used to carry out financial and exchange functions change over time and vary across space, the underlying functions that financial institutions perform change relatively little. Specifically, the financial system provides a limited number of core functions embedded in a socio-cultural environment. First, the financial system provides methods for making payments as a means to facilitate economic exchange. The second function of the financial system is the transfer of economic resources over time and space (e.g., investments). Management of risk over time and space is the third function of a financial system. Fourth, the financial system provides a mechanism to co-ordinate decentralised economic exchange via a price information and price mechanism (e.g., interest rate). Finally, the financial system should provide a mechanism to handle incentive problems that interfere with efficient economic transactions – as reflected in functions one to four.

Although the set of financial functions does not change significantly over time and space, the way each is performed varies across space depending on traditional national practices, regulations, the level of technology, and other contingencies. Likewise, the performance of each function changes over time as product innovations, improved technologies, and alterations in the competitive landscape take place and eventually lead to higher levels of organisational and functional efficiency. Therefore, competition and

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sion of financial services. These organisations include, for example, Virgin, Intuit, Mysis, GM, GE, and Ford, to name but a few.

technological improvements are sparking organisations to exploit and explore organisational capabilities and resources in a constant drive to perform organisational functions more efficiently. Innovative institutions compete directly with traditional banks, brokerage firms, and the growth of these non-traditional institutional forms threatens the traditional provision and distribution of banking services.

In the short term, traditional financial institutions will continue to compete by cutting costs and striving to be more efficient. Conversely, in the long run there are more important and legitimate reasons for functions, products and services to be combined into new "packages" and/or provided via new vehicles. To some extent, the logic comes from economics – cost sharing in production and distribution can make the provision of a package more efficient than that of individual services (Eppen, Hanson and Martin, 1991; Simon and Fassnacht, 1993). Likewise, the substitution of cost-effective methods for expensive ones will eventually shift the focus from traditional means of distribution to new "digital" exchange systems. The disintegration of old integrated products and services, opens two routes to adaptation and innovation. First, organisations should focus on the technological mechanisms that best integrate and deliver existing financial products and services; that is the **exploitation** of existing capabilities. Conversely, organisations should **explore** new methods, procedures, and processes to effectively provide financial functions, products and services across time and space.

2.4.1 Technology and Banking – An Introduction

The financial services sector has been at the forefront of the application of advanced and basic forms of ICTs (Legg, 1994; Morgan, Cronin, and Severn, 1995; Steiner and

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[13] Additional perspectives and amendments to Merton's (1990) functional view of financial operations

Teixeira, 1990)[14]. Moreover, profitability has been directly influenced by the impact of information technology on both the cost and revenue sides of the business (Crane and Bodie, 1996). However, the application of technology has also had qualitative impacts by changing the mode of operation in the industry and modifying the range of services and products provided. In addition, these same technologies provide the impetus to link physically distinct operations across the traditional constraints of time and space and thereby establish a global financial community. In any business or industry, the application of basic and advanced ICTs may be viewed as a strategic weapon, which if used effectively, may enable an organisation to gain a competitive advantage (Anderton, 1995; Anderton, Davis, Hussain and Staley, 1995). Some of the effects of ICT on the financial services industry are summarised below, followed by several more in-depth profiles.

2.4.1.1 Effects of Technology

A financial services provider, which is able to reduce its operating costs below those incurred by competitors, providing similar services, has the potential to enhance his profitability and/or gain a competitive advantage by passing some of these cost savings on to its customers. In the financial services sector, operating costs arise from two broad areas. First, those connected with the management and production of information, and second, those connected with the execution of transactions (Anderton, 1995; Anderton, Davis, Hussain and Staley, 1995)[15]. ICT has contributed to the containment of both these areas of cost. In commercial banking, for example, the application of suc-

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are provided in Crane and Bodie (1996) and Tufano (1989, 1995, 1996).

[14] See also *Business Week* (1994) May 2; June 13; December 12a,b.

[15] See also *The Economist* (1995) April 15; *The Economist* (1996) February 10, April 27, October 26.

cessive generations of computerisation since the early 1960s has dramatically reduced the size of the back-office. Simultaneously, the growth of the expensive paper based systems for money transmission has been curtailed by the development of paperless computerised payment systems such as the electronic funds transfer at the point of sale[16].

Traditionally, the need to develop and maintain a large network of branches has been a major barrier to entry in financial retail banking. However, the development of the Internet as a platform for EC and the associated commercial exploitation potential of these systems have greatly diminished these entry barriers. This has not only reduced the cost of entry for financial services providers but also reduced the barrier to entry for firms whose traditional business has not been financial services. For example, Intuit, a maker of financial software has recently started to offer online money and asset management capabilities that may threaded the operations of existing banks.

Information and communications technologies – in the context of financial services – may be thought of as affecting the provision of services and products in one of three ways; or any combination thereof[17]. First, technology may be conceived as an enhancement of existing product and services capabilities. Second, the creation of new products and services and the subsequent distribution thereof via existing or new digital channels may critically depend on advanced technology. Third, ICTs may considerably contribute to product and services differentiation – that is, making the offerings of one firm appear different from and superior to those of other industry players. In the context

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[16] Because the banking and financial services industry was an enthusiastic early user of ICTs, it now suffers from that early adoption (Anderton, 1995). Legacy mainframe systems and backlog problems (the maintenance and transition of COBOL programmes into more flexible environments) are just two of the problems associated with this early technology adoption.

[17] Based on our interview data, these three categories have been conceived as important by all surveyed financial institutions. In addition, the triangulation interviews have also confirmed the importance of these three genuine areas of influence associated with advanced ICTs.

of asset management, for example, the availability of real time information on stock market events such as price and volume are crucial for the successful operations of an asset and portfolio management firm. Conversely, a delayed price feed may eventually impair a professional financial institution from remaining successfully in the market.

In practise, however, the distinction between these different sources of influence on the provision of financial services and products and the development thereof is blurred. Thus, one might argue that a substantial number of these new offerings are not new services and products but simply new ways of repackaging and distributing traditional services to existing or new clients. For example, the development of EC or home banking systems might be thought of as simply an alternative way of providing traditional account management and funds transfer capabilities to retail bank customers. However, financial services and home banking facilities, embedded in EC systems, with their reliance on advanced technology and communication systems and their divorce from the traditional branch based distribution systems, may be regarded as sufficiently novel as to represent new products and/or services[18]. Similarly, interorganisational value networks, such as shared Automatic Teller Machines (ATMs) facilities and systems based on Electronic Fund Transfer at Point of Sale (EFTPOS), might be regarded simply as alternative ways of obtaining cash or making payments. Yet the underpinning network of information technology links, which allows bank customers to access services and products without constraints of time and space, have been thought of as being sufficiently different to constitute genuinely new products and services[19].

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[18] Based on our interview data, ninety percent of all the surveyed banks, financial services providers have agreed with this statement. In addition, all the triangulation interviews have revealed similar results (85 percent of respondents confirmed this allegation).

[19] 75 percent of respondents agree (T7, distribution, globalisation). Appendix 4 provides an overview of the seven themes that have form the basis for the data collection of this research in the form of semi-structured interview. T7 refers to theme seven, while "distribution" and "globalisation" indicate the topic

Until fairly recently, financial services providers (and especially banks) enjoyed a comparatively comfortable existence largely because of public policy restraints on, and unwritten agreements to refrain from, competing in one another's markets. In addition, cartel-like conditions – in the case of banks – rendered their respective markets healthy and rather predictable. Furthermore, consumer affluence, the demand for the security of (credit) card based transactions and the boom in domestic home ownership have all facilitated the growth and diversification of these financial services providers. Therefore, the largely oligopolistic industry structure of financial services and especially the banking sector promotes competition to take place in the area of services quality rather than along the dimension of pure price differentiation (e.g., Anderton, 1995; Anderton, Davis, Hussain and Staley, 1995)[20]. Accordingly, product differentiation is an important part of such non-price competition and, in turn, ICTs have significantly contributed to product and services differentiation in the financial services industry (97 percent of interviewed respondents agree: T7, innovation). As part of their attempt to differentiate products and services, financial institutions accumulate vast amounts of data and information about the financial and personal circumstances of their customers. The traditional problem has been to mobilise this data into information, which could be used by the business in the marketing of its services to its customers. The recent proliferation of data warehouses and data mining technologies has provided sophisticated tools to access data, collected in connection with the provision of other services, and to utilise the information derived to identify customer requirements in yet other areas. Such a cross-selling approach promises particularly fruitful results in those sectors, within universal financial services organisations, where firms provide a diverse

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addressed within theme seven. For a more detailed discussion about the notation of aggregated frequency data see Chapter Three **Research Methodology**.

[20] See also *The Economist* (1995) April 15; *The Economist* (1996) February 10, April 27, October 26.

range of financial services and products and are expected to significantly profit from exploiting existing cross-selling capabilities[21].

In summary, the role of ICTs for financial services providers is central to their strategic and operational success. The original introduction of the computing facilities in the early 1960s was for bookkeeping purposes. However, the introduction and adoption of sophisticated interorganisational information network systems has provided financial services providers with information that ultimately might be deployed in ways similar to that of other traditional resources. Information, we believe allows financial institutions to identify new product and service requirements and act thereupon. New market entrants will arise because of the adoption and implementation of advanced technology and their incorporation in existing business strategies. If customers are indifferent about the delivery system of products and services, and there is some evidence from the increasingly popularity of EC systems[22], then the exploitation of digital distribution channels opens a cost effective solution for the provision of financial services. This opportunity is largely without the disadvantage of the high costs associated with the establishment of the branch network; previously thought of as an almost insuperable barrier for new entrants.

2.4.2 Advanced Information Technology

The stance taken towards the topic of this research is strategic, organisational and managerial, as opposed to technical. As recently noted by Galliers (1993) the discus-

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[21] Based on the workshops with Oracle and Goldman Sachs.
[22] "Internet Communities – How They are Shaping Electronic Commerce." *Business Week*, May 5, 1997

sion of corporate information, communication and digital exchange systems is largely dominated by technical analysis.

Advanced ICTs comprise digital entities that transmit, manipulate, analyse, explore or exploit information – these processes are executed based on user requests that assist organisational communication and/or decision tasks (Huber, 1990). Although the above dimensions are relevant to user, it is often the multidimensional configuration of these levels, characterising a particular technology, which is most relevant for a particular task. The organisational possibilities of advanced information and communications technologies do not just derive from increasingly favourable economies of scale and the eventual ease of use. They stem more particularly from the forms in which information and exchange can be managed and more important the way these forms lift restrictions on their temporal and spatial access (Child, 1987). Boisot (1995) distinguishes the space and time dimensions by referring to the codification and diffusion of information, which in turn underlies economic exchange. Codification refers to the social equivalent of the structuring of information by individuals, namely, a coding process in which both information compression and specificity are achieved. Thus, codification is a substantive element of formalisation. Conversely, diffusion refers to the extent of information sharing within a specific population and is therefore directly linked to the scope of the communications and/or exchange network.

The question of what impact (advanced) technology will have on business organisations continues to puzzle academics and practitioner alike. Likewise, the question of technology's impact on the organisation itself has gained renewed attention (Rockart and Short, 1989). Accordingly, Rockart and Short (1989) classify the literature on information technology into four distinct areas. First, there is a view that technology changes many

facets of the organisation's internal structure, affecting roles, power and structural arrangements. A second body of literature focuses on the emergence of team-based problem-focused work groups, supported by electronic communications, as a primary organisational structure. Third, there is the view that organisations are disintegrating – their boundaries punctured and semi-permeable – as a result of the steadily decreasing costs of electronic interconnection among different network constituents. The fourth view of organisational change arises from a technical perspective. Here, it is argued that improved and advanced information and communications technologies ultimately lead to systems integration within and across organisational boundaries. A supplementary view can be centred on the notion of managing organisational interdependence. According to this view, an organisation's ability to continuously improve the effectiveness of managing interdependence is the critical element in responding to new and pressing competitive forces.

According to Child (1987), there are three novel strategic challenges – related to advances in technology – that need to be mastered by large firms, particularly under conditions of high environmental uncertainty. These changes both heighten the demand of advanced ICTs as well as encourage changes in the way economic transactions are organised – changes, which in turn are reflected in new informational requirements. The first strategic challenge stems from demand risk. This is the risk of sharply fluctuating demand or even the collapse of markets. It is exacerbated by rapid changes in taste and by advantages in product and services specifications. Fluctuations in demand require organisations to be flexible and adapt swiftly to the new environmental contingencies. Kanter (1983) further remarked that increased environmental uncertainties require organisations to master higher levels of information processing in a more cohesive and

timely manner. The second strategic challenge derives from innovation risk. This is expressed in an organisation's failure to match competitors' innovation in a context of accelerating technological change. Thus, organisations need to maintain simultaneously the capacity to explore new organisational capabilities and preserve a large enough capability and resources pool for the exploitation thereof. The third strategic challenge is associated with inefficiency risk, the failure to match competitors' unit costs. This is among other reasons due to an organisation's inability to maintain an optimal balance between the exploitation of existing capabilities and resources – of eventual scale economies – and the exploration of innovative elements. This may generate the need to increase control over operations and, therefore, to improve operational information so that inefficiencies and associated costs may be reduced to a minimum.

2.5 Value Network

As recently noted by DeSanctis and Poole (1994), and Fulk and DeSanctis (1995), there is a rising interest in innovative forms of collaborative interorganisational arrangements, whether or not they share the same value chain. In addition, new forms of "interorganisational coupling" may be developed through ICTs, in what has been termed electronic integration (Malone, Yates and Benjamin, 1987; Venkatraman, 1991, 1994; Zaheer and Venkatraman, 1995).

Advanced technologies offer a significant contribution towards meeting contemporary strategic challenges because they extend the choice of viable transaction modes and procedures. Likewise, these technologies provide powerful means to create value across organisational boundaries. In particular, advanced ICTs facilitate the transition from physical value network dominated transactions (e.g., branch network) to-

wards various forms of economic exchange embedded in VE value networks (e.g., EC). Advanced technology does this through its ability both to process huge amounts of codified data and to diffuse data and information widely and largely free of time and space constraints. The eventual transition from the physical- to the virtual domain of the value network mandates the need for access to all diffused information and data[23]. Therefore, an organisation's overall value creation or added value, as depicted in Figure 2, is a combined function of organisational procedures and capabilities embedded in both the physical as well as the virtual domain of the organisational value network.

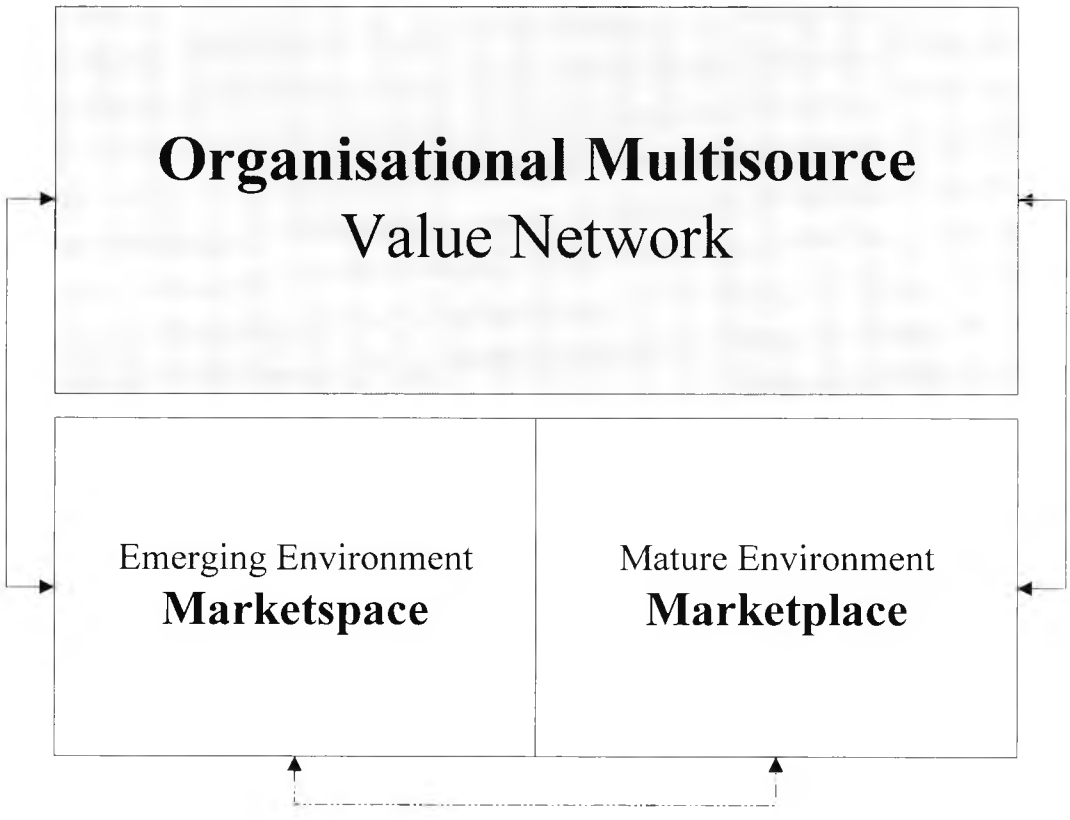

Figure 2 Organisational Multisource Value Network

[23] The perfect market of classical economics requires that there are no limits to the availability of infor-

Advanced ICT can support the organisation of economic transactions and exchange across the entire organisational value network. In particular, technology can facilitate the transition from the physical domain of the value network to the digital information intensive and often intangible virtual domain of the value network. For example, the transition from the physical branch network of financial institutions to the branchless homebanking system based on advanced technology driven VE platforms. The creation of value in the virtual domain of an organisational value network is thus more suitable for organisations that offer largely intangibles as their core products and services (e.g., financial services). Conversely, less digital information intensive value creation procedures may be more suitable for the physical domain of the organisational value network. Our data indicated that financial institutions operate largely along the virtual domain of the organisational multisource value network. However, numerous functions and procedures are provided in both the physical and virtual domain of the value network. For instance, a customer can have access to services and products via physical nodes (e.g., branch network) or virtual nodes (e.g., home- and telephone banking). Thus, the overall value creation is a function of both the virtual as well as the physical domain of the organisational multisource value network. Note, however, that organisations operating in technology intensive environments and organisations that extensively use advanced technology may well shift their operates from the physical to the virtual domain of the value network – as indicated by our data in the case of financial institutions. Accordingly, advanced ICT systems have become an integral element of organisational design and value creation (Henderson and Venkatraman, 1994; Scott Morton, 1991, 1995; Venkatraman, 1991, 1994). Such systems have the capacity to control and manage codified information and to diffuse it across barriers of time and space. The ability to

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mation on any of the constituents in the economic exchange process.

reprogram modular software systems offers considerable flexibility in the face of environmental uncertainty for an organisation's thrive for continuous adaptation. These characteristics lessen the technological constraints on exploitation and exploration and hence increase the choice for organising transactions and exchange arrangements.

2.6 Exploitation, Exploration and Adaptation

The relationship between organisations and their environment is increasingly characterised by higher levels of uncertainty (Bettis and Hitt, 1995; Drucker, 1994; Hamel and Prahalad, 1996; Jauch and Kraft, 1986; Prahalad and Hamel, 1994). Hence, organisations of the future are likely to face higher levels of environmental volatility than their antecedents. As recently noted by March (1995), the metric on which such assessments are based is sometimes elusive, yet the overall rate of change in economic, social, political and technological worlds seems to have accelerated. Simultaneously, the magnitude of environmental change appears to have multiplied.

Technology is rapidly altering the nature of competition in the late 20th century, causing what some refer to as a technological revolution (Bettis and Hitt, 1995; Hitt, Keats and DeMarie, 1995). Therefore, new forms of technology replace existing technologies that have developed over centuries with new ones that themselves have short life expectancies. In addition, the blurring and convergence of industries and the introduction of genuinely new technologies, most marketable in the area of advanced ICT, further increase the level of environmental uncertainty. Complex technological developments such as these are altering the nature of strategy in many industries (Burgelman and Grove, 1996). Thus, executives in technology-intensive organisations (e.g., telecommunications) and in firms that intensively use technology (e.g., financial institu-

tions) must develop a better understanding of the relationship of strategy to technological change and achieve a better integration of the two (Bettis and Hitt, 1995). Likewise, the developments in communications- and computer technology have far-reaching consequences for the management of all organisations.

2.6.1 Technology and Organisational Adaptation

The proposition that advanced information technology bears the capability to introduce radical differences to organisational structure, the mode of economic and social exchange and practice is a cliché, and, like other clichés, it is true to a certain extent (March, 1995)[24]. ICTs – built around the capabilities of modern hardware and software systems and their components – have produced a substantial transformation of modern organisations (e.g., Benjamin and Blunt, 1992; Child, 1987; Haeckel and Nolan, 1993; Malone and Rockart, 1991; Scott Morton, 1991; Venkatraman, Henderson and Oldach, 1993). By affecting the ways organisations monitor actions, keep records and determine accountability, advanced ICT affects the capabilities for co-ordination and control and accordingly provides an important impetus for organisational adaptation. By affecting the ways firms access, monitor and keep track of information about the environment, ICT modifies capabilities and processes that determine organisational learning and influence organisational decisions. By affecting the ease and nature of interorganisational digital network co-ordination, ICT changes the cost benefit structure of alternative governance and exchange forms and mechanisms (e.g., EC).

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[24] Despite the exaggerations of science fiction forecasts (e.g., Benedikt, 1992; Gibson, 1984, 1993; Rheingold, 1991, 1992, 1994), advanced ICTs have produced substantial transformations in modern organisations (Malone and Rockart 1991; Scott Morton, 1991, 1995).

2.6.2 Organisational Adaptation

How should a company manage organisational adaptation in a high velocity and dynamic environment? New research in strategic decision making indicates that the traditional exhaustive and inclusive planning model appears to produce low accuracy and predictability (Anderson, Day and Rangan, 1997). Thus, more effective organisations increasingly sacrifice thorough planning for experimental action by generating a large number of or experiments or options *without* analysing most of them thoroughly (Bahrami, 1992; *Business Week*, August 18 – 25, 1997). An effective firm may launch many small experiments or trials, carefully analyses some options, and reacts quickly to feedback from the experiments. Thus, organisations place many small "bets" and then enlarge and realise those that seem to be most favourable. Placing many small bets may seem indecisive and irrational, however, it is now often seen as the first step in a rational strategy of holding options (Trigeorgis, 1993). A strategic option (or real option) is a firm's small investment in an operation that creates the right but not the obligation to take further action. Options and derivatives theory holds that many seemingly small organisational commitments will actually amount to a lot if the commitment keeps an organisation in the game or is a learning experience. Because options buy time and knowledge, they are probes (Anderson, Day and Rangan, 1997); although they are costly, they simultaneously prevent more expensive mistakes and indicate where to exploit and where to explore further organisational capabilities and resources.

When is it worth to purchase options? In line with real options theory (e.g., Trigeorgis, 1993), we conjecture that options may be best suited for highly uncertain and dynamic environments such as at the intersection of technology, services and finance, where investor have difficulty determining an asset's worth. Thus, options may be considered a fair estimate of the worth of a later, larger investment. Options are valuable in

dynamic and high growth industries, in particular, because uncertainty suggests opportunity, which suggests investments – but initial investment decisions (under uncertainty) are difficult to make rationally. Moreover, options are even more valuable when they cannot be imitated quickly or easily and hence provide some lead time over competitors as is the case in infrastructure related investments. Likewise, a bundle of (real) options allows a firm to move faster, as it recognises and seizes opportunities. Thus, failing to realise option values means a firm is merely exploring; it does not develop ideas, realise opportunities, or develop distinct competencies that can be exploited in the future.

Environments and history shape organisational forms and practices, although they do so inefficiently (March, 1995; Senge, 1990a, 1990b; Tyre and Orlikowski, 1994). Adaptiveness involves both the exploitation of what is known and the exploration of what might come to be known (March, 1991). Adaptiveness requires both exploitation and exploration. A system that specialises in exploitation will eventually discover itself becoming better and better at an increasing obsolescent technology. Conversely, a system that specialises in exploration will never realise the advantages of its discoveries. Therefore, organisations that fail to adapt – or reflect a minimum level of environmental change in the structure of their economic and social entities – seem destined to expire as the environment around them continues to change. Consequently, the notion of environmental adaptation has received considerable attention in the recent strategy literature (e.g., Senge, 1990a).

2.6.2.1 The Exploration / Exploitation Trade-Off

A central concern of studies of adaptive processes is the relation between the exploration of new possibilities and the exploitation of old certainties (Schumpeter, 1934).

Both exploration and exploitation are essential for organisations, but they compete for scarce resources[25]. Thus, organisations have to make explicit and implicit choices between the two. The explicit choices are found in calculated decisions about alternative financial investments and competitive strategies, organisational concepts and paradigms. The implicit choices are embedded in features of the organisational structure, forms, customs and the culture of the institution. In the context of technology, the problem of balancing exploration and exploitation is exhibited in distinctions made between refinement of an existing technology and invention of a new one (Levinthal and March, 1981). Consequently, exploration of new alternatives reduces the speed with which skills at existing ones are improved; or vice versa that improvements in competencies at existing procedures make experimentation with others less attractive (Levitt and March, 1988). Thus, finding an appropriate balance is made particularly difficult by the fact that the same counterbalancing issues occur at various interdependent levels of a nested system – at the cultural level embedded in the organisational social system level, the organisational design level, and the individual level. Furthermore, understanding the choices and improving the balance between exploration and exploitation are complicated by the fact that the returns from the two options vary not only with respect to their expected profit, but also with respect to their risks expressed in terms of variability, timing, and the distribution of capabilities within and beyond the organisational boundaries. Consequently, processes for allocating resources between exploitation and exploration embody intertemporal, interinstitutional, and interpersonal comparisons, as well as an explicit revelation for the preferred level of risk. Hence, the difficulties inherent in these comparisons lead to complications in specifying [a] appropri-

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[25] The concept of scarce resource should be understood in the context of the "resource based view of the firm" (Penrose, 1959; Wernerfelt, 1984, 1995; Grant 1991; Mahoney, 1992, 1995; Mahoney and Pandian,

ate trade-offs, and [b] in achieving them. As has been pointed out above, adaptiveness involves both the exploitation of what is known and the exploration of what might come to be known (March, 1991; 1994). **Exploitation**, then, refers to the short-term improvement, refinement, routinising and elaboration of existing ideas, paradigms, technologies, strategies, and organisational knowledge. Exploitation thrives on focused attention, precision, and repetition embedded in routines, analysis, discipline and various forms of organisational control (March, 1991, 1995). Exploitation is served by knowledge, forms and practices that facilitate an organisation's economic performance and survival in the short term. It emphasises improving existing organisational capabilities and technologies. It profits from close attention, systemic reason, risk aversion, sharp focus, and attention to structural details (March, 1995). Exploitation includes locating and developing organisational competencies and tying those together to produce high value added products and services.

Exploitation is further served by a pursuit of legitimacy (March, 1995). People in organisations and people with whom they interact are driven by mutual understandings of appropriate organisational behaviour. They try to act in accordance with codified and tacit forms of organisational knowledge and the organisational culture and expect others to act accordingly as well. As noted by DiMaggio and Powell (1983) and Powell and DiMaggio (1991), exhibiting proper organisational forms and acting in an appropriate manner generate support and thereby aid organisational survival. As organisations seek technical efficiency and legitimacy, they focus energy on relatively short-term concerns (Monkhouse, 1994). Refining organisational capabilities, reducing costs and adopting corporate-wide standard procedures receive increased attention in an

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1992), where scarce resources include intangibles (reputation, trust) as well as the traditional neo-classical factors of production.

organisation's thrive for short-term efficiency and effectiveness. Accordingly, the organisation mobilises efforts and resources in an attempt to meet clearly defined short-term objectives. Some of those concepts that exhibit a strong tendency for short-termism have received an abundance of attention over the course of the last decade. For example, re-engineering (e.g., Clemons, 1995; Davenport, 1993; Hall, Rosenthal and Wade, 1993; Hammer, 1990; Hammer and Champy, 1993; Henderson and Venkatraman, 1994; Martinez, 1995; Venkatraman, 1991, 1994), downsizing (e.g., Gertz and Baptista, 1996) and total quality management (e.g., Powell, 1995).

Exploration refers to experimentation with new ideas, paradigms, concepts, technologies, organisational strategies and knowledge in an attempt to discover alternatives that improve old ones (or discover genuinely new ones). Exploration thrives on serendipity, risk-taking, novelty, new association, loose discipline and relaxed corporate control systems (March, 1995). The characteristic feature of exploration is its risky nature. Accordingly, success is not assured – indeed it is often not achieved. Even when exploration is successful, its rewards are often slow in coming and not necessarily realised by organisational entities that have initially incurred the costs. Therefore, exploratory risk-taking appears to be more likely when an organisation is falling somewhat behind its target aspirations than when it is achieving its a priori stated benchmarks (March, 1995). Thus, exploration tends to be significantly stimulated by previous organisational failures.

The complementary nature of exploitation and exploration ensures organisational adaptiveness – although, it does not per se guarantee success (March, 1995). Consequently, returns related to the exploitation of existing knowledge are systematically closer in time and space than are returns stemming from the explorations of new possibilities and knowledge. This asymmetry in expected returns eventually produces

two deficiency traps within adaptive systems (March, 1995). The first is the failure trap. Under this scenario, an organisation fails and tries a new direction; this process continues and eventually follows a trial and error fashion. Therefore, this process leads to an endless cycle of failure and exploration. The cycle is sustained by the fact that most new directions are bad ideas and that most new ideas that are good ideas usually require practice and time in order to realise their potential capabilities. Thus, in the short run, even good ideas often fail and are thus rejected. The failure trap usually leads to impatience with a new course of action as well as an excess of exploration. The second trap is the success trap. When an organisation succeeds, it repeats actions that appear to have produced success in the past. Consequently, an organisation becomes more proficient at the exploitation of the successful technology (embedded in organisational capabilities) at the expense of developing new exploratory technologies and/or organisational capabilities. Consequently, the organisation is likely to be successful again because of the greater proficiency. This process eventually, leads to an endless cycle of success, increased competence and local efficiency (in the exclusive area of concurrent success). Yet, a new and potentially valuable idea or technology may not tried, or if tried compares less favourable than an existing technology due to the disparity in competence between the two. Therefore, over time the success trap may eventually lead to a failure to experiment adequately and hence endangers an organisation's long-term survival as existing technologies become obsolete (Arthur, 1989, 1990, 1996).

This short illustration of organisational change reveals a fundamental dilemma faced by organisations. Exploitation and exploration are linked in an enduring symbiosis. Each requires the other in order to effectively contribute to an organisation's long term survival and prosperity; simultaneously, however, each interferes and competes with the other by trying to tie a critical amount of scarce organisational resources to its

undertakings. Exploitation is likely to undermine exploration (and vice versa). It discourages the experimentation and variation that are essential to long-term survival. It results in sticking to one currently effective core capability to such an extent that there is little room for exploration of others, or in failing to stick to one potentially effective capability long enough to determine its true value[26]. Likewise, exploration often comes at the expense of exploitation. Efforts to promote experimentation – or the development of new organisational capabilities that form the core of sustainable competitive advantage – encourage impatience with new ideas, strategies, concepts and technologies (March, 1995). Therefore, new potentially valuable ideas are likely to be abandoned before enough time has been devoted to developing the competence that would make them useful in the respective organisational context. Thus, the impatience of exploration results in unrealised ambitious projects and unelaborated discoveries. Adaptive systems that engage in exploration to the exclusion of exploitation are likely to find that they suffer the costs of experimentation without gaining many of its benefits. They exhibit too many undeveloped new ideas and too little distinctive competencies. Conversely, systems that engage in exploitation to the exclusion of exploration are likely to find themselves trapped in suboptimal stable equilibria (March, 1991). As a result of the counteracting forces of exploitation and exploration, organisations are likely to fall short of maintaining an effective long-term balance between the two symbiotic forces.

[26] A more detailed discussion about core capabilities and rigidities is provided in Collis (1994); Grant (1991); Hamel and Prahalad (1994a, 1994b); Kogut and Zander (1992); Leonard-Barton (1992); and Venkatraman, Henderson and Oldach (1993)

2.6.2.2 Uncertainty, Exploration and Exploitation

The standard organisational response to modern contexts of environmental volatility and uncertainty appears to be greater flexibility and change (Aaker and Mascarenhas, 1984; Aldrich, 1979; March, 1995; Quinn, 1978, 1992a,b; Volberda, 1995). This in turn invites higher levels of organisational exploration, variation, and experimentation and thus prefers a long-run systemic perspective. However, as recently noted by March (1995), the primary responses of organisations seem to be increased efficient exploitation (as part of the high level of vulnerability related to organisational exploration), with the emphasis resting on reliability, limited experimentation and a short-run, local perspective[27]. For example, the exploitation of a currently valuable asset such as reputational capital to exploit eventual economies of scale, scope and sequence[28].

2.6.2.2.1 The Vulnerability of Organisational Exploration

Returns from exploration, compared to returns from exploitation, are systematically less certain, more remote in time, and hence organisationally more distant from the locus of concurrent action and adaptation. Short and long term perspectives, strategies and organisational objectives differ. Strategies and hence the allocation of scarce resources at time t_1 may significantly differ from those required at t_2. Beneficial strategies for organisational entity A may exhibit less favourable profits for organisational entity B. Finally, what is of substantial value for an organisation at t_1 may not be beneficial for

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[27] This apparent inconsistency between individual organisational pursuits of immediate efficiency and environmental pressures for longer-run adaptiveness can in part be overcome by relaxing the constraints of analysing the individual firm and hence adapting a perspective beyond the individual organisations to the social systems of which they are a part (Hannan and Freeman, 1989). Populations of organisations, rather than individual organisations, adapt through selection among non-adaptive, efficient and legitimate organisations, retaining those that match the current environment and discarding those that do not.

the social system as a whole of which it is a part. As organisations learn from past experiences how to allocate scare resource between exploration and exploitation, the distribution of economic outcomes and consequences across time and space affects the lessons learned. This newly acquired knowledge in turn affects the future allocation of organisational resources and capabilities among a discrete number of explorative or exploitative projects (Arthur, 1989, 1990). The high level of perceived certainty, speed, proximity, and clarity of feedback ties exploitation to its consequences more quickly and more precisely than is the case with exploration (March, 1991). Conversely, the search for new ideas, concepts, and strategies has less certain outcomes or tangible economic pay-offs, longer time horizons, and more diffuse effects than does further development of already existing and successful organisational capabilities.

Because of these differences, organisational adaptive processes characteristically improve and foster exploitation at the expense of organisational exploration. Path dependency and positive feedback loops, over time, cumulate the advantages of organisational exploitation (Arthur, 1990, 1994; David, 1985). Each increase in competence at an organisational activity increases the likelihood of rewards for engaging in that activity, thereby further increasing the competence and the likelihood of sustainable competitive advantage. These aggregated effects extend, for example through network[29], to others with whom the learning organisation interacts (March, 1991).

Organisational performance can then be defined as a joint function of both expected return from an activity and present return with respect to an organisational competence (March, 1991). Thus organisations, as recently pointed out by Arthur (1989,

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[28] Economies of sequence are formally defined in Spulber (1989, 1992, 1994, 1996). Economies of sequence refer to economies achieved by vertical integration of steps in a production sequence.

[29] A more detailed discussion about "network externalities" is provided in, for example, Bartness and Cerny (1993); Burt (1992); Castells (1996); Charan (1991); Cravens, Piercy and Shipp (1996); Economides (1996); Katz and Shapiro (1985, 1994); and Liebowitz and Margolis (1990, 1994, 1996a, 1996b).

1996), are likely to exhibit increasing returns to experience. However, the balance between exploitation and exploration hinges upon the extent of positive local feedback, which produces strong path dependence and inertia (Arthur, 1994; David, 1985; Liebowitz, and Margolis, 1990) and hence bears the possibility to result in suboptimal equilibria. Consequently, it is possible for an inferior organisational competence to generate enough feedback and hence attract a substantial amount of organisational resources to exclude potentially superior organisational activities with which the organisation, at present, has little experience (Herriott, Levinthal and March, 1985). Therefore, the development of long-term corporate knowledge depends on sustaining a reasonable level of organisational exploration. Conversely however, the tendencies to increase exploitation and reduce exploration are likely to render organisational adaptive processes potentially self-destructive (March, 1991).

2.6.3 Adaptation – A Corporate Balancing Act

One of the largest adaptation problems, in the context of balancing organisational exploration and exploitation, is that of focusing attention on the refinement of existing capabilities in the face of signs of the potential negative long-run consequences of such a focus (March, 1991). Although efforts spent on exploration of new possibilities detract from maximising short-run efficiency and specialisation, organisations sometimes try – usually unsuccessfully and with adverse consequences for their short-run efficiency (March, 1995) – to escape the specialisation/exploitation rigidities. Therefore, without a steady stream of exploratory efforts, adaptation is likely to fail. And it fails particularly when the environmental context is changing rapidly. Consequently, exploration becomes useful only if it can be sustained long enough to expose its true value. Con-

versely, however, the relative certainty of rewards from exploitation and their nearness in time and space give them an advantage over the rewards from exploration. Thus, firms eventually end up with increasingly specialised competence and an emphasis on the refinement of existing organisational procedures. An illustration of these contingencies embedded in an organisational adaptation process is provided in Appendix 1, Technology and Adaptation, the case of Bank ABC.

2.6.3.1 Exploration and Exploitation – Some Remarks

The exploitation and exploration potential – related to the introduction of new advanced forms of ICT – depends on the corporate ability to embed these new technologies into the existing organisational infrastructure. This is particularly true for companies that are applying advanced technologies to either improve their competitive market position or alternatively, refrain from being no longer able to compete in the market – that is lose their "ticket to play" (Tyre and Orlikowski, 1993). The benefits of these advanced technologies, embedded in corporate knowledge, cannot just be purchased. Instead, they are achieved by carefully blending new technologies with the existing corporate infrastructure to fit a firm's existing organisational and strategic intent (Burn, 1993; Venkatraman, Henderson and Oldach, 1993). Likewise, organisational skills need to be upgraded and aligned to fit the innovations and new technologies (Van de Ven, 1986).

However, as recently pointed out by Tyre and Orlikowski (1993, 1994), it is generally accepted that these adaptations are gradual in nature. Assumptions about gradual adaptation have been built into a number of theories and concepts such as the familiar learning curve, which implies a highly regular accretion of improvement over time. Nevertheless, there are a number of reasons why it may make sense to manage the

adaptation process in short yet aggressive intervals. Many of the problems that affect the implementation of new technologies require an abundance of diverse resources. Thus, a short intensive period of adaptation may exploit existing economies of scale in problem solving and implementation. Likewise, exploitation of motivational economies of scale associated with a small but intense and important project may be higher than if the project is long and unimportant. Accordingly, short intensive adaptation programmes may provide the basis to implement accumulated experience related to the implementation of previous successful projects[30].

Moreover, there is evidence that a rather discontinuous, or a strategically guided, process of adaptation can yield important benefits (Tyre and Orlikowski, 1993). First, there appears to be a natural surge of energy at the start of projects, which eventually can be fully exploited by senior management. Second, routine operations provide periods that enhance learning and thus provide the basis for further exploration and exploitation of organisational capabilities in between periods of rapid change. Third, discontinuous rather than continuous adaptation provides the basis for realignment of environmental requirements with organisational capabilities (Tyre and Orlikowski, 1993, 1994). Accordingly, discontinuous adaptation can also be seen as a discrete number of adaptation projects linked via a common yet continuously advancing and evolving denominator (e.g., a new form of technology).

In summary, the essence of exploitation is the refinement and extension of existing competencies, technologies, and paradigms. Its expected returns are positive, proximate, and predictable. The essence of exploration is the experimentation with new al-

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[30] These findings have been reported in the various studies of with Bank Cial, SBC and other financial institutions (name disguised upon request) as illustrated throughout this thesis.

ternatives. Its expected returns are uncertain, distant, and frequently negative. Consequently, the distance in time and space between the starting point of a project and the locus for the realisation of a positive return is generally greater in the case of corporate exploration than in the case of corporate exploitation. Accordingly, we conjecture that in the context of organisational adaptation, there is a tendency to substitute exploitation of relatively low risk alternatives for the exploration of uncertain and hence high-risk alternatives. The advent of multimedia and other forms of interactive communication, monitoring capabilities and exchange and their role in the organisational adaptation process require further research. The convergence and blurring of ICTs with consumer electronics, no longer permit a strict distinction to be made between the individual technologies that form the overall bundle of organisational technologies and systems deployed. Thus, we believe that further inquiry is indispensable to unravel the link between various yet mutually interdependent technologies in the process of organisational adaptation.

3 Research Methodology

3.1 Abstract

This chapter describes the design of our research methodology, methods and processes. The first section outlines the general thinking behind the overall approaches to research in the social sciences. The second section discusses the major assumptions in the social sciences with special reference to this research. It also summaries the major characteristics of qualitative and quantitative research methods. The third section provides an in-depth overview of the qualitative research methods. We then discuss the qualitative research procedures including – pilot case, data management, verification and writing – as far as they are applicable to this research. The next section discusses the concept of theory development with special application to empirical fieldwork and data collection within the case study methodology. Within this fieldwork research paradigm, we analyse the theory building and the theory testing processes. Finally, we outline the actual research process.

3.2 Methodological Assumptions in Social Science

Two important dimensions of philosophical methodology can broadly be distinguished along the confines of inductive versus deductive analytical generalisation (Yin, 1994) and theory building (Seth and Thomas, 1994). The inductive method of theorising – or analytical generalisation – is the process of starting with highly warranted observational statements about specific events and inferring generalisation (Churchman, 1971). Thus, observations are the very basis of the emerging framework and/or theory. Conversely, the deductive mode is the process of using a set of assumptions to prove a theorem by some standard set of rules of inference (Churchman, 1971). In this method, the role of initial observations is to provide a basis for speculation about the phenomena under investigation, which is then followed by development of assumptions and a hypothetical framework from which generalisations are deduced.

Analytical generalisation and theory building in the strategic management field has often relied on an inductive mode based on empirical evidence rather than using deductive logic (Seth and Thomas, 1994). Typically, the unit of analysis is the empirical firm rather than the theoretical firm, and the importance of adhering closely to realism in analysing managerial motives and behaviour has been paramount. According to Kuhn (1970), and Seth and Thomas (1994) the ultimate objective of theory development – for example in the form of conjectures and propositions[31] – is to both explain and predict phenomena. Therefore, we believe that it may be useful to view the pure inductive method and the pure deductive method of theory building as representing two extremes of a continuum. Seth and Zinkhan (1991) pointed out that both inductive and deductive methods of inquiry represent valid ways to generate theory. Therefore, it is ultimately the research question that dictates whether more inductively oriented modes of inquiry, with their greater emphasis on the role of initial observations, or more deductively oriented techniques are likely to be appropriate and useful. It may be extremely useful to approach research with the rigour and profoundness that derives from a deductive approach. Eventually, such an approach has the advantage of enabling the development of principles of strategic behaviour, which are robust in their application. This may be in stark contrast with the development of theories for special situations, contingencies, and eventually simplifying underlying assumptions, which is a possible danger if inductive theory building is used exclusively (Seth and Thomas, 1994).

A further distinction among research methodologies can be drawn between a normative perspective towards analysing what organisations ought to do and a positive

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[31] A theory may be defined as a set of related propositions that specify relationships among variables (Blalock, 1969; Kerlinger, 1986). The set of propositions set forth in this research, related to one another (at the very least) within the same industry environment through their possessing a common independent variable, advanced ICT, passes this definitional test of a theory. Yet, further research is required to devise a framework that tightly integrates the propositions.

perspective, which aims to describe what is, rather than to prescribe what should be done. Theorising in the social sciences, as outlined below, is subject to individual value statements, various assumptions and belief systems. Peer orientation, contemporary dominant research designs, and available tools and methods further shape the belief system of social scientists and ultimately hinder them to achieve the scientific ideal of pure objectivity (Kuhn, 1970; Morgan and Smircich, 1980). Seth and Thomas (1994) further noted that the shape of theory derived is intricately bound up with the experiences of the researcher. However, to further advance strategy research, we believe, we must recognise the value of the positive research perspective, which may not have immediate practical or normative applications, yet it may be an important step to generate an understanding of phenomena.

In science, theory and analytical generalisation are developed through incremental empirical testing and extension (Kuhn, 1970). Therefore, the framework building process – leading eventually but not necessarily to a new theory – relies on past literature and empirical observation or experience as well as on the insight of the theorist to build incrementally more powerful frameworks. There are times, though, when relatively little is know about phenomena or current perspectives seem inadequate because they have little substantiation or even conflict with one another. As noted by Eisenhardt (1989), in situations like these, analytical generalisation (Yin, 1994) or the development of new frameworks from case study research is particularly appropriate because this methodology relies little on previous literature or prior empirical evidence. In summation, analytical generalisation from case study data is most appropriate in the early stages of research on a topic (e.g., VE systems and EC). Alternatively, analytical generalisation from case study data can be deployed to provide freshness in perspective and a general account to an already existing topic. For example, technology is an existing

topic in the literature; yet, there is relative scarcity in the academic literature on advanced technology in financial organisations and the exploration and exploitation thereof as means of organisational adaptation.

3.3 Assumptions in Social Science

All approaches to research in the social sciences are based on interrelated sets of assumptions regarding human nature, epistemology and ontology. Concerning the relationship between these issues and methodology, Morgan and Smircich (1980) provide a useful map for overviewing different research methods. According to Morgan and Smircich (1980), the dichotomy between qualitative and quantitative research methods is vague and oversimplified. No single research methodology can be considered or presented in the abstract, because the choice and adequacy of a research method embodies a variety of assumptions regarding the nature of information and the methods by which it can be obtained and analysed. The nature of the phenomenon to be investigated is further contingent to a set of assumptions about the nature of the phenomena to be investigated. In the following section, we focus on the distinction between the subjective or qualitative and objective or quantitative viewpoints. The distinction between those two views, embedded in the various views that social scientists hold about the world and human behaviour, all have a distinguished history and are the product of a long academic discourse by their respective advocates. The different assumptions with respect to ontology and human nature and the different views they reflect imply different grounds for knowledge about the state of the world. The distinction between subjective and objective perspectives reflects the polar positions in the epistemological debate.

These extreme positions – adapted from Morgan and Smircich (1980) – will be illustrated in the following section.

3.3.1 Subjective and Objective Perspectives

The subjectivist view perceives reality as a projection of individual consciousness and creative imagination. The extreme position to this perspective is commonly known as solipsism and alleges that there may be nothing outside oneself – thus one's mind is one's world. From a slightly less extreme point of view, reality may be viewed as a social construct, where the world is a continuous process. The process itself is the product of continuous interaction between individuals and their environment in an attempt to establish meaningful realms of definitions. Social reality is embedded in the nature, character and use of language, communication, symbols, images, labels, perceptions, actions and routines that refer to different states of the world and the interaction therein (Jervis, 1970). Thus, the realm of social affairs has no concrete status of any kind; rather it is a symbolic construct. Individuals create their own realities; accordingly, there are no situations other than those which individuals bring into being through their own creative imagination. This perspective supports the epistemological stance of phenomenology, which emphasises the importance of understanding the process through which individuals perceive and contrive their relationship with the environment. Therefore, this perspective challenges the notion that there can be any form of "objective" knowledge. All knowledge is no more than an expression or an imaginative construct of the manner in which a human being randomly imposes a frame of reference on the environmental contingencies and ultimately the world.

Conversely, the objectivist view holds that the social world is a concrete and well definable structure – a real manifestation much like the "natural" world, a network of determinate arrangements and interdependencies among constituents. Reality is to be found in the behaviour and relationships between these interlinked network entities. In this deterministic environment, individuals are perceived as "responding" machines, which will respond to environmental stimuli in a predictable and deterministic manner. Thus, a network of casual relationships and interdependencies links all significant aspects of human behaviour to their context. Though human perception and reaction may influence this process somewhat, people's responses to situations always adhere to- and are determined by certain rules. Therefore, this perspective supports the epistemological stance of positivism, emphasising the importance of empirical study of the links and interdependencies among constituent parts of this concrete structure, reflecting the world, in order to understand its workings. Positivism encourages a concern for an "objective" form of knowledge that maps the precise nature of laws and relationships among phenomena measured in terms of facts and empirical evidence.

Considering that the definitions of "reality" to which proponents of each perspective subscribe are at opposite pools of the spectrum, the grounds for knowledge under each paradigm are fundamentally different, and perhaps largely irreconcilable. As one moves along on the spectrum from subjectivist to objectivist approaches to social science, the choice of research methodology and design changes significantly. For example, a research method perceived to yield adequate insight by a researcher with positivist tendencies may be called too simplistic, too narrow in focus or too mechanistic by a more subjectivist researcher and vice versa. Conversely, the positivist researcher may conclude that the subjectivist's research methods are yielding no concrete facts or exhibit low practical value. Thus, we conjecture that it is important to have at least a

pragmatic awareness of one's own position along this continuum before the research commencement. Likewise, when examining the range of available ontological and epistemological perspectives, it is further important to realise that no one perspective is necessarily the best. We have reviewed a continuum of paradigms whose epistemological positions range from subjectivism to empiricism. Each view of the world may be relevant and applicable to the analysis of exploitation and exploration of advanced technologies in financial services, but cannot be fully implemented without the appropriate research methods. We first discuss the nature of organisational adaptation expressed as a function of exploitation and exploration in the context of advanced technologies and then compare the characteristics of qualitative and quantitative research methods.

Furthermore, a note of caution is in place that relates to the exploratory and explanatory nature of this research. According to Orlikowski (1992), there is little agreement on the definition and measurement of technology, and no compelling evidence on the precise role of technology in organisational affairs. Thus, the initial research questions, based on work from March (1991, 1995) Orlikowski (1992), and Tyre and Orlikowski (1993, 1994) have been centred around the paradigm of exploitation and exploration in the context of organisational adaptation. We have transplanted this framework into the domain of advanced ICT, as defined by Huber (1990), to understand the organisational adaptation process in terms of exploitation and exploration within financial institutions.

3.3.2 An Assumption on Technology[32]

The modern perception of advanced technology, we surmise, underlies the basic assumption that technology is neutral (Davies, 1995). The belief that advanced technology is neutral is further widely held in the business world (61 percent of respondents agree; T2, T7). We conjecture that it is important to note that the way technology is appropriated by, and made understandable to, the business world is by predominantly using the language of accounting, finance and strategy. Accordingly, this way of dealing with advanced technology is dependent on the belief that technology is a quasi-neutral tool, which can be adequately grasped by applying numbers to it. We believe that the notion of technology being neutral is both useful and dangerous. It is useful because it pushes the onus of responsibility onto human beings – as it may be considered unethical to hide behind a deterministic view of an autonomous technology where our only responsibility is to adapt to the technology imperative[33]. The notion of technological neutrality – we propose – is simultaneously dangerous as the increasing complexity of technology and its role in the organisational (support) system are inadequately reflected in the decision making process. Moreover, long term considerations of strategic issues are often undermined by short-term financial objectives. Correspondingly, in a world of

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[32] The following two assumptions have crystallised during the course of the field research in 1995 – 1997. The majority of all 87 interviews have revealed that technology is conceived as neutral and a significant driver for economic and business prosperity. These assumptions are further present in a number of recent works on technology. See, for example, Anderton, Davis, Hussain and Staley (1995); Applegate, Cash and Millis (1988); Bakos (1992); Barley (1986, 1990); Bednar, Reeves and Lawrence (1995); Benedikt (1992); Beniger (1990); Bettis and Hitt (1995); Biocca (1992); Boland, Tenekasi and Te'eni (1994); Burn (1993); Child (1987); Clemons and Row (1992); Davidow and Malone (1992); Eriksson and Mattson (1996); Gibson (1984, 1993); Gerwin (1981); Haeckel and Nolan (1993); Hamel and Prahalad (1994a,b, 1996); Henderson and Venkatraman (1994); Heygate (1994); Huber (1990); Lacity and Hirschheim (1993); Malhotra (1993); Matte and Dagi (1996); McFarlan (1984); Miles (1989); Molloy and Schwenk (1995); Nelson (1994); Prahalad and Hamel (1994); Price (1996); Ramarapu and Lado (1995); Rheingold (1991, 1992, 1994); Rockart and Scott Morton (1984); Rockart and Short (1989); Stebbins, Sena and Shani (1995); Tan (1995).

[33] As recently correctly pointed out by Davies (1995), much of the literature on technology in the 1970s and 1980s in the genre of "... the impact of technology on ..." was in some way responsible for encouraging such a viewpoint.

limited resources, someone ultimately has the power or is forced to make a decision to exploit and explore certain organisational capabilities and resources at the expense of others. It may thus be in the interest of a certain economic agent and commensurate with his power to do so. Thus, the technology is likely to represent the balance of power and vested interest of politics, business and key individuals who control the resources rather than the interest of society at large and ultimately the end user. Therefore, the benefits of the resulting technologies may eventually be unequally distributed in favour of the resources. Moreover, we often only learn of the true value and nature of a specific technology long after it has become deeply embedded in society and its adverse side effects can no longer be easily ignored. It is under this assumption that the role of advanced technologies and their role in the organisational adaptation process – expressed in the exploitation and exploration of organisational resources – needs to be seen.

3.3.3 Qualitative versus Quantitative Research Methods

The most relevant of presuppositions that determines one's research perspective is that methodological issues must always be answered within the context of a particular research setting. That is to say, methodologies are neither appropriate nor inappropriate until they are applied to a specific research problem. This perspective treats methodologies as tool of inquiry; each inquiry requires careful selection of the proper tools. Having the wrong tools for the task may be no better than having no tools at all (Downey and Ireland, 1979). Research methods refer to the systemic, focused and orderly collection of data for the purpose of obtaining information from it, in order to

solve our research problems and/or questions (Ghauri, Gronhaug and Kristinslund, 1995).

In general, case study research is the preferred research strategy when "how" and "why" questions are being posed and when the investigator has little control over events and when the focus is on a contemporary phenomenon (Yin, 1994). How and why questions are more **explanatory** and likely to lead to the use of case studies because such questions deal with operational links needing to be traced over time (Yin, 1994). As a research endeavour, the case study approach contributes uniquely to our knowledge of individual, organisational, social and political phenomena[34]. The distinctive need for the case study methodology arises out of the desire to understand complex phenomena. In brief, the case study concept allows a researcher to retain the holistic and meaningful characteristics of real-life events (Yin, 1994). This concept entails two broad domains that are not limited to either qualitative or quantitative methods of research. A case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between the phenomena and the context are not evident. Consequently, one would use the case study method to explicitly investigate contextual conditions[35]. Because phenomenon and context are not always distinguishable, the research strategy may comprise a set of technological char-

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[34] A number of authors have recently conducted case studies on a variety of phenomena and/or a mixture thereof. Bumbacher (1995); Carr, Tomkins and Bayliss (1994) and Corstjens, Corstjens and Lal (1995) have focused on an industry in one or several countries and conducted comparative studies. Channon (1989); Collis (1991); Currie (1994); Hess and Kemerer (1994) have predominantly focused on analysing a specific industry using the case study methodology. A focus on an organisation can be found in Currie (1995); Golder and Choi (1996); and Stulz (1995). Finally, a focus on a specific phenomenon can be found in Baden-Fuller and Stopford (1994); Burgelman (1994); Holland and Lockett (1996) and Thomas and Trevino (1993). In addition, a number of authors use a number of different case studies that take a holistic stance towards a specific topic and/or theme. Furthermore, these cases explicitly investigate phenomena embedded in specific social and cultural environments. See for example Baden-Fuller and Pitt (1996), Golder and Turner (1996), and Quinn (1992a).

[35] Based on the structure of Quinn's (1992a) seminal work on services organisations and the changes they have been facing over the last few decades, we introduce case studies throughout the text to support and illustrate our findings and/or to introduce empirical evidence in the first place.

acteristics – with the logic of design incorporating specific approaches to data collection and to data analysis (Yin, 1994). Thus, the case study approach is neither a data collection tactic or simply a design feature but a comprehensive research strategy (Stoecker, 1991). Additional features of the case study strategy, in the context of the discussion qualitative versus quantitative research methods, need clarification. Case studies may include both qualitative and quantitative evidence. In fact, the contrast between quantitative and qualitative methods of research inquiry does not distinguish the overall research strategy (Yin, 1994). Likewise, case study strategy should not be confused with qualitative research (e.g., Strauss and Crobin, 1990; 1994; Van Maanen, Dabbs and Faulkner, 1982). Instead, case studies can be based on any mix of qualitative and quantitative evidence (Van Maanen, 1979). Furthermore, as noted above, some scholars distinguish between qualitative and quantitative research not on the basis of the type of evidence but on grounds of philosophical beliefs. As recently noted by Yin (1994), these distinctions have led to a continuous debate within the field of evaluation research.

Methods or techniques, however, cannot be better or more scientific simply because they belong to one stream of scientific inquiry. Accordingly, which methods and techniques are most suitable for which research will depend on the research problem and the purpose of the inquiry. According to Kuhn (1970), Miles (1979, 1983), Ross and Lepper (1980), and Van Maanen (1979), the scientific method is not immune to biases, casual explanation, and a host of other afflictions[36]. Likewise, scientists can be blind, sometimes deliberately so, to unanticipated or uncongenial interpretations of their

[36] Lacking an absolute truth from which to approach the world, we create via social consensus an absolute reference point, our paradigm. The concept of paradigm (Kuhn, 1970), represents people's value judgements, norms, standards, frames of reference, perspectives, ideologies, myths, theories, and so forth that govern their thinking and actions. Therefore, in the field of science, a paradigm consists of the re-

data and recalcitrant in their theoretical allegiances. Nevertheless, the scientific method has often been responsible for increasing human understanding of the natural and social world. Despite its flaws, it remains the best means of extricating us from the errors of intuitive beliefs and intuitive methods of testing those beliefs.

A major difference between qualitative and quantitative research is not the quality but the procedure (Van Maanen, 1979). In qualitative research, findings are not arrived at by econometric methods or other procedures of quantification (Stake, 1994; Van Maanen, 1979). Thus, these two different approaches reflect the different perspectives on knowledge and research philosophies discussed in the previous sections. Many scholars claim that the two approaches are complementary and cannot be used in isolation from each other (e.g., Downey and Ireland, 1979; Van Maanen, 1979). According to this viewpoint, no method is entirely qualitative or quantitative. They are not mutually exclusive (Van Maanen, 1979). Qualitative methods represent a mixture of the rational, serendipitous, and intuitive in which personal experiences of the organisational research are often key events to be understood and analysed as data (Van Maanen, 1979). Alternatively, the difference between qualitative or quantitative methods is in the overall form and in the emphasis and objectives of the study. Although qualitative research methods dominate throughout our work, quantitative and qualitative research methods interplay throughout our thesis along the lines suggested by Miles (1979, 1983).

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searcher's perception of what one should be doing and how one should be doing it. In other words, what are the interesting research problems and which methodological approach can be used to tackle them?

3.4 Qualitative Research – An Introduction

Qualitative research is a field of inquiry in its own right (Denzin and Lincoln, 1994). It overlaps disciplines, fields and subject matter. Qualitative research has distinguished histories in social work, communication, history, psychology, organisational studies, and sociology (Vidich and Lyman, 1994). As discussed above, a complex, interconnected family of terms, concepts and assumptions surround the term qualitative research. There are separate and detailed literatures on the many methods and approaches that fall under the category of qualitative research, such as interviewing (e.g., Burns, 1989; Oppenheim, 1992) and participant observation (e.g., Clandinin and Connelly, 1994; Reason, 1994).

Qualitative research is multimethod in focus (Brewer and Hunter, 1989), involving an interpretative, naturalistic approach to its subject matter (Denzin and Lincoln, 1994). Therefore, qualitative research studies things in their natural and social settings, attempting to make sense of, or interpret, phenomena in terms of the subjective meanings that individuals bring to them. Qualitative research involves the collection and analysis of a variety of empirical material – case studies, interviews, observations, and secondary materials – that describe routine and problematic moments and meanings embedded in a particular environment. The use of multiple methods, or triangulation, reflects an attempt to secure an in-depth understanding of the phenomena in question. Objective reality can never be captured (Denzin and Lincoln, 1994). Thus, triangulation is not a tool, method or a strategy of validation, but an alternative to validation (Denzin, 1989; Fielding and Fielding, 1986). Flick (1992) recently noted that the combination of multiple methods, empirical materials, perspectives and observation is best understood, then, as a strategy that adds rigor, fullness, and depth to an investigation.

The topic of using qualitative data to assess an organisation embedded in its social and natural world has become increasingly important to organisational research. In organisational research, ultimately the aim of strategy[37] (Chandler, 1962), discussions usually focus on choosing between objective and subjective measures (as discussed above). Objective in these discussions usually refers to tabulation and ranking of objects and events in an organisation or its environment. Conversely, subjectivity usually is applied to any measure that seeks somehow to tap participants' perceptions of their organisations.

Given these labels it is not too surprising that researchers tend to exhibit a revealed preference for objective measures. While this preference may not stop them from using subjective measures, it does tend to influence their future research objectives (Downey and Ireland, 1979). Subject to discussion and ultimately belief (Kuhn, 1970), current research norms attach high value to anything that can be labelled "objective". This preference, though, does not come as a surprise, since "objectivity" is the presumed aim of scientific inquiry. This polar categorisation has had, however, at least two dysfunctional effects on organisation research (Downey and Ireland, 1979). First, it has tended, a priori, to push research away from qualitative data when they may be useful for assessing some organisational dimensions or environmental contingencies. Thus, the objective-subjective dilemma has equated objectivity, and thus scientific inquiry, with methods of quantification. Consequently, qualitative assessments have largely been avoided by researchers because of an understandable desire not to appear unscientific. Second, the polar categorisation has further tended to use subjective measures as an analogy to measurements of perception. The association of all measures of

[37] Chandler (1962) refers to strategy as determination of long-term goals and objectives together with the adoption of a course of action and the allocation of resources for carrying out those goals.

perceptions as subjective is based on a confusion over whose subjectivity is involved. The objectivity that is desired in scientific inquiry refers to objectivity on the part of the researcher. Therefore, subjective behaviour on the part of those being studied, may well be a legitimate phenomenon for scientific inquiry.

3.5 Qualitative Research – Procedures

This section sets out to discuss the essence of qualitative research design. Qualitative research design begins with a question – for example: What is the purpose of this study? This marks a critical beginning point. Regardless of our point of view, and quite often because of our point of view, we construct and frame a question for inquiry. After this question is clear, we select the most appropriate methodology to proceed with the research project. The phenomena or object of inquiry is bound to the natural and/or social world of individuals or organisations. This is in stark contrast to the quantitative paradigm, which is comfortable with aggregating large numbers of people and facts, without communicating with constituents of the phenomena to be investigated.

The first set of design decisions have to do with what is the object of inquiry or the phenomenon of interest, under what circumstance for how long and with whom. Simultaneously, the researcher needs to select sites according to some rationale. Access, entry, time and costs are sensitive components in qualitative research (Janesick, 1994; Yin, 1994) and the researcher must establish trust, rapport, and authentic communication patterns with the participants. Subsequently, the appropriate modes of data collection strategies, suited to the study, need to be decided. The selection of these methods and strategies is intimately linked to how the researcher views the purpose of the work or the underlying assumptions. Data collection in qualitative research is often

based on a combination of participant observations, interviews, and additional document analysis (Downey and Ireland, 1979).

3.6 Case Study Methodology

Case study is defined by interest in individual cases, not by the methods of inquiry used. Yin (1994) has noted that unlike other research strategies, a comprehensive catalogue of research designs for case study has yet to be developed. Although, the case study is a separate research strategy that has its own research designs, these have not been codified (Yin, 1994). The concept of the case remains subject to debate (Stake, 1994) – seen from different worldviews and in different situations, the same case is different. Likewise, the term study is ambiguous (Stake, 1994). A case is both the process of learning about the case and the product of our learning.

Different researchers have different purposes studying cases. Accordingly, Stake (1994) suggested three types of study to keep such differences in mind. First, the intrinsic case study is undertaken because one wants better understanding of a particular case. It is not undertaken primarily because the case represents other cases or because it illustrates a particular trait or problem, but because, in all its particularity and ordinariness, this case is of genuine interest. The researcher temporarily subordinates other phenomena so that the particular case may reveal its story. Thus, the purpose is not to come to understand some abstract construct or generic phenomenon; it is not theory building[38], but rather because of the intrinsic interest and value of a particular case. Second, an instrumental case study is conducted when a particular case is examined to

[38] Note though that case studies, like experiments, are generalisable in terms of **theoretical propositions**; yet these may not be applicable to populations or universes. In this sense, the case study, like the experi-

provide insight into an issue or refinement of a theory. The actual case is of secondary interest; it plays a supportive role, facilitating our understanding of something else. The case may be seen as typical of other cases or not. The choice of case is made because it is expected to advance our understanding of that other interest. Third, with even less interest in one particular case, researchers may study a number of cases jointly in order to inquire into phenomena. Stake (1994) refers to this type of case study as collective case study. Herriott and Firestone (1983) refer to collective case study as multisite qualitative research. However, it is not a study of a collective but instrumental study extended to several cases. They are chosen because it is believed that understanding them will lead to better understanding, perhaps about a still larger collection of cases. This last category corresponds to the approach chosen for this research.

Yin (1994) provides an alternative framework for distinguishing between different approaches to case study research design. These will be discussed below based on the two-by-two matrix as illustrated in Table 1. The matrix assumes that single and multiple case studies reflect different situations and that, within those two types, a further distinction can be made between the number of units being analysed.

	Single Case Design	Multiple Case Design
Single Unit – Holistic	Prototype 1	Prototype 3
Multiple Units – Embedded	Prototype 2	**Prototype 4**

Table 1 Case Study Design Based on Yin (1994)

A primary distinction in designing case studies can be drawn between single and multiple case design. According to Yin (1994), a single case design should be pursued if a

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ment, does not represent a sample, and the investigator's objective is to expand and generalise theories – **analytical generalisation** – and not to enumerate frequencies (statistical generalisation [Yin, 1994]).

case represents a critical case, an extreme or unique situation, or a revelatory case – a situation where a phenomenon can be studied for the first time. Whatever the rationale for doing single cases, a potential vulnerability of the single case design approach is that the selected case may eventually turn out to be a "lemon" (Akerlof, 1970)[39]. The same study may involve more than one unit of analysis. Yin (1994) suggested that the holistic design is advantageous when no logical subunits can be identified and/or when the relevant framework underlying the case study itself is holistic. Conversely, the same research may involve multiple case study sites; and hence involve comparative studies. Since neither of the above suppositions holds in our case, our research design rests on an analysis of multiple units within multiple organisations and hence corresponds to prototype 4. The decision to undertake multiple case studies should follow a replication logic (Eisenhardt, 1989). Thus, each case should be carefully selected in so that it either [1] predicts similar results or [2] produces contrasting results but for predictable reasons (Yin, 1994). The selection of these cases is based on theoretical sampling, where the objective rests on extending emergent analytical generalisability or replicating existing findings. Therefore, random selection is neither necessary, nor even preferable (Pettigrew, 1988)[40].

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[39] Aklerof (1970) argued that the seller of a used car knows whether or not it is a lemon (poor quality); the buyer has to play the averages, knowing only that some cars are lemons but not whether the particular car he is buying is. Buyers will pay only a price that reflects the average frequency of lemons in the market. The average is a high price for a lemon but understates the worth of the better cars offered on the market. The owners of the better cars are reluctant to sell at a price that makes allowance for the lemons that other people are selling. Hence better cars appear less frequently on the market and the average frequency of lemons increases. As customer understand this link, they make a greater allowance for lemons in the price they are willing to pay. The cars of average quality in the previous market are now undervalued and their owners less willing to sell them. Thus, the percentage frequency of lemons continues to rise. In the end, the market may disappear (although institutional arrangements such as guarantees, certifications may keep the used car market alive).

[40] The concept of population is crucial because it defines the set of entities from which the research sample is to be drawn. The sampling of cases from the chosen population relies on theoretical sampling (Pettigrew, 1988). Thus, the objective of theoretical sampling is to choose cases, which are likely to replicate or extend the process of analytical generalisability.

Another question that arises out of the multiple case study design is related to the number of case studies that should be conducted. Because a sampling logic should not be used, the typical criteria regarding sample size also are irrelevant. Accordingly, we have applied a basic saturation concept: cases have been selected until the analytical generalisation has reached a point of saturation and additional data have confirmed previous findings. Consequently, using replication logic, additional cases have yielded no new insight or only provided marginal additional valuable information. Finally, we need to distinguish between holistic and embedded designs. We have selected multiple embedded case studies because the phenomena being studied occur across many organisations (cases) and on multiple levels of analysis.

3.6.1 The Pilot Case

As part of the initial and preparatory steps of the actual data collection, we conducted a pilot study with Bank Cial AG, Basle, Switzerland in 1995. The pilot case was used to refine the data collection plans with respect to both the contents of the data and the procedures to be followed. The pilot case has further yielded insight into amending the existing line of questions and issues to be covered during the subsequent interviews[41].

Convenience and access to the pilot site have been among the main criteria for selecting the pilot case. This has allowed for a less structured and more prolonged relationship to develop between the interviewees and the researcher than in other real case study sites. Furthermore, we have assumed the subsequent role of the pilot site as a laboratory and last resort for clarifications, which has further permitted us to observe different phenomena from many different angles or to try different approaches on a trial

basis. Finally, the interviewees at the site also were congenial to the notion that the investigator was at an early stage of his research and would thus not have a fixed agenda. As recently noted by Yin (1994), the inquiry for the pilot case study can be much broader and less focused than the ultimate data collection plan. In addition, the inquiry can cover both substantive and methodological issues.

3.6.2 Data and Evidence Collection – Research Data Base

Evidence can be collected from a number of sources. Yin (1994) list six sources as outlined in Table 2 below. The use of these six data and information sources calls for slightly different analytical skills and methodological procedures. In addition to the attention given to these different data sources, data should be collected from a number of different sources such as organisations, individuals and outsiders. Data collection with outsiders is here refer to, as "triangulation interviews" with third parties that have insight in the field of inquiry yet are not part of it (e.g., management consultancies).

Evidence	Strengths	Weakness
Documentation	*Stable*: continuous review possible. *Unobtrusive*: not a result of the case study. *Exact*: contains references, details on specific events. *Broad Coverage*: several settings and events, longitudinal.	*Retrievability*: potentially low. *Selective Bias*: selection of documents and extent of selection. *Reporting Bias*: unknown bias of author. *Access Bias*: restriction and confidentiality of documents.
Archival Records	*See documentation*	*See documentation*
Interviews	*Targeted*: focused directly on case study topic. *Insightful*: provides perceived causal inferences.	*Inaccuracies*: due to interviewees' poor recalls. *Reflexivity*: response bias; interviewee presents desired data. *Questions Bias*: bi-

[41] See Appendix Four **Interview Question Guide**.

Evidence	Strengths	Weakness
		ased, or emphasis on specific topic.
Direct Observation	*Reality*: data coverage in real time. *Contextual*: covers context of events.	*Selectivity*: unless broad coverage. *Access Bias*: restriction and confidentiality. *Time and Cost*: high form of resources consuming data collection. *Reflexivity*: event may proceed differently because of observation.
Participant Observation	*Insightful*: relevation of interpersonal behaviour and motives. *See direct observation*	*Manipulation Bias*: investigator's interaction might distort events. *See direct observation*
Email	Informal, fast, and exact.	Selection bias.
Correspondence	Exact, triangulation.	Slow, formal, bias.
Physical Artifact Anthropology	Insightful into cultural studies, operations.	Availability and Selectivity.

Adapted from Yin (1994)

Table 2 Case Study – Sources of Evidence

Note that no single source has complete advantage over all the others. In fact, the various sources are highly complementary, and a good case study will therefore want to use as many sources – although there may be constraints in terms of time and costs. This research has made use of the following five data sources: interviews (and workshops), personal correspondence, email, documentation including archival records, and direct observations. In practice, the semi-structured open-ended interviews and direct observations were supplemented by document collection and analysis, formal retroperspective interviews, a number of workshops, personal correspondence and email, and triangulation interviews with other organisations working in the specific field of inquiry (e.g., management consulting firms)[42].

[42] Interviews, as a method of inquiry, are discussed in a separate section below.

Documentary information and to some extent archival records are likely to be relevant for the majority of case studies. This type of information and data can take many forms such as administrative documents, proposals, reports, and other internal documents and newspaper clippings[43]. The most important use of documents is to corroborate and augment evidence from other sources. Access to internal documents and reports may be limited and/or subject to **confidentiality**. For example, the majority of financial organisations has requested that a number of documents labelled confidential can only be used to gain overall insight; yet the information contained within them cannot be published (in the case of 93 percent of all interviews). Archival records have been used on limited occasions, predominantly for clarification and/or to obtain insight into the history of a specific organisational process.

By making a visit to a case study site, the opportunity for direct observations arises. Under the assumption that the phenomena of interest are not of purely historical nature, some relevant behaviours or environmental conditions will eventually be available for observation. These observations – as illustrated in Table 2, serve as yet another source of evidence in a case study. For example, the existing ICT infrastructure will convey something about the role of technology in the organisation. If the prevailing infrastructure corresponds to the latest trends in the industry, one can assume that a significant amount of resources is dedicated to technology and hence that technology may play an important role in the organisation.

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[43] In the present research, much of the written information and data sources have been subject to confidentiality. Accordingly, sources and names have been disguised on a number of occasions. Moreover, many sections of the results and conjectures chapter have been cut during the validation process with the respective case study sites.

3.6.3 Data Collection – Interviews

Asking questions and getting answers is a much harder task than it may seem at first. The spoken or written word has always a residue of ambiguity, no matter how careful the researcher words the questions and reports or codes the answers. Yet interviewing is one of the most common and most powerful ways we can use to study and understand phenomena (Fontana and Frey, 1994). Interviewing involves asking questions of those who have information about a phenomenon that the researcher has not been able to observe directly. Therefore, interviews may require respondents, among others things, to speak about events that have happened in the past, speculate about the future, speak about themselves and their role in a specific situation and inform on the attitudes and actions of others in the situation under investigation.

In case study research, interviews are one of the most important sources of information (Denzin and Lincoln, 1994; Downey and Ireland, 1979; Fontana and Frey, 1994; Janesick, 1994; Van Maanen, 1979). This information may be in the form of factual replies to factual questions, or responses to attitude scale items, or ideas and feelings, or precepts and expectations, attitudes and the like. The respondents may, or may not, have this information, or they may have it but be unable, or unwilling to communicate it. Thus, the purpose of all research interviews is to obtain information of certain kinds, to collect percepts and ideas and to improve the conceptualisation of the research problem (Oppenheim, 1992).

We can distinguish broadly between two types of interviews[44]. The standardised or structured interview is primarily concerned with the collection of data, while the focus of the exploratory indepth- or unstructured interview rests on developing ideas and

[44] For a more detailed discussion see below (Structured Interviews and Unstructured Interviews).

research propositions[45]. Conversely to the highly structured standardised interview, the exploratory interview will have a hidden agenda or paradigms around which an interviewer will seek to direct the interview as unobtrusively as possible. Similarly, Yin (1994) distinguishes between open-ended interviews and focused interview. The former corresponds to an unstructured method of inquiry, where respondents are asked about the facts of a theme as well as for the respondents' opinions about the issue. The latter corresponds to a situation in which a respondent is interviewed for a short period of time – often guided and structured by a certain set of questions. Yin (1994) further distinguishes an additional type of interview, which entails more structured questions and thus essentially is a hybrid between a focused interview and a survey. In summary, interviews are essential sources of case study evidence. Interviews can also provide insight into related issues such as the prior history of the situation, which can be beneficial for the identification of other relevant sources of information. Nevertheless, interviews should be considered as verbal reports only (Yin, 1994), and as such are subject to the common problems of bias, poor or inaccurate articulation and poor recall. Thus, a sensible research design is to corroborate interview data with information from other available and relevant sources. We have selected semi-structured exploratory interviews for our research – a dynamic mixture between structured and unstructured interviewing. This decision is in part based on the exploratory nature of this work. Likewise, we desired to remain open-minded to topics that arose during the course of an interview. The next two sections provide a brief outline of structured and unstructured

[45] The studies of Miles and Snow (1978), for example, were based on open-ended interviews, whereas structured interviewing provided the database in studies by Lenz and Engledow (1986). However, there have been variations on the typical interview format in strategic management research (Snow and Thomas, 1994). These include, among others, the [a] use of combined open-ended and structured interviews (Duhaime and Grant, 1984); [b] group interviews (McDaniel, Thomas, Ashmos, and Smith, 1987); [c] unscheduled group interviews over repeated and multiple time periods (Johnson, 1988); and [d] telephone

interviews and some considerations and methods related to the analysis of such data. Appendix 2 and 3 provide an overview of the data sources. Appendix 4 provides an overview of some genuine topics that have been discussed during the course of an interview.

3.6.3.1 Structured Interviews

Structured interviewing refers to a situation in which an interviewer asks each respondent a series of preestablished questions (often with a limited set of response categories [Fontana and Frey, 1994]). There is generally little room for variations in response, depending on the richness of the stated question, expect where an infrequent open-ended question may be used. The responses are further recorded by the interviewer according to a coding scheme that has already been established before the start of the fieldwork.

The researcher/interviewer controls the pace of the interview by treating a set of questions as if it were based on a script to be followed in a standardised and straightforward manner. Thus, all respondents receive the same set of questions, asked in the same order or sequence. Hence, the way the questions are asked or answered in the context of the structured interview setting leaves only limited flexibility. Moreover, this mode of inquiry calls for the interviewer to play a neural role – never interjecting his opinions of the respondent's answers. The interviewer is to establish what has been called "balanced rapport" – he must be, on the one hand, casual and friendly, but on the other hand, directive and impersonal (Converse and Schuman, 1974; Fontana and Frey, 1994). Accordingly, the researcher must perfect a style of interested listening that rewards the respondent's participation but does not evaluate the responses (Converse and

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interviews (Javidan, 1984). Finally, the study by Grinyer, Al-Bazzaz, Yasai-Ardekani (1986) is notable

Schuman, 1974). Fontana and Frey (1994) recommend that the following guidelines be followed for the conduct of successful structured interviews:

- avoid long explanations of the study – instead use standard explanations;
- avoid deviations from: interview structure, the sequence and wording of questions;
- avoid letting people other than the addressed respondent answer the question;
- avoid interpreting the meaning of questions – yet provide clarification if required;
- avoid suggesting an answer or agree, disagree with a question; and
- avoid any improvisations

The guidelines set forth above are intended to produce an "ideal" interview, yet in practice this does rarely happen. Errors occur (Fontana and Frey, 1994), and they commonly evolve from three sources: [1] respondent behaviour, as when the respondent attempts to give a "socially desirable" response to please the interviewer and/or omits relevant information to hide something from the interviewer (Bradburn, 1983); [2] the set of questions or the wording of the questions; and [3] inconsistency related to the methodology used by the interviewer (e.g., different questions for different sites).

The largely predetermined nature of structured interviewing is aimed at minimising errors. However, "structured interviewers" should be aware that interviews take place in organisation- and industry specific environments that in turn are embedded in a wider socio-cultural laden environment (Granovetter, 1985). Thus, Converse and Schuman (1974) correctly noted that there is no single interview style that fits every occasion and/or is applicable to all respondents. Accordingly, interviewers must be aware of respondent differences and hence must be flexible enough to make proper adjustments for unanticipated developments. Moreover, it is not enough to understand the mechanics of interviewing; it is equally important to understand the respondent's world and forces that might stimulate or retard response (Kahn and Cannell, 1957). In sum,

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for its large scale interviewing process conducted in 48 randomly selected firms.

the structured interview process evolves under a stimulus response format; assuming that if questions are phrased correctly, the respondent will answer them truthfully. Thus, such an interviewing style often elicits rational responses, yet it often overlooks or inadequately assesses the cultural and emotional dimension (along with the contextual idiosyncrasies of a specific environment).

3.6.3.2 Unstructured Interviews

Unstructured interviewing provides a greater breath than structured interviews, given its primary emphasis on qualitative aspects of data collection (Fontana and Frey, 1994). In this section, we discuss the traditional type of unstructured interview: the open ended indepth interview. Qualitative researchers differentiate between indepth interviewing and participant observation. Yet, as Lofland (1971) points out, the two go hand in hand, and many of the data gathered in participant observation come from informal interviewing in the field and vice versa. In this particular case, data has also been gathered from the interviews and the additional five workshops conducted as part of the overall verification procedure. The unstructured or exploratory indepth interview is based on the premises that the interviewer has some general topics he wishes to know about, but he does not use closed-ended questions or a "formal" approach to interviewing. If the case being analysed is "emerging" and/or the environment exhibits dynamic changes, the interviewer intending to explore the phenomena is often better equipped without imposing any rigorous a priori categorisation that may limit the field of inquiry. The semi-structured interview is a dynamic mixture of structured and unstructured interview; depending on the situation and the phenomenon under investigation. This additional flexibility takes into account that interviews take place in the largely situational

everyday world of respondents. Moreover, refraining from close-ended interviews provides a way to investigate emerging and dynamic relationships and phenomena. Thus, the exploratory semi-structured interview is essentially heuristic. It aims to develop ideas and research propositions – and the incorporation thereof in a theoretical framework (Blalock, 1969; Kerlinger, 1986) – rather than to gather statistics. Therefore, it is concerned with understanding emerging relationships among variables, constituents and phenomena.

3.6.4 Data Analysis

The extant literature on methodologies of qualitative data collection far outnumbers that on qualitative data analysis, a notable exception includes Miles and Huberman (1984)[46]. Thus, one of the most serious and central difficulties associated with the use of qualitative data is that methods of analysis are not well formulated. For quantitative data, there are clear conventions the researcher can use. However, the analyst faced with a bank of qualitative data has very few guidelines and fixed formulas for the protection against self-delusion, the presentation of unreliable or invalid conclusions during the process of scientific inquiry. Instead, much depends on an investigator's own style of rigorous thinking, along with sufficient presentation of evidence and careful consideration of alternative interpretations. In other words, the analysis of qualitative data is often a personal activity that arises out of the direct interactions between interviewer and interviewee, which are embedded in a specific social-cultural environment. Accordingly,

[46] Miles and Huberman (1984) suggested the use of various analytic techniques for qualitative data analysis such as: putting information into different arrays; making a matrix of categories and placing evidence within such categories; creating data displays for examining the data; tabulating the frequency of different events and occurrences (used throughout this research); and putting information into chronological order or using some other temporal scheme.

there are no definitive rules to be followed by rote and by which, for example, two researchers can ensure that they reach identical conclusions about a specific set of data and/or information (Stake, 1994).

Sieber (1976) suggests several steps that will lead to a "good" **analysis of the collected data**. First, the process of data collection and data analysis should be intertwining. Second, the phenomena underlying the scientific inquiry should be categorised in classes; subsuming observations under progressively more abstract classes. The third step is based on identifying themes. Here the strategy formation process is one of making linkages between concepts, noting regularities, which have caused further inquiries, and perhaps have led to the formulation of conjectures and propositions[47]. Linking data to propositions can be done in a number of ways. One promising approach for case studies is the idea of pattern matching (Campbell, 1975); additional and related approaches are system dynamics (Randers, 1980)[48] and mind mapping (O'Conner and Seymore, 1995). Pattern matching expressed in aggregated frequencies, the principal methodology used throughout this thesis, is a data analysis approach whereby several pieces of information from one or a number of cases may be related to some theoretical propositions and conjectures. Eisenhardt (1989) refers to the procedures of pattern matching as analysing within-case data, which typically involves the production of detailed case study reports for each site. The idea is to become familiar with each case as a standalone entity. This process allows the unique patterns of each case to emerge before investigators push to generalise patterns across cases in an attempt to achieve high levels of analytical generalisability. The second step in Eisenhardt's (1989) pattern

[47] Mintzberg (1979a) has argued that the strategy formation process is better understood as a discontinuous, adaptive process rather than a formally planned one. Mintzberg (1979a) further noted that the more complex organisational research, the more investigators should rely on so-called exploratory – as opposed to rigorous – research methodologies.

matching procedure is based on the search for cross-case patterns. One tactic that has been used in this research was to select categories and then look for within-group similarities with intergroup differences. The selected categories are [1] exploitation and [2] exploration. Within the former, five subcategories have been formed, namely: retail banking, capital markets, infrastructure, globalisation, and knowledge. Note that this step corresponds to Sieber's (1976) second step of categorisation of classes.

The next step, along the roadmap for developing analytical generalisation from case study research, is to compare systematically the emergent framework, comprised of propositions and conjectures, with the evidence from the cases in order to assess how well or poor it fits with case data. The central idea being that researchers constantly compare the emerging framework and data – iterating a framework that closely fits the data. Glasser and Strauss (1967) referred to this continuous comparison of data and theory, beginning with data collection, as grounded theory building[49]. Based on this intertwined process, Eisenhardt (1989) proposes a two-part proposition shaping process involving [1] refining the definition of the construct and [2] building evidence which measures the construct in each case. This occurs through constant comparison between case data and constructs so that accumulating evidence from diverse sources converges on a single, well defined construct or proposition.

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[48] A more detailed discussion about system dynamics is provided in Casti (1992a,b); Forrster (1961, 1971); Golder (1994); Goodman (1974); Jervis (1991); and Schweppe (1973).

[49] Beginning with Glaser and Strauss (1967), much has been written about developing grounded theory, being open to what a site has to tell us, and slowly unfolding a coherent and consistent framework rather than imposing one from the start of the scientific inquiry. However, the need to develop grounded theory usually exists in tension with the need for clarity and focus; research projects that pretend to come to the study with no assumptions and propositions usually encounter much difficulty (Miles, 1983). We thus surmise that a rough working framework needs to be in place near the beginning of the research project. Of course, this is likely to change during the course of the investigation. The risk is not necessarily that of imposing a self-blinding framework, but rather that an incoherent, bulky, irrelevant, meaningless set of observations may be produced, which no one can make sense of (Miles, 1983). Consequently, we chose

3.6.5 Verification – An Assessment Data Quality

To reduce the likelihood of misinterpretation, we employ a number of procedures and tests, including construct validity; internal and external validity; and reliability (Yin, 1994). Construct validity refers to the establishment of correct operational measures for the phenomena being studied. Internal validity refers to establishing a causal relationship, whereby certain conditions are shown to lead to other conditions, as distinguished from spurious relationships. Conversely, external validity is concerned with establishing the domain to which a study's findings can be generalised. Alternatively, this step of the validation process is concerned with the replication of logic across multiple cases. That is each proposition (and conjecture) is examined for each case and not for the aggregated cases. In replication logic, cases that confirm the emergent framework (consisting of propositions) enhance confidence in the validity of the interdependencies and hence the formulation of propositions (Eisenhardt, 1989). Conversely, cases that disconfirm the logic of the relationship often provide a chance to refine and extend the framework. The qualitative data are of particular use for understanding why or why not emergent logic holds (Eisenhardt, 1989; Yin, 1994). When a relationship holds, the qualitative data often provide a good understanding of the dynamics underlying the relationship, that is the "why" of what is happening. This in turn is crucial for the establishment of internal validity, as an apparent relationship may simply be a spurious correlation. Accordingly, it is important to discover the underlying theoretical reasons for why the relationship exists. Finally, replication demonstrates that the operations of a study, such as the data collection procedures, can be repeated with the same or similar

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the strategy of developing explicit preliminary frameworks consisting of propositions quite early; even so, we revised them repeatedly over the life of the research project.

results. For qualitative case work, these validation procedures are generally referred to as triangulation (Stake, 1994; Miles and Huberman, 1984).

Triangulation is broadly defined as the combination of methodologies and data sources in the study of the same phenomenon (Denzin, 1989). Triangulation can further be distinguished between a within-method, which essentially involves crosschecking for internal consistency or reliability and a between-method, which examines and tests the degree of external validity (Denzin, 1989). The former concept, within-method triangulation, means that the researcher has examined the phenomena or relations from multiple perspectives, however, these views share common flaws and an eventual bias, which prevent strong convergent validity from being established. Conversely, the latter concept refers to the need to augment field methods with other types such as experiments and/or surveys (Denzin, 1989; Snow and Thomas, 1994). Thus, triangulation has generally been considered as a process of using multiple perceptions and sources of evidence to clarify meaning and to verify the repeatability of an observation or interpretation[50]. The most important advantage of triangulation, exhibited by using multiple sources of evidence, is the development of converging lines of inquiry (Yin, 1994). Thus, any finding, conclusion and/or proposition related to a case study is likely to be much more convincing and accurate if based on several different sources of information, following a corroboratory mode. A note of caution is in place, however, as one basic assumption is buried in all the various triangulation designs. The effectiveness of triangulation rests on the premise that the weaknesses in each single method will be compensated by the counter-balancing strengths of another (Jick, 1979). That is, it is assumed that multiple and independent measures and data sources do not share the same weaknesses or potential for bias. Although it has been observed that each method and

data source has assets and liabilities, triangulation purports to exploit the assets and neutralise, rather than compound, the liabilities. Therefore, acknowledging that no observations or interpretations are perfectly repeatable, triangulation further serves to clarify meaning and hence analytical generalisability by identifying different ways the phenomena are being seen (Flick, 1992). Thus, triangulation, which prominently uses qualitative methods (Jick, 1979), can potentially generate holistic work or thick description. As Weiss (1968) remarked, qualitative data are apt to be superior to quantitative data in density of information, vividness, and clarity of meaning – characteristics more important in holistic work, than precision and reproducibility. However, triangulation is not without some shortcomings. Jick (1979), has noted that replication has largely been absent from organisational research – although it is usually considered to be a necessary step in scientific progress[51].

3.6.6 Case Writing Procedure

Qualitative research is endlessly creative and interpretative (Denzin and Lincoln, 1994). However, the researcher does not just leave the field with mountains of data and then easily write up his findings. Qualitative interpretations are constructed. The researcher first creates a field text consisting of field notes and documents from the site. The writer as interpreter (Denzin and Lincoln, 1994) moves from this text to a research text: notes and interpretations based on the field text. This text is then re-created as a working interpretive document that contains the researcher's initial attempt to make sense out

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[50] A number of data sources have been listed in Table 2 Case Study – Sources of Evidence.

[51] Replicating a mixed mode research design and data sources, including idiosyncratic techniques, is almost an impossible endeavour and hence unlikely to become a popular exercise. Qualitative methods, in particular, are problematic to replicate.

of what he has learned (these "semi-final" drafts have been validated by respondents). Finally, the writer produces the "public text" that comes to the reader.

Accordingly, the case writing procedures for this work comprised a series of different types of reports and cases that have been prepared in the course of the research. First, each case was structured in an analytical chronology, laying out the plot across different levels of analysis. This helped to clarify sequences of events, suggested causal linkages and early analytical themes. We then decided to give semi-final drafts to interviewees (including other relevant people) and invited them to correct errors of fact, and supply alternative interpretations to those that we made. Several issues emerged from this site validation and feedback procedure. First, there is no possibility of maintaining real anonymity inside a site of investigation. Even with pseudonyms, everyone within the organisation knew exactly who was who. Thus, many actual sources had to be further disguised or excluded and initial quotations have been removed or turned into the overall content of the case to maintain the requested **confidentiality** of interviewees. Many cases have thus been woven into the fabric of the overall text to dilute the explicit case in an attempt to maintain the highest possible level of confidentiality. Second, some people felt vulnerable as information not previously known to others had eventually been made public. Likewise, people often felt at unease about verbal statement that they initially made. Consequently, we have been asked to either remove them completely or disguise the source, respectively. These concerns have been justified because careers and interpersonal relationships could be affected. Finally, people almost never objected to frequency data that have been aggregate across all participating organisations. However, they usually objected to direct quotes or specific characterisations of their behaviour or the inclusion of "competitive information" in the proceedings (and thus this work). Again, people felt that the "leak" would be obvious and could exhibit

negative repercussions. The next step in the case writing procedure was to reorganise the cases among several conceptual themes – for example exploitation (outlined above) and exploration of advanced technology within organisation. The theme on exploration was then roughly structured around different contingencies of VE systems while the theme exploitation has further been discerned into retail banking, capital markets, infrastructure, globalisation and knowledge.

3.6.7 Theory Development – The Field Work Perspective

Within the context of empirical fieldwork, Snow and Thomas (1994) have recently discussed the contributions of field research methods for theory development. The matrix in Table 3 outlines the field research methods and their respective contribution to theory development. The matrix is defined by [1] the phase of theory development (building versus testing) and [2] the purpose of the theory (description, explanation, prediction). Each cell contains a description of the specific stage of the theory development process.

	Description	Explanation	Prediction
Theory Building	Key Question is "what". Identification of essential constructs and variables. Technique: interview and observation.	Key questions are "how" and "why". Establish relationships among constructs and provide theoretical rationale for observed relations. Technique: interview, observation.	Key questions are "who", "where", and "when". Examine boundary conditions of a theory. Technique: interview, observation, survey, and questionnaire.
Theory Testing	Developing and validating measures of constructs and variables.	Documenting relationships among variables through hypothesis testing.	Testing competing theories of the same phenomenon through experiments.

Adopted from Snow and Thomas (1994)

Table 3 Field Research Methods and Theory Development

Before a specific theory can be subject to critical scrutiny and tests, it must be developed. Thus, the next section is concerned with the process of theory building while the subsequent section discusses the procedures and processes involved in theory testing.

3.6.7.1 Theory Building

The process of theory construction typically includes steps such as the identification of relevant constructs, the development of propositions about interdependencies and relations, and the proffering of explanation for these relationships (Eisenhardt, 1989; Snow and Thomas, 1994; Yin, 1994). Each of these steps addresses a different research objective. **Description** contributes to the overall understanding of a specific phenomenon, primarily by identifying the concepts or constructs of a theory. While the ultimate objective of theory building may be to answer the questions *how*, *why* and *when* (Eisenhardt, 1989; Yin, 1994), the main purpose of description is to answer the question of *what* (Bacharach, 1989). Snow and Thomas (1994) have noted that the very success of descriptive theory building hinges on other investigators extending initial theories by adding more variables and/or more data sources to an existing framework. **Explanation** is an attempt to establish *how* and *why* key variables are related (Whetten, 1989). Accordingly, we can distinguish between a number of objectives associated with this research inquiry. The first objective is to explore the nature and degree of association (correlation) among variables. The second objective is to evaluate and decide whether additional variables need to be included in the existing framework to provide a more accurate description of the phenomenon under investigation. The third and last objective is to offer theoretical explanations of observed interdependencies. The basic purpose of **prediction** is to establish the conditions under which a theory holds. Whetten

(1989) has argued that the questions addressed by predictive studies involve issues of *who*, *where* and *when*. Thus, a predictive research design builds on the efforts of prior research by incorporating previously identified variables and propositions into a theoretical framework (Blalock, 1969; Kerlinger, 1986).

3.6.7.2 Theory Testing

After a theory has been constructed, it can be tested – and if needed amended. Consonant with theory building, theory testing moves through several distinct phases characterised by increasing specifications and rigour. However, as recently pointed out by Snow and Thomas (1994), theory testing usually requires larger samples and refined data sources. Whereas **description** during the theory construction phase is concerned with construct identification, description in theory testing is predominantly concerned with construct measurement (Snow and Thomas, 1994). Snow and Thomas (1994) have further noted that there exist two broad categories within the domain of construct measurement research. The first comprises conceptual articles that attempt to improve the definition and/or measurement of essential constructs and variables. The second strand of research in construct measurement is centred around empirical research on procedural and instrumental development. **Explanatory** studies are normally well grounded in theory that posits an association between variables. However, there may be some inadequate or conflicting arguments about the direction of the relationship or the generalisability of an association. Finally, the ultimate objective of a theory is the **prediction** of future outcomes. However, prediction without explanation provides little understanding for the phenomenon in question. In situations where predictions are wrong, the researcher has a limited set of tools to modify the existing theory. According to Snow

and Thomas (1994), the predictive study that is build on explanation is the ultimate form of theory development.

In recent years, the conduct of strategy research has been skewed towards quantitative as opposed to qualitative approaches. Accordingly, several observers have expressed concern that strategy researcher increasingly use sterile data (Snow and Thomas, 1994) and that a clear tendency towards analysis of secondary data has developed. Such trends may eventually be detrimental to the entire research process in strategic management (Mintzberg, 1979a). As Mintzberg (1979a) argued, effective theory building and subsequent testing in strategy research require rich description. Snow and Miles (1994) have pointed out that using soft data derived from field methods, investigators may be better able to explain relations and interdependencies among variables and thus set the foundation for prediction and subsequent testing.

3.7 Summary – Research Methodology

We have described the design and research methodology for this research. The chapter has summarised the various strands of literature and paradigms concerned with investigating phenomena in strategy research. Accordingly, we point out that a major difference between qualitative and quantitative research methods, the two most prominent strands of strategy research, is not the "quality" but the "procedure". In qualitative research, findings are not arrived at by econometric methods or other procedures of quantification. Thus, the two different approaches reflect the different perspectives on knowledge and research philosophies. The exploratory and explanatory nature of this work – exemplified by "how" and "why" questions – invite the use of qualitative research methods because such concepts deal with operational links and processes traced

over time to obtain a holistic view of the phenomena under investigation. Qualitative research is multimethod in focus, involving an interpretative and naturalistic approach to its subject matter. Thus, qualitative research studies things in their natural and social settings, attempting to make sense of, or interpret, phenomena in terms of the subjective meanings that individuals bring to them. Qualitative research involves the collection and analysis of a variety of empirical data – case studies and interviews being the most prominent ones – that describe routines, problematic moments and meanings embedded in a particular environment. The distinctive need for case study methodology is anchored in the desire to understand complex and "emerging" phenomena. Thus, the case study concept allows a researcher to retain the holistic and meaningful characteristics of real-life events by taking into account contextual conditions. Interviews are essential sources of case study evidence. Accordingly, we have carried out semi-structured exploratory interviews with the management of financial institutions. In addition, five workshops have been conducted to corroborate our interview data with additional sources and insights. The data has been analysed using pattern matching techniques and the identification of common themes that led to the formulation of propositions that laid the foundation for analytical generalisation. Analytical generalisation from case study data is most appropriate in the early stages of research on a topic.

3.8 Actual Research Process and Procedures

Increasingly, organisational research is impressed by the importance of phenomena that cannot be measured (Mintzberg, 1979a). Furthermore, organisations also experience all kinds of lags and discontinuities. For example, Chandler (1962) and Rumelt (1974) have noted that structural change is often the result of strategic change. However, due

to lags and discontinuities it may often be a matter of luck whether a multi-variable study manages to capture and adequately reflect the structure that reflects the concurrent strategic situation (Mintzberg, 1979a). Likewise, the presence of discontinuities, for example structure as a function of technology (Woodward, 1965), may eventually play havoc with conventional research approaches and methodologies (Mintzberg, 1979a).

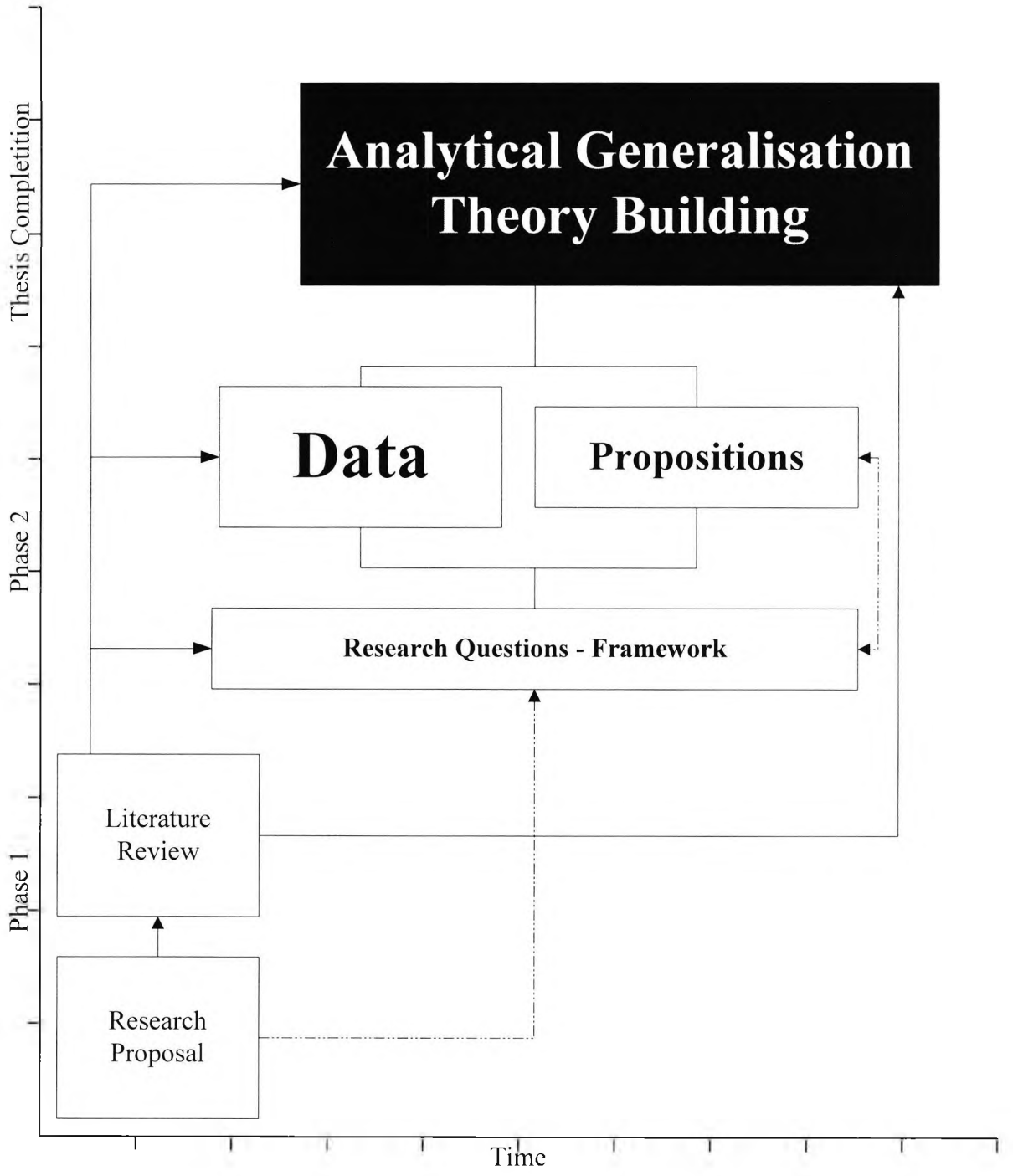

Figure 3 Actual Research Process and Procedures

Having spelled out this note of caution, the reminding of this section outlines the actual processes involved in this research work. Based on the theoretical roadmap as outlined above, the whole process in producing this thesis, and the research methods used, are

summarised in Figure 3 above. This research seeks to contribute in two ways. First, this work amends the scare literature on advanced technology in information rich environments such as financial institutions. Furthermore, we provide a detailed account of how advanced technology is used in financial organisations; likewise, we unravel a number of areas that arise out of the use of advanced technologies. One emerging paradigm then forms the substance and basis for further research as carried out in the second part of the thesis: the exploration of advanced technology to devise and develop VE platforms. Second, the exploratory nature of second part of this work (the exploration of advanced technology in financial institutions) amends the literature on VE and EC; the objective being, to develop pertinent propositions and conjectures for further inquiry. A methodology based on established research paradigms and methods in the social sciences was designed to achieve this objective. Except for the aggregated frequencies, all adopted research methods are of qualitative nature.

Financial services and products are increasingly bits and bytes of data and information combined in a number of ways and disseminated via the plethora of digital distribution channels.

4 Advanced Technology: Forms and Structures

4.1 Abstract

This chapter deals with the exploitation and exploration of advanced technologies in financial institutions. In the first part of this chapter we review the literature on technology and provide several views and perspective on technology. Due to the organisational changes associated with the exploitation and exploration of technology, we argue that the organisational value network is subject to change. We then introduce the concept of disaggregation to distinguish and analyse the individual working components of technology within the organisational system. A distinction between balance sheet and functional disaggregation is made. Within the latter, we analyse various level of technological sophistication to investigate their potential for exploitation or exploration, respectively. We provide a framework, comprising three distinct level of technological sophistication, to analyse the ability and potential of exploitation and exploration. The second part of this chapter examines the way technology is affecting the distribution of financial services across time and space. Likewise, we investigate the implications of advanced ICT on the ability of financial institutions to segment the market. Finally, we provide an indepth analysis of the role of technology in three distinct areas; namely, the distribution, globalisation (as a special type of distribution), and innovation of financial products and services.

4.2 The Role of Technology in Organisations

Since the first industrial revolution, social scientists have called attention to the central role played by technology and technological advances in shaping the economy and driving economic growth (Tushman and Nelson, 1990). Schumpeter (1934, 1942), has further emphasised the role of technological advances as a central feature of modern economies. Nevertheless, his stressing the importance of technological advances as often upsetting old as well as contemporary structures – as waves of "creative destruction" – have caused turmoil in the economy. Consequently, the surge of new thoughts in economics, business and the social sciences have continued to challenged conventional notions and paradigms. Accordingly, Schumperterian ideas have been catalysts for

much theoretical and empirical work. Technology has been accorded a central position in several streams of research. Technology and workflow have taken a central position in organisational theory since the work of Taylor (1911), Bernhard (1938), March and Simon (1958), Child (1972) and more recently, Barley's (1986, 1990) work on technology, power and social order. Pettigrew (1972) pointed out the profound implications of technological change on power, politics, and the social order of an organisation.

As recently pointed out by Tushman and Neslon (1990); Nobel (1984); and Tushman and Anderson (1986), it is apparent then that technological change deserves a central role in any organisational theory. In addition, it is increasingly important that the causal influences and processes flow in both directions (DeSanctis and Poole, 1994; Fulk and DeSanctis, 1995; Orlikowski, 1992; Tyre and Orlikowski, 1993, 1994; Tushman and Nelson, 1990). Organisation at the level of the firm, the industry, and the nation affects technological advance. Although the basic linkages in the complex web of interconnected constituents comprising science, technology, firms and universities and the role of governments within these interlinked constituents have been analysed, much remains unclear (Nelson, 1982, 1984; Orlikowski, 1992; Tushman and Nelson, 1990). Notable exceptions include North (1990) and Castells (1996), who analyse the links and interdependencies among different constituents in society such political-, social-, economic-, and educational institutions and their links to rule setting bodies. Although there is a large literature on the sociology of science and the nature of scientific progress (Kuhn, 1970; Merton, 1973), there is a relative scarcity in the literature on either the technological progress or the effects of technological change on organisation and individual outcomes (Orlikowski, 1992; Tushman and Nelson, 1990). Notable exceptions, however include, the recent literature on technology based intraorganisational and in-

terorganisational communication processes[52]. The recent literature on information technology and firm design discusses the impact of technology on organisational design and role of feedback mechanisms between technology and structure[53]. In addition, the contemporary literature on outsourcing discusses organisational design in the broader context by asking what processes and activities should be carried out within the organisation, although the term organisation and outside are often used ambiguously[54]. Finally, the emergence of new organisational forms and structures, largely facilitated by technology, is a further area where technology is being analysed in the context of organisational theory. Recent advances in ICT have significantly facilitated the rise of EC systems, interorganisational VE networks, virtual communities and virtual organisations[55]. Technology and technological change can be seen as potential sources of uncertainty or reward for organisations (Tushman and Nelson, 1990). Technological changes range from competence enhancing, incremental, and compatible to competence destroying, discontinuous, and incompatible. For example, the competencies acquired in the mainframe era are becoming a commodity in a client-server driven environment – thus the shift in computing and network paradigm will eventually destroy existing competencies.

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[52] An analysis of interorganisational communication processes (ICRs) is beyond the scope of this work. However, a detailed discussion about ICRs is provided in Bolton and Dewatripont (1994); Capozzi, and Sutherland (1996); Daft and Lengel (1984, 1986); Fulk and DeSanctis (1995); Griffith and Northcraft (1994); Hinds and Kiesler (1995); Lea, S'Shea and Fung (1995); McKenny, Zacky and Doherty (1992); Mohr and Spekman (1994); Nouwens and Bouwman (1995); Orlikowski, Yates, Okamura and Fujimoto (1995); Pickering and King (1995); Rogers and Kincaid (1981); and Thompson (1996).

[53] Authors that have analysed the relationship between technology and structure include, for example, Bakos (1991a,b); Blackler (1994); Burn (1993); Child (1987); Davenport (1993); Davidow and Malone (1992); Earl (1989, 1996); Galliers (1993); Huber (1990); Hurst and Hannessian (1995); Malhorta (1993); Porter and Millar (1985); Rockart, Earl and Ross (1996); Rockart and Scott Morton (1984); Rockart and Short (1989); Scott Morton (1991, 1995); Sherer (1995a); Stebbins, Sena, and Shani (1995); Tushman and Nadler (1978); and Venkatraman, Henderson, and Oldach (1993).

[54] A detailed discussion about outsourcing is, for example, provided in Alexander and Young (1996); Bettis, Bradley and Hamel (1992); Cheon, Grover and Teng (1995); Choi, and Willcocks (1995); Cross (1995); Earl (1996); Elfring and Baven (1994); Hendry (1995); Huber (1993); Jennings (1996); Lacity and Hirschheim, (1993, 1995); Lacity, Willcocks and Fenny (1995, 1996); McFarlan and Nolan (1995); Quinn and Hilmer (1994); Willcocks and Fitzgerald (1994); and Willcocks, Fitzgerald and Fenny (1995).

Thus, the greater the degree of technological uncertainty, the greater the learning or knowledge pressure facing the organisation or alternatively the requirement for exploitation of technological investments. In summary, firms must be flexible in order to proact or respond to a changing competitive landscape; sophisticated technologies may help firms exploit and explore organisational capabilities and resources in their drive to improve their responsiveness to environmental changes and ultimately to maximise profits.

4.2.1 Views on Technology

Technology has always been a central variable in organisational theory (Tushman and Nelson, 1990). However, despite years of investigation effort, there is little agreement on the definition and measurement of technology. Accordingly, there is no compelling evidence on the precise role of technology within organisation (Orlikowski, 1992).

Prior conceptualisations of technology have each focused selectively on some aspects of technology, at the expense of others, with the result that the current state of knowledge about technology in organisations is ambiguous and conflicting (Barley, 1990). Orlikowski (1992) has put forward two important overarching aspects of the technology concept. Namely, the scope of technology – what is defined as comprising technology; and the role of technology – how is the interaction between technology and organisations defined. Both these aspects inform prior technological research, within the confines of organisational theory, where they have been specified and used discrepantly.

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[55] See, for example, Alexander (1997); Armstong and Hagel (1995); Benjamin and Wigand (1995); Davidow and Malone (1992); Goldman, Hagel and Preiss (1995); Handy (1995b); Malone, Yates and Benjamin (1987, 1989); and Rheingold (1991, 1992, 1994).

Two views on the **scope of technology** have pervaded studies of technology. The first set of studies focused on technology as hardware or the machinery within an organisation (Barley, 1986). Nevertheless, the traditionally wide range of industry and organisation specific hardware has led to multiple and predominantly context-specific definitions of technology. This diversity in turn has significantly inhibited any substantial comparisons across multiple settings, industries and organisations. This restrictive focus on technology – as a variable in organisations that employ hardware in their productive activities – has prompted researchers to try to generalise the scope of technology so as to encompass organisations such as services firms (Orlikowski, 1992). Thus, in a second set of studies, the technology concept was extended to social technologies, thereby including the generic tasks, techniques and knowledge utilised when humans interact with hardware in any productive activities (Thompson, 1967). Mintzberg (1979a, 1979b, 1991), however, has pointed out that – although such a generic conception of technology as meaningful variable within all organisations – inevitably creates boundary and measurement ambiguity.

The **role played by technology** in organisations can be distinguished from three different streams of technology research (Orlikowski, 1992); reflecting the philosophical opposition between subjective and objective realms that have largely dominated the social sciences (Morgan and Smircich, 1980). While the early work assumed technology to be an objective, external force that would have relatively deterministic impacts on organisational properties, the later research work on technology focused on the interaction between humans and technology. The more recent work on technology has partially reverted to a moderate determinism, where technology is posited as an external

force, yet human actors and organisational context moderate these impacts[56]. The first body of research, on the role of technology within organisations, examines the impacts of technology on organisational (e.g., structure) and individual dimensions (e.g., productivity). While providing insight into the often determining aspects of technology, this body largely ignores the actions of human agents on developing and changing technology. Accordingly, technology is seen as an independent influence on human or organisational properties in that it exerts unidirectional causal influences on organisations and organisational constituents. Consequently, this perspective falls short of providing a well balanced account of the role of technology and its interaction with organisations. The second stream of research on the role of technology within organisations suggests that technology is not an external object, but a product of continuous action, design, and appropriation. According to Zuboff (1982, 1988), the focus of this perspective rests on the manner in which technology is influenced by social and environmental contingencies. Zuboff (1988) argued that organisations should eventually restructure around the potential of information technology – in the light that technology can be designed with different intentions and hence will eventually exhibit different implications for human agents. Likewise different interpretations and anticipations of technology are likely to affect the development of and interaction with technology. The third view about the role of technology in organisations is focused on technology as a trigger for structural change (Barley, 1986, 1990). Within this perspective, technology is understood as a social object, whose meaning is defined by the context of use, while its physical form

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[56] Orlikowski (1992) employed the tenets of structuration theory to reconstruct the concept of technology and propose a model for the relationship between technology and organisation. Structuration is posited as a social process that involves the reciprocal interaction of human actors and structural features of organisations. The theory of structuration recognises that human actions are enabled and constrained by structures, yet that these structures are the result of previous actions (Orlikowski, 1992). For a more detailed discussion about structuration theory, see also DeSanctis and Poole (1994); Orlikowski (1992); Orlikowski, Yates, Okamura and Fujimoto (1995).

and functions remain fixed across time and contexts of use (Orlikowski, 1992). However, Barley (1986) does not allow for the modification of technology during use. Although such an assumption may be appropriate in a specific setting, it may not be generally appropriate, and is particularly inappropriate in the context of advanced ICTs within the fast changing environment of financial institutions.

Although advanced technologies are changing financial services with unprecedented speed, a considerable amount of change is linked to the way advanced technologies are being deployed to create added value for both firms and their customers. We surmise that the recent progressions of advanced technologies have dual applicability in the financial services industry. First, the existing set of organisational capabilities, embedded in the organisational infrastructure, comprising both data, processes and capabilities, can be further exploited if advanced technology is being applied in an efficient and costs-effective manner. Second, recent innovation in advanced ICTs have provided organisations with a host of tools to explore new capabilities that may permit a specific financial institution to sustain and eventually extend its competitive advantage. For example, a firm can widen the scope and range of its exchange activities beyond the ubiquitous marketplace to span "space" activities.

4.2.2 Exploitation of Existing Capabilities

The early computing systems in financial services of the 1960s and 1970s were usually designed to be more efficient analogous of their physical counterparts. Hence, the computing infrastructure of financial services largely mirrored its physical infrastructure. Consequently, the focus rested on efficiency considerations rather than on questioning the logic of the processes per se. In retrospect, such a focus seems rather surprising

given the knowledge of management that the information embedded in processes and transactions rather than the transaction per se is one of the basic essences of financial services (91 percent of respondents agree: T1, exploitation; T4, knowledge; T2, technology). Yet, financial services institutions continued to build systems that simply dealt with processes and transactions rather than the information contained within these transactions. Although such an approach provided the basis for the design of more efficient systems, the impact of advanced technologies has thus far been limited as a result of the inability to effectively capture and monitor corporate and customer information[57].

Although financial services providers have always had and maintained repositories of customer knowledge – one of the most important source of sustainable competitive advantage according to 90 percent of interviewees (T4, knowledge; T7, nature of financial services and products) – these traditionally resided in humans rather than in big central databases. By scattering these human repositories as widely as possible, banks and other financial services providers built what were in effect intraorganisational information- or social networks (Burt, 1992). Accordingly, financial institutions and especially banks had little sense of whether their relationships with particular customers were profitable, or whether specific customer requirements had been optimally met. Therefore, there has been significant attempt to aggregate and subsequently analyse the tediously recorded information. Extracting specific customer information from process driven mainframe systems was technically difficult and often related to high financial expenses – at least until recently. The development of middleware[58] and data warehouses, in combination with a new generation of data analysis concepts have introduced

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[57] Sources disguised upon request. However, 87 percent of respondents of all surveyed financial institutions anonymously agreed with this statement (T3, organisational design, interorganisational arrangements; T7 risk of interorganisational exchange).

[58] Middleware systems are data communication and sophisticated software solutions that facilitate data extraction and analysis between mainframes and workstations.

a new era of data management and thus provided the means to provide more efficient customer services. In addition, relational databases have been perceived as an additional source that confers competitive advantages for firms dealing with large amounts of data[59]. Falling communication costs removed another barrier to the creation of sophisticated computer and data networks, permitting the linking of previously disparate intra- and interorganisational systems.

These new advanced technological capabilities have prompted a significant shift in the methods open to financial institutions in their corporate activities to exploit existing resources. Increasingly, financial institutions seek to use their existing data repositories to turn them into valuable information, which eventually provides the foundation to make more profitable business decisions. Note, however, that these measures and methods are not necessarily considered as a part of the recent shift towards the deployment of alternative distribution channels and exchange platforms; rather they are aimed at exploiting existing relationships. Most banks for example, having built their ATM networks, have made little effort to ensure that customers actually use the machines and that the existing ATMs effectively perform the requested customer functions. Undoing such negligence can yield substantial benefits for both customers and financial services providers[60]. For financial services providers, ATM based electronic transactions are much cheaper than their non-electronic counterparts[61]. For customers, these technologies are part of a broader trend to tailor products and services to individuals rather than to mass markets. An increasing amount of banks no longer rolls out a

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[59] Form all the respondents, 67 percent of senior executives agreed, while almost 90 percent of information and corporate communication executives agreed (T4, competition; T1, exploitation and exploration; T5; T7, value of technology). We hypothesis that this gap is mainly a result of awareness and focus. Senior executives have to cover a wider range of corporate activities than do information executives. We believe that the sole focus of the latter on technology is the driving force behind this overall higher appreciation of relational databases.

[60] Sources disguised upon request.

new product or service and then tries to sell it to their existing customers. Rather, they assess each customer, based on his information profile, and ask what he might need and make an appropriate suggestion that matches the existing customer portfolio.

Another financial area where the application of advanced technologies is poised to provide financial institutions with better information is customer lending and credit operations[62]. Traditionally, customer lending and credit operations have largely been based on local decision-making following a bottom-up approval strategy. Under such a system, cases that have progressed to the ultimate decision making point (often a centrally operating credit specialist), have implicitly already been approved further down the hierarchy[63]. Therefore, banks did not have a binding common set of rules to evaluate individual applications and their riskiness, resulting in binary decisions of approval or rejection. Thus, each individual credit application had traditionally been treated in a vacuum, without giving apt consideration to the banks overall risk exposure and the customer's overall relationship with the bank. Correspondingly, the credit application had been treated in isolation, without reference to either the bank's existing corporate loan portfolio or a customer's other assets with the bank[64].

Sophisticated software systems permit an ongoing analysis of a bank's aggregated loan portfolio and hence its corporate risk exposure to the market. For example, the bank can monitor how many of its borrowers may have to be downgraded and hence increase the overall risk exposure of the bank. This knowledge can then be used to plan the financial institution's provisions against bad debts with greater accuracy. Further-

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[61] Interview with SBC, Electronic Retail Banking, Basle, 05/10/96.

[62] Author's personal observation at two Swiss financial institutions – all names have been disguised upon request. These observations have further been confirmed in three interviews with Coopers & Lybrand, Financial Services and Accounting Practice in Switzerland in 1995 and 1996.

[63] Sources disguised upon request.

[64] From the bank's perspective, the question to ask is: What is the chance that **this** specific loan will be repaid? Moreover, taking into account the customer's relationship with the bank, the question to ask is:

more, a bank can more adequately price its lendings to reflect its view of borrowers' riskiness. Similarly, the bank can use the same information to consciously direct its lending away from particular risk grades. Over the long term, the bank may be able to identify some of the underlying patterns or combinations thereof to identify certain high risk applications and consequently be more selective in its lending and credit business. Although massive amounts of credit data have been available for a long time already, financial institutions typically did not have a way to exploit the hidden information contained within these databases. Therefore, the introduction, application, exploration and exploitation of advanced technologies and sophisticated software solutions in previously establish functional areas of financial institutions may lead to significant, and often unexpected, economic, operational and cultural changes[65].

4.2.3 Exploration – The Rise of New Alternative Systems

Network systems and digital network based exchange systems challenge conventional business models[66]. The rapid evolution of virtual environments and embedded EC systems extend the reach and scope of financial institutions beyond traditional constraints of time and space. We believe that the importance of virtual environments and EC systems for the financial organisation (and the entire industry) cannot be assessed in isola-

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How does this loan application change the customer's overall financial standing with the bank and what are the implications for the long-term customer firm relationship?

[65] Other examples where advanced technology has been successfully applied to existing businesses include: credit card fraud detection systems based on neural networks and genetic algorithms; programme trading based on neural networks; voice, holograms and scanning devices embedded in security systems such as smart cards; and complex algorithms for the pricing of derivatives and exotics.

[66] For example, the link between digital network system and "new business models" is extensively analysed in the works of Bakos (1991a, 1991b); Bartness and Cerney (1993); Benjamin and Wigand (1995); Blankenburg-Holm, Eriksson and Johanson (1996); Cravens, Piercy and Shipp (1996); Crede (1995); Handy, (1992, 1995a, 1995b); Hess and Kamerer (1994); Malone, Yates and Benjamin (1987, 1989); Nalebuff and Brandenburger (1996); Rayport and Sviokla (1994, 1995); Steinfeld (1995); and Wigand and Benjamin (1995).

tion; rather they need to be seen as one element of the overall corporate value network. The concurrent transition from place (atoms) to space (bytes) entails [1] secure and reliable distribution of information in a cost-effective manner and [2] the use of high value added information to unlock new streams of revenues. Firms that can do both successfully are well positioned to master the gradual transition from the physical to the virtual domain without cannibalising concurrent physical revenue streams.

4.3 Transformation and the Value Network

The restructuring efforts of the international banking industry have been driven primarily by economic and competitive forces[67]. Financial institutions are using technology as a key element in this restructuring process. In addition, banks are undergoing a fundamental transformation as advances in ICTs gradually permit the automation of processes and activities. Notwithstanding advances in technology, the first two stages in the production of financial services – back office and front office automation – usually do not substantially change the economies of scale and scope nor are they particularly visible to customers (Steiner and Teixeira, 1990). It is in the third stage – when the direct customer interface becomes automated – that economies change the most and competition usually reaches a critical juncture[68]. Although the transition to digital value networks is affecting the fundamental processes of banking and finance, advanced technologies, as an enabling force, are particularly affecting what processes and hence what products and services financial organisations are able to provide.

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[67] See, for example, *The Economist*, October 26, 1996; *The Economist*, February 10, 1996; *The Economist*, April 27, 1996; and *The Economist*, April 15, 1995.
[68] Workshops with Oracle, Lehman Brothers and SBC.

The majority of system expenses (related to technology and communication) are allocated to just one function, namely the transaction of funds as part of the overall distribution system[69]. A transaction can be defined as any change to an account or event linked to any account. Whatever the origin and context of a transaction, it requires an infrastructure to assure that the transaction (or rather the information contained within the transaction) can reach its destination. The majority of these transactions are financial payments or supporting transactions, for example a credit card approval before the actual funds movement takes place. Simultaneously these types of exchanges form a significant cost category. Yet at the same time, these transaction processes by their very nature must be standardised and support industry-wide distribution protocols. Therefore, systems that support funds movement functions are not unique and hence carry little competitive advantage. Thus, this fact goes a long way toward explaining why profits do not automatically flow from technology investments.

Although the majority of system expenses are linked to transactions and exchange, we conjecture that the areas in banking, among others, where value can be added are credit (avoidance of losses), marketing (innovation and control), and distribution (noticeable services distinctions)[70]. An additional characteristic of the advanced technological landscape is the effort for product and services proliferation. ***Financial services and products are increasingly simply bits of data and information combined in a variety of ways and disseminated via the plethora of digital distribution channels***. Thus, important customers such as institutional clients get many of their products and services tailor-made, reflecting individual risk preferences, based on criteria ranging from timing options to varying levels of interest rates. Furthermore, the majority of

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[69] Eighty percent of respondents agreed (T2, disaggregation of technology; T3, exchange; T6, exchange).
[70] Workshops with SBC, Lehman Brothers, Bank Cial, SBC and Oracle.

these innovations is digital information system-dependent and literally could not be produced in a non-digital environment. For example, the proliferation of derivatives and exotics, the application of these instruments in portfolio management, and portfolio insurance and hedging are all dependent on substantial computing power. Moreover, they often require quasi real-time links between the different organisational constituents and financial accounts to manage corporate risks in a consistent and coherent manner. However, the development of financial derivative instruments, which itself requires complex computer systems and mathematical algorithms, hinges upon modifications of existing computer applications to handle each new derivative security.

> **Conjecture 1**: Additional customisation and segmentation of information products and services, based on digital data, are unlikely to face considerable barriers – except from (the cost of) advanced technology itself.

The likely beneficiaries of this product and services proliferation are the financial institutions' customers. They continue to enjoy a growing number of choices, which can be more closely tailored to their needs. For financial institutions, product and services proliferation, however, is a double-edged sword. Popular new products and services can be a salvation only if they are distinct and carry a unique added value. We believe that too many financial services and products are still commodities, although they offer innovative features (e.g., the wide range of modified derivatives).

4.3.1 Disaggregation and the Rise of the Value Network

The concept of disaggregation is useful because it breaks down what otherwise appears as a monolithic whole and allows us to distinguish the individual working components

of the entire value network system (including the physical and virtual domain). Such a disaggregation further illustrates the changing nature of competition in the financial services industry. The same concept can be applied to the technological infrastructure of financial organisations. By focusing on individual parts of the entire system, we can better evaluate the value they contribute to the overall competitive position of a financial institution (within and across its industry). There are parts where competitive advantage is potentially more rewarding and others where such leverage is less prevalent. Making this distinction is helpful in developing a more sophisticated understanding of how to compete with various forms of advanced technology.

In areas where a financial services provider cannot offer truly distinctive products and services, technological investments can be viewed as a defensive requirement rather than an offensive weapon (90 percent of respondents agree: T2, technology; T7, financial services; T4, competition). We conjecture that with today's expanding and increasingly independent lines of businesses, competition needs to be considered on a product by product or service by service basis rather than across the entire product and services lines (Eppen, Hanson and Martin, 1991; James and Houston, 1996; Rajain, 1996; Simon and Fassnacht, 1993). This pattern is further reinforced by a disaggregation of services provision across the entire interorganisational value network.

The restructuring and transformation of product and services lines is often accompanied by considerable changes in the cost structure. For instance, fixed costs are displacing variable costs in a number of product and services lines. Accordingly, a shift in the cost structure of a specific product or service exerts considerable pressure on competitors to become more volume-orientated. Consolidations and profit pressures are occurring in a large number of automated business lines. Because of this economic

shift, it is more difficult to achieve consistently high levels of return, although actual productivity is substantially improving.

> **Proposition 1**: Sustaining advanced technology based competitive advantages by exploiting existing capabilities may be quite effective when a unique line of business with high market share comprises a large advanced technological content.

In these cases, the technological investments are not just defensive and accordingly should be sustained so long as a relative competitive advantage can be maintained. However, we have found very little evidence for the existence of such – purely advanced technology based – forms of competitive advantage. Organisations, however, try to compensate for the lack of such competitive advantages by pooling together their capabilities to create interorganisational value network solutions (e.g., shared interorganisational ATM networks). These shared network solutions further provide the impetus to compete with proprietary systems. Therefore, many value networks in financial services have become quite powerful; with only a handful of players left to compete with them head on. Examples include; Visa and Cirrus that act as utilities and intermediaries and help maintain a fragmented industry structure despite the pace of automation.

4.3.1.1 Balance Sheet Disaggregation

Historically, the traditional banking system has been highly integrated. The strict regulatory systems of many countries have tended to further reinforce this industry structure. Under this system, the majority of banks and financial organisations created all their products and services on their own. They raised their own funds, lent their own funds,

made their own credit evaluations, kept those funds on their own books over the life of the loans, and did all of the required back-office processing. The decision to make as opposed to buy, was significantly the result of regulation, protection and access to an extensive distribution system. Although this integrated banking structure guaranteed an attractive profit margin to a large number of banks and financial institutions, the profits did not ensure that the proceeds would be put to effective use.

With time, and increasing levels of investments in advanced technologies, non-banking institutions – not subject to banks' regulatory restrictions – begun to invade the banks' turf. More specifically the most promising and profitable customer areas, and product and services lines (e.g., Virgin, Marks & Spencer has recently started to offer personal financial services and pension schemes). The easier and cheaper transmission of information and data, caused largely by advances in ICTs, was fundamental in creating and exploiting this opportunity. Now, large corporations, many of whom have better credit ratings than the financial institutions themselves, can borrow in the commercial paper market and bypass financial organisations completely while other financial services providers have simply gone straight into lending.

4.3.1.2 Functional Disaggregation

A more refined analysis of the functional view of the financial services industry (Merton, 1990) can be achieved by explicitly distinguishing among the individual working components of the overall technological system. Functional disaggregation arises when (banking) production functions are separated and performed by those best suited to perform them. Accordingly, the individual bank moves away from creating all of its products and services in-house toward a more rational and economical approach by rethink-

ing the buy-versus build decision. For instance, small banks could become local retailers buying financial and banking services from another financial organisation or a wholesaler. Larger banks could become manufactures and wholesalers, and non-banks could become production subcontractors. A number of private banks in Switzerland have adopted this approach. Under this system, the products and services that are being offered are created and maintained on advanced information and technology systems of large universal banks. In addition, a number of private banks that have been bought by the universal banks a few years ago now run all of their information and data processing requirement on the holding company's infrastructure[71]. Consequently, the industry runs at greater efficiency because of the overall lower cost level. Other examples include the mortgage-backed security banking business, where new mortgages are securitised and sold off in the secondary market. This trend has revolutionised how business is conducted; with different organisations carrying out different functions (e.g., origination, servicing, credit enhancement, placement, and investment).

Two points are worth noting about the overall process of functional disaggregation. First, functional disaggregation is caused significantly by the increasing power of advanced technology systems. Technology has speeded up the flow of information and destroyed the old local concept of branch based banking. It has further created economies of scale that facilitate and promote outsourcing activities. Moreover, advanced technology has also provided the basis for better interorganisational monitoring capabilities, which further prompt outsourcing activities. At the same time, distribution channels other than the traditional branch network have gained in importance (e.g., EC). This transition to non-branch based distribution highlights the trend away from bank controlled distribution channels to other channels that financial institutions do not own

[71] Sources disguised upon request.

or control; with the most prominent example being the Internet. Second, functional disaggregation is most obvious in the technology itself. Whether a bank is buying technology to support a banking product or service, or developing new ways to reach the customer, a specialised vendor of the basic and advanced technology is usually available. Therefore, the function for which disaggregated value network constituents are most evident is the technology function itself. In the remaining of this chapter, we present and highlight the various levels of technological sophistication and their respective contribution to an organisation's overall competitive industry position. This discussion provides a complementary view to the analysis of advanced and basic technologies by DeSanctis and Poole (1994), and Huber (1990). We aim to apply the concept of basic and advanced technology to the infrastructure of an organisation and discuss the sophistication of three distinct levels of technological infrastructure. Moreover, based on the framework depicted in Figure 4, we discuss appropriate areas for both exploitation and exploitation of technological infrastructure capabilities.

4.3.2 Infrastructure and Technological Sophistication

We call our individual parts or levels of technological infrastructure T_1, T_2 and T_3, respectively, which refer to the first-, second- and third level of organisational structural design and management, respectively. As illustrated in Figure 4, each level represents a different part of the overall technological infrastructure and accordingly serves different business practices.

4.3.2.1 T_1 – The Basic Technology Level

T_1 is the basic technology infrastructure of an organisation, which in effect provides the basis and henceforth supports the two higher infrastructure levels of T_2 and T_3, respectively. This basic technology level includes the hardware, systems software, and generally accepted technological knowledge. Thus, T_1 is **generic**; not financial organisation or even business specific. Thus, all T_1 hardware in the financial services industry – from mainframes, client server systems and PCs to ATMs and telecommunication systems – is bought or leased from a number of independent hardware manufactures. Likewise, T_1 software – such as operating systems, database management systems – also comes from a number of compatible vendors that feature built in communication and data exchange interfaces.

Considering, that T_1 is mainly obtained in the open market and embraces no proprietary organisational expertise, it has the following fundamental characteristics: T_1 provides no competitive advantage and thus is largely **defensive** in nature (95 percent of respondents agree: T4, infrastructure; T3 firm design), inasmuch as a majority already has the technology or is in the process of upgrading the existing infrastructure. However, a limited competitive advantage can be achieved by seeking economies of scale in T_1 or executing T_1 skills on behalf of other financial services providers. For example, banks and financial services providers can establish an independent organisation that provides financial services specific outsourcing capabilities to other banks[72]. Likewise, in a collaborative and cost effective arrangement, banks can establish a joint information and technology provider for their own requirements.

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[72] However, most surveyed banks maintain reasonable operations in T_1 through consolidation and the size of the business itself to be in a position to exploit eventual economies of scale. Sources disguised upon request.

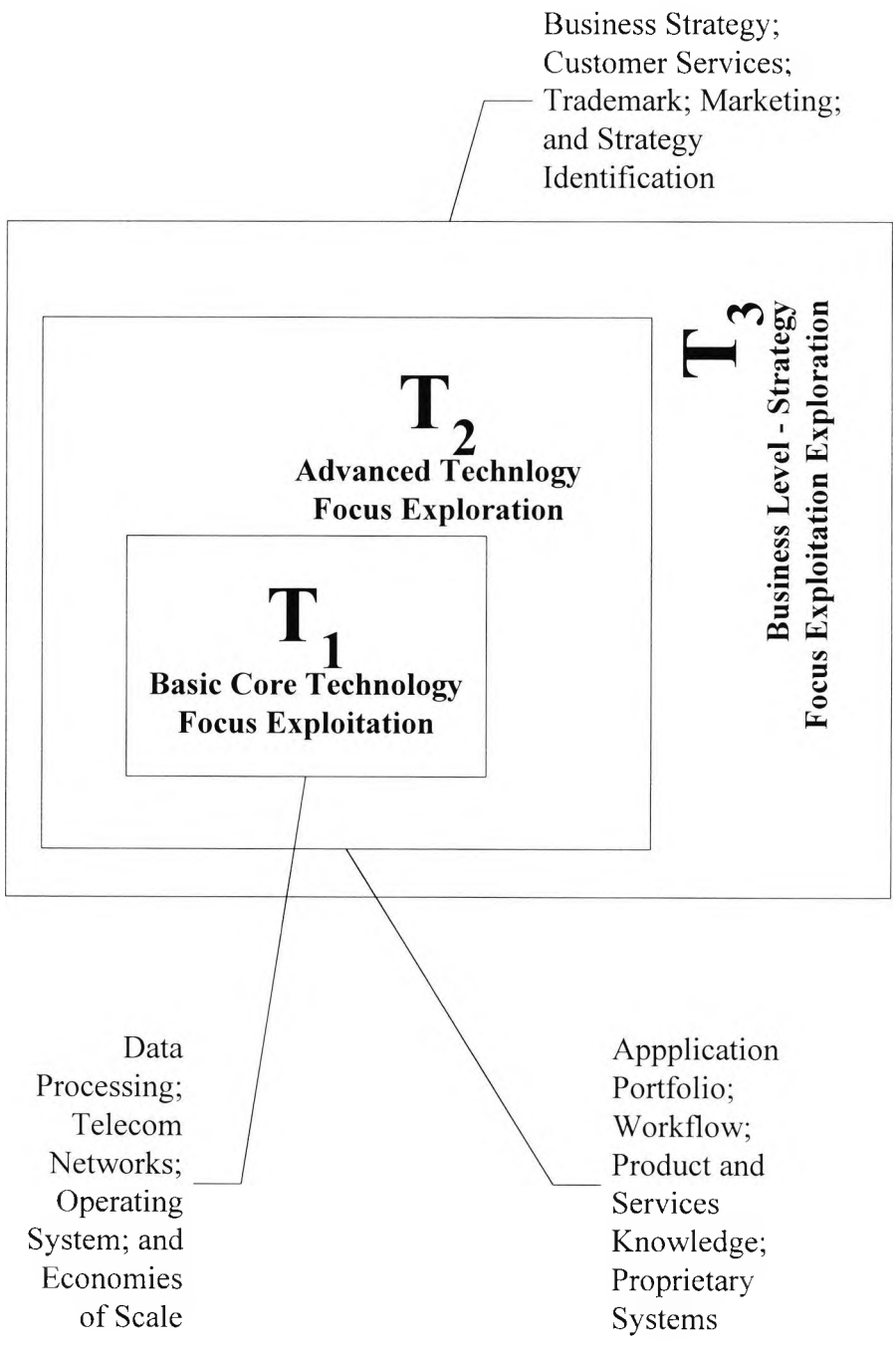

Figure 4 Organisational Operations and the Technological Infrastructure

Notwithstanding the fact that heavy investments in T_1 infrastructure provide no or little competitive advantage per se, such investment need to be undertaken by all financial

institutions since they are the **ticket to play** (Tyre and Orlikowski, 1993, 1994)[73]. Thus, T_1 does little to winnow the competition; all financial institutions have similar access to the support and help of systems vendors and solutions providers. However, there are some aspects of T_1 that can be critical for establishing a competitive advantage. For instance, knowing when to switch to a new T_1 infrastructure and likewise the selection of compatible hardware and software components from a number of suppliers. Yet, the impact of these decisions, as long as they are done right, is just to set the stage for the more important decisions in the areas of T_2 and T_3, respectively.

4.3.2.2 T_2 – The Advanced Technology Level

We define T_2 as the set of processing activities and corporate resources that get built onto the basic infrastructure platform of T_1. Correspondingly, T_2 elements can be referred to as the actual corporate workflow or organisational processes embedded in an organisation's products and services. T_2 is composed of two major parts; namely [1] automated application programmes or T_{2A} that run on T_1 infrastructure and [2] interactive processing operations or T_{2P} that correspond with the application programmes. For example, practically all backoffice operations still require a mixture of both automated T_{2A} and manual interactive T_{2P} processes.

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[73] Infrastructure investment decisions can be rational from an individual point of view, where such decisions are often viewed as a way to further reduce unit costs. However, on an aggregated level, such decisions may lead to increased industry capacity and eventually overcapacity as each competitor will try to built in more computing capacity than he had in the past and simultaneously accommodate for future growth (Baden-Fuller, 1990). Overcapacity can further be seen as a direct consequence of many banks' inability to measure the real profitability of individual products and services that have traditionally been a component of an integrated financial services package. Thus, the individual profitability of single products and services runs counter an accounting system that is based on integrated financial packages as opposed individual packets thereof. Interviews with Bank Cial AG, Accounting, Basle, 05/09/96; Oracle, Financial Services Division, New York, January 1997; Bank Sarasin & Co., Corporate Development, Basle, 09/17/95; Schroder, Corporate Finance, London, 09/26/95 and Information Technology, 09/27/95.

In the context of technology, competition among financial services providers and banks largely takes place within the confines of T_2. Consequently, the competition is in the application of technology – not the technology itself. Ideas and business systems, in an attempt to pre-empt the market for some time, are expressed through the T_2 infrastructure. However, according to our data, the majority of financial institutions have not been particularly successful with the exploitation or exploration of the technology infrastructure. We conjecture that this is partially the result of financial organisations' emphasis on supporting commodity products and services rather than added value applications and services (79 percent of respondents agree: T2, technology in finance; T7, value creation). But with commodities, even the most advanced and sophisticated technology will not make any competitive difference, which reveals the fundamental difficulty of T_2. Traditionally built in-house, most T_2 investments do not, in fact, result in any competitive advantage, precisely because there is nothing unique about the function, products or services provided by these associated T_2 investments. In other words, too many financial institutions have an undistinguished proprietary T_2 infrastructure in place that yields little if any competitive advantage. Accordingly, this situation has caused enormous problems, as T_2 has been extensively overbuilt (69 percent of respondents agree: T3, organisational design; T4, infrastructure). Over time, a number of financial services providers have added a myriad of details and complexities – in excess of that required by new products and services innovation – onto the existing T_2 infrastructure in an attempt to distinguish their financial services and products. However, outsiders and the majority of senior executives (87 percent of all senior executives interviewed agree: T7, value; T3, firm design; T4, infrastructure; T2) have typically little comprehension or appreciation for the degree of complexity built into T_2. As a direct consequence of all these proprietary T_2 activities that are many times dupli-

cated across the entire financial services industry, the organisation dependent skills and knowledge to run these sophisticated and complex T_2 systems are meticulous and expensive. In addition, the proprietary character and the knowledge to run one T_2 system does not provide the experience to run another organisation's T_2 system. Thus, knowledge and T_2 infrastructure management comprise tacit forms of knowledge rather than codified forms of knowledge and accordingly exhibit low potential for interorganisational exchange (Choi and Lee, 1996; Nonaka, 1991, 1994; Nonaka and Takeuchi, 1995). Ultimately, each financial services provider faces the question as to whether its T_2 infrastructure is unique enough to justify its costs. Nevertheless, the rise of interorganisational value networks, based on advanced ICT components, presents a potential to exploit and explore existing and new capabilities. Such a development would shift the focus from exploitation of T_1 and T_2 infrastructures to the profitable exploration of T_2 infrastructure and subsequently the development of new (unique) value added financial services and products. Although the focus of this research rests predominantly on an analysis of T_1 and T_2, the environment or T_3 in which the various forms of technologies are embedded plays a significant role in determining the scale and scope of future infrastructure investments. Accordingly, the next section briefly discusses key attributes of T_3 and the correlation between the three different levels of technological sophistication.

4.3.2.3 T_3 – The Strategic Level

In our framework, T_3 represents the actual business requirements. Accordingly, T_3 is not a specific technology per se but rather the set of business requirements that determine the technological requirements. There is a plethora of factors that contribute to a

successful business strategy; the sum of a financial institution's business requirements for technology is what constitutes T_3.

4.4 Summary, Discussion an Conclusion

In summary, the three levels of technological sophistication allow us to better understand what goes on inside a financial institution as it reinvests in more and different types of technology; both basic and advanced. Actions that make sense on one level may not make sense on another. As the overall level of systems intensiveness or automation grows, the cost of T_1 and T_{2A} grow, and in turn, increase the level of fixed costs. These underlying changes in economies of scope and scale are possible explanations for the financial organisations' continuing difficulty to make profits out of technology and technological infrastructure.

The pace and uncertainty of innovations in basic as well as advanced technologies makes it increasingly impossible for many senior executives to track potentially valuable technologies. Consequently, the majority of financial services providers has expressed their concern (89 percent of respondents agree: T1; T2; T3) about whether they are fully up to date in terms of available or existing technologies. Note, however, that the term "up to date" is rather ambiguous. Many financial organisations have expressed their concern about the level of technological sophistication in their organisation. Our data has indicated that "up to date" has rather different implications for different firms and thus requires different resources. Likewise concern is also being expressed about the relative competitive position of a financial organisation compared with both direct and indirect competitors (e.g., other banks and increasingly a number of virtual financial services providers such as E*Trade and Quote.com).

While some financial institutions have a reputation for technological leadership, other financial organisations pursue a more reactive technology strategy. Laggards in T_2 often have a difficult time; they may never be able to catch up with the leader once he has established a dominant market share (Steiner and Teixeira, 1990). Yet, attaining technological leadership in T_2 requires the ability to dynamically adapt to environmental change. It requires constant adaptation as the ratio of automated T_{2A} to interactive processing operations T_{2P} changes and as new technological features are added to existing solutions. Therefore, technological competitiveness within T_2 is a moving target. Functions and processes that have been automated for some time tend to become commodity packages in integrated software solutions.

Based on our interview and secondary data, we conjecture that technological leadership (an active technology strategy) within T_1 confers little if any competitive advantage all by itself. The T_1 profile should be driven by the technical requirements of T_2 and ultimately the business requirements of T_3. Accordingly, appropriate technology is the driving force behind companies that successfully operate various business lines and hence deploy various forms of technology. In the context of T_2, however, the use of sophisticated and unique advanced technologies often confers a competitive advantage, **if** the business and strategy requirements, as expressed in T_3, are unique and promise successful. In fact, many success stories in information and advanced technologies can be traced to early market entry with a new T_3 component such as processes, business ideas, products or services, backed up by appropriate T_2 and T_1 investments.

Having discussed the genuine role of technology within financial organisations, we now examine the way technology is affecting the distribution of financial services across time and space. Likewise, we investigate the implications of advanced ICT on the ability of financial institutions to segment the market. Finally, we provide an

indepth analysis of the role of technology in three distinct areas; namely, the distribution, globalisation (as a special type of distribution), and innovation of financial products and services.

4.5 Technology – Three Areas of Influence

4.5.1 Introduction

Since the first industrial revolution, social scientists have called attention to the central role played by technological advances in driving economic growth, in shaping the evolution of organisations, and in affecting intraorganisational, interorganisational and interpersonal relationships (Tushman and Nelson, 1990). Technology is developing at ever increasing rates and with ever widening influence (Schendel, 1995a,b). However, it is not the observation of ever increasing rates of change of technology that is new, or even that there is a widespread, increasing rate of diffusion of technology that is new (Benedikt, 1992; Gibson, 1984, 1993; Rheingold, 1991, 1992, 1994). What is different is the observation that technology is affecting a plethora of organisational procedures and processes (Tushman and Nelson, 1990). Likewise, technological change has more pervasive psychological and sociological impact than to simply improve equipment and machinery, or the way we communicate and entertain ourselves (e.g., Handy, 1995a, 1995b; Pickering and King, 1995; Orlikowski, Yates, Okamura and Fujimoto, 1995; Schendel, 1995a,b). In like manner, technology is streamlining the procedures and mechanisms by which we use our minds to create and manufacture products and services (Eriksson and Mattsson, 1996; Nobel, 1984; Pine, 1993; Pine, Victor and Boynton, 1993). Hence, it has forced use to adapt new routines and methods to manage our procedures and operations (Gibson, 1984, 1993; Schendel, 1995a,b). Simultaneously,

technology has a long tradition of defining new standards of efficiency and productivity at the very roots of management responsibility (e.g., Barnett, Greve and Park, 1994; Daft, Lengel and Trevino, 1987; Drucker, 1991; Eccles, 1991; Porter, 1985; Rumelt, 1974; Schendel, 1995a,b; Taylor, 1911).

Technology has further conciliated the access to remote stores of information and in turn facilitated knowledge management. The resulting information or knowledge revolution (Rayport and Sviokla, 1994; Rheingold, 1991) has been made possible by the advent of sophisticated ICTs that consolidate data, information and the algorithms required to process these repositories of information and knowledge. The innovations emerging from the amalgamation of knowledge and/or information and technology are **intangible** and hence fundamental distinctive from the tangible innovations we normally associated with products. It is the intangible innovations – often embedded in organisational procedures and/or processes – that are most important to organisations (Hall, 1992; Itami and Roehl, 1987; Schendel, 1995a,b). The intangible outcome of innovations made possible by technology is based on the juxtaposition of three contingencies. First, the notion of converting data into valuable information – based on advances in ICTs. Second, the identification and recognition of these critical intangible resources as potential sources of competitive advantage. Third, the conceptualisation, construction, and combination of new or existing organisational processes and procedures, to create competitive advantage out of rapidly gained and applied knowledge and information. In the context of the resource-based view of the firm (Penrose, 1959; Wernerfelt, 1984, 1995)[74], these conceptual developments led to a specification of managerial variables relevant to strengths and weaknesses and opportunities and threats.

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[74] For a more detailed discussion about the "resource based view of the firm" see, for example, Braney (1991, 1995); Black and Boal (1994); Collis (1991); Collis and Montgomery (1995); Conner (1991);

In summary, technology has long lost its virtual and invisible character; instead it has become an all-pervasive force that continues to shape connections across social, organisational, and environmental domains. Blurring and convergence – the tentacles of digital technology – have further demolished the barriers between distinct industries, technologies, and organisations (e.g., Bettis and Hitt, 1995; Choi and Hilton, 1995a).

4.5.2 Technology – Time and Space Expansion

The distribution of services across time and space is currently experiencing unprecedented attention; exemplified in the contemporary efforts towards globalisation by a large number of organisations. Indeed, as recently noted by Mathe and Dagi (1996), services have emerged as the fastest growing component of international trade. With reference to technology, this expansion has twofold implications. First, what is the contribution of technology per se in the globalisation process of services, and more specifically in the context of financial services? Second, how can technology in services – an important component for the provision of services per se – be successfully transferred or exported from the home country to a host country? Alternatively, how exportable is a technological solution originally developed for one environment with reference to local conditions (outside the domain of the home country)? We conjecture that the development of secure and reliable digital networks for the delivery of services and the co-ordination and support of global organisational procedures significantly influences the globalisation process. Therefore, apt strategic attention should be paid to the devel-

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Gilbert and Lorange (1994); Grant (1991); Hall (1992); Mahoney (1992, 1995); Mahoney and Pandin (1992); Markides and Williamson (1996); Peteraf (1993); and Ring Smith (1996a).

opment of interorganisational arrangements to facilitate the development of a technological infrastructure that supports the corporate globalisation process.

One of the major applications of ICT is to make organisational expansion across time and space profitable as well as feasible. It does so by consolidating, streamlining and organising support- and back office operations in beneficial ways, for both the organisation and its environment. Services operations, embedded in an organisational value network, can then be defined as those which provide value through cost-effective provision of information, desired psychological states or experiences or changes in the physical attributes of property. Preferably, these services should be made available without serious constraints of time and space. Customer contact can be used as an artificial demarcation line to distinguish organisational services that are performed in house and those that are provided at the interface between the organisation and its clientele. Thus, front-line operations focus on the interface between the provider of services and the customers, or service receivers. However, in an increasing number of services operations, predominantly in purely information oriented services sectors such as financial services, the advent of technology has allowed a large part of the front office to be automated[75]. Conversely, back office operations deal with the largely invisible in-house procedures and processes necessary to provide seamless customer services[76]. Many of these back-office operations are customised to support particular front office operations; irrespective of whether or not the front-end procedures themselves are customised and/or automated. Accordingly, back office technology deals with an organisation's hidden preparatory internal support functions; necessary to perform front line proce-

[75] Workshops with Oracle, Goldman Sachs and Lehman Brothers.
[76] Workshops with Oracle, SBC, and Lehman Brothers.

dures effectively. However, back office technology may well deliver secondary or unanticipated front-line benefits[77].

Along the traditional physical component of the value network, organisational expansion has induced firms to increase the number of delivery and support outlets. In financial services, for example, the branch network is more or less comprised of "clones" that tend to assume similar functions within a complete and globally dispersed delivery network system. Conversely, EC and VE platforms, the virtual components of a value network, make such distinctions difficult; if not impossible. Difficult, since an end-user has little possibility of identifying the true origin of services provision, other than the locale of consumption or the reception of services. Moreover, customers – independent of constraints of time and space – can tap into a network capable of providing services that are not confined by a single services provider. Correspondingly, expansion through pure cloning is neither necessarily efficient nor effective[78]. In response to market pressures and increasing competition, most multi-sited services organisations have sought to rationalise – or achieve economies of scale and scope – their corporate activities through the integration and reorganisation of back-office operations. In effect then such endeavours aim at establishing an intraorganisational mini value network.

This strategy facilitates not only the exploitation of potential economies of scale and frees front-line officers from maintenance and support functions, but also provides an effective and homogeneous internal services and support system. Moreover, it is often possible to move resource intensive or uncustomisable (non-automatable) operations

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[77] Goldman Sachs & Co. Bank Zurich, Switzerland and Raymond James Financials, St. Petersburg Florida, for example, deploy back office software system to provide a totally customised personal statement for each customer. The application of artificial intelligence to existing databases and content stored on client server systems provides mechanisms to achieve higher accuracy in database management operations (Cronk, 1993; Halfill, 1996; Reinhardt, 1993, 1994).

to areas with lower costs per operations (e.g., costs associated with human resources and real estate). This type of organisational structure includes hub and spoke systems, where multiple services outlets or front-offices or spokes are linked to a back-office or centralised hub that maintains responsibility for the connected spokes (Vinckier, 1994). Although the hub controls and provides a number of services and exerts control over basic service quality across the entire network, some clones may retain more autonomy than others may. On a corporate level, these systems provided the advantage of remaining sensible to local conditions and contingencies while simultaneously maintaining global or international presence (Kanter, 1995).

We conjecture that ICTs constitute one of the primary resources upon which a decentralised and fully integrated services system can thrive in a global economy. It enables an organisation to maintain permanent communication links among its different network nodes or locally dispersed services outlets. Simultaneously, an ICT based value network provides the basic interorganisational exchange platform for services and information.

Mathe and Dagi (1996), however, rightly point out that the assumption that technology will serve the same enabling functions locally and internationally does not hold under all circumstances. Unless T_3 technology is integrated coherently and synergistically into corporate strategy, it cannot be expected to lead to globally successful and efficient operations. In line with the findings of Mathe and Dagi (1996), we understand that **synchronisation between technology and corporate strategy** has to be achieved along three dimensions. First, a front-line technology must adhere and be compatible with the local conditions and contingencies; moreover, it must take into account cultural

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[78] Interview with SBC, Electronic Retail Banking, Basle, 05/10/96.

and regulatory criteria. The introduction and use of technology for specific geographic and cultural regions is, however, often problematic. Cultural differences and requirements related to such cultural variation might quickly overwhelm technological advantages, and turn potential savings into expenditure[79]. Second, technological integration must be embedded in a feasible corporate strategy aimed at the development of a corporate hub and spoke system linked by advanced ICTs. Third, it must assure that any technological solution is fully adaptable to local or spoke conditions while maintaining the automated data exchange and communication link with the centralised hub.

4.5.2.1 The Value of Technology in Financial Services

ICTs have dramatically changed the way financial institutions conduct their daily operations. The quality of the selection, implementation and integration of technology systems ultimately decides whether technology investments will yield a competitive advantage or turn out to become a corporate liability.

Accordingly, the introduction of technology in financial services – as a reoccurring and ongoing process – has not been effected without some reservations. The spending on technology across all surveyed financial institutions has averaged almost 19 percent of operations in 1996; with the maximum being 31 percent, while the minimum investments associated with technology was 9 percent of operations. Simultaneously, technological change takes place with unprecedented pace. Moreover, it is not only the observation of ever increasing rates of change that is new or the widespread increasing rate of technological diffusion. What is different is the observation that tech-

[79] Sources disguised upon request.

nology is affecting the very procedures and process, or T_3, of organisations (Schendel, 1995a,b).

Therefore, respondents unanimously are concerned about the growth of annual investments and expenditures associated with technology and the simultaneously rapidly decreasing period to render new technologies obsolete. However, three additional difficulties and uncertainties associated with the assessment of potentially beneficial new technology leads to the mixed appreciation of advanced T_1 and T_2 technology. First, it often requires considerable imagination and creativity to assess the potential value or payoff of a new technology – simply because it is new. Second, technology advances so rapidly that obsolescence is a serious problem and often tempts organisations to skip a few generations of technology. This is done in anticipation of reducing both uncertainties associated with future technological developments and eventual expenditures associated with making the wrong choice. Hence, organisations often adopt a wait and see approach. However, as recently pointed out by Johnson, Ott, Stephenson and Weberg (1995), although at first sight conservative, such an approach can be far more costly than anticipated. Additional costs are incurred as distribution channels multiply and the costs of complexity rise. This conservative wait and see approach further overlooks the potential cost-reduction and experience building programmes that are required to compete in a new environment. Organisations adopting a wait and see approach further deprive themselves from forming alliances and risk being lockout as the market consolidates[80].

[80] Interviews with SBC, Electronic Retail Banking, Basle, 22/12/95, 05/10/96; Union Bank of Switzerland (UBS), Corporate Communication, Zurich, 09/20/95; UBS, Singapore, personal correspondence, 1996; Schorders, Information Technology, London, 09/27/95; Citibank, Corporate Strategy and Information Technology, London, 09/27/95; and Oracle, Financial Services Division, New York, 1997.

Unless the solutions adopted fully support existing organisational structures and business processes, additional investments in technology are unlikely to be fully utilised. Although it has been demonstrated that it is possible to isolate common technological elements and factors, which appear to correlate with a successful provision of services internationally, technology per se is not a solution. Rather, it must be embedded in the organisational environment. Likewise, a technology must correspond and appropriate to the concurrent problem, integrate into the domain of feasible and possible strategic options and blend well against the existing organisational infrastructure.

The globalisation process of services providers begets yet another potential problem. Increasing levels of globalisation eventually lead to an increasingly heterogeneous customer base. We argue that the home country customer base tends to exhibit a relatively high level of homogeneous preferences (e.g., a function of regulation); that is a specific market is likely to have similar preferences across a number of variables. Increasing dispersion of organisational activities across a number of disparate markets leads henceforth to higher levels of customer segmentation. Thus, increasing levels of globalisation render, ceteris paribus, an originally relatively homogenous customer base increasingly heterogeneous. As recently noted by Kanter (1995), the aim of globalisation should be the provision of services adapted and tailored to local taste and contingencies. Moreover, as recently pointed out by McCormick and Rose (1994), changes in customer behaviour, regulation and new technology make market segmentation crucial for achieving customer satisfaction and profitability in banking and financial services. Accordingly, in the next section we analyse the relationship between technology and the organisation of markets.

4.5.2.2 Technology and Market Segment Organisation

The traditional market segmentation paradigm in banking and financial services is to focus on geographical areas, where the entire product and services range is offered (Channon, 1986, 1989, 1990). In the 1980s, however, a common trend in the banking and financial services sector led to an increasing focus on product and services related segments (Rose, 1987). An important assumption in market segmentation – comprising both a product and geographic focus – is that both customer relations and internal operations should be handled more effectively within the segments. This in turn would increase the market share and henceforth profitability of the financial services provider (Hagel et al., 1997; Kimball, 1990). This seems reasonable insofar as external offerings of financial services providers are often driven by equally diverse internal operations.

Market organisation or segmentation oriented organisational procedures, however, are not free from organisational co-ordination and control problems. More specifically, the problem of aligning organisation specific internal activities with contemporary market contingencies. Market organisation in the context of financial services faces yet another impediment: the rather homogeneous culture of the banking industry (Eriksson and Mattsson, 1996). A long period of stringent regulations and norms has created a relatively homogeneous culture within the banking industry, making it difficult to introduce new organisational practice. In addition, there may be strong normative influences in industries within a well-developed and sophisticated institutional framework (DiMaggio and Powell, 1983; Meyer and Rowan, 1977; North, 1981). Eriksson and Mattson (1996) put forward that banks and financial services providers operate under such a framework, which is generally referred to as the genuine culture of an industry (Choi, 1994; Choi and Kelemen, 1995; Trompenaars, 1993). We believe that this homogeneity is partially attributable to a long period of institutional conformity

originating from rules and regulations imposed on banks and a number of other financial institutions such as insurance and brokerage. For example, most countries have an extensive regulatory framework that governs the financial services sector; most prominently banking institutions (Dale, 1984; Hentsche and Smith, 1994; Mazumdar, 1996; Melitz and Borders, 1991; Spulber, 1989; and Vives, 1991). We conjecture that these rules, norms and regulations, and hence path dependency, have been a fundamental factor in the creation of a strong industry specific and professional culture (Choi and Kelemen, 1995; Liebowitz and Margolis, 1996b). Correspondingly, we **propose** that strong and coherent norms and a strong culture in the banking industry will make it relatively difficult to introduce genuinely new organisational practices. Thus, a financial services provider that has adapted predominantly one homogeneous culture may find it difficult if not impossible to change and create separate market segments and henceforth establish different subcultures during the globalisation process (Bate, 1984; Choi, 1994; Kono, 1994)[81].

4.5.2.2.1 Production and Segmentation of Banking Services

Much organisational research has been devoted to how production should be organised (Gerwin, 1981). The segmentation and/or market organisation idea in banking and financial services is in part derived from the technology driven differentiation between the levels of service standardisation (Berry and Thompson, 1982; Hagel et al. 1997;

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[81] Interviews with Goldman Sachs & Co. Bank, Zurich, Operations, 09/19/95, Corporate Information, 09/19/95; Goldman Sachs & Co. Investment Bank, London, 03/04/96; Citibank, Corporate Strategy and Information Technology, 09/27/95; SBC, Electronic Retail Banking, Basle, 22/12/95 and 05/10/96; Bank Cial AG, Basle, 1995, 1996; and Bank Sarasin & Co. Corporate Development, Basle, 09/17/95. For a more detailed discussion about the implications of culture on organisational activities see, for example, Campbell and Verbeke (1994); Choi and Kelemen (1995); Golder, Raman, Berger and Choi (1997); Hampden-Turner and Trompenaars (1994); Hatch (1993); Hofstede (1980); Philips (1994); Schein (1985); and Trompenaars (1993).

Kimball, 1990). Thus, highly standardised services and products – targeted at a relatively homogeneous customer base – require little customisation. Conversely, services with a low degree of standardisation are more complex and hence often require high levels of customisation to fit the requirements and preferences of a relatively heterogeneous population. According to Eriksson and Mattsson (1996), the magnitude to which production technologies vary, can be assessed by looking at the corporate activities and resources required to produce and distribute such financial services and products.

The highly standardised services are characterised by a high degree of automation and the individual steps in the workflow are expected to follow a rigidly structured sequence. The organisational resources, required to manufacture such services, are usually relatively easy to obtain and comprehend. Accordingly, they vary little within a customer segment. Thus, the codified knowledge and the information requirements, for the provision of standardised services, deviate little from common practice and established organisational routines. We assume, on the other hand, that the provision of unstandardised services generally requires professional attention. Henceforth, the overall potential for automation is relatively low when compared with highly standardised systems. Furthermore, financial services providers decree over considerable freedom as to when and how they perform unstandardised services. The organisational resources required to perform and manufacture unstandardised services are rather difficult to categorise. Moreover, future organisational requirements vary according to environmental contingencies and thus are difficult to predict in turbulent environments. The tacit forms of knowledge involved in the production and provision of unstandardised services are much more complicated, since they involve complex casual links between a number of intraorganisational, interorganisational and market constituents.

Conjecture 2: Market organisation or segmentation implies that different segments are handled by *partially* different production technologies.

Conjecture 3: Advanced information and communication technologies provide means to perform and execute *partially* different production technologies in centralised locales.

Conjecture 4: The differentiation of production technologies, and thus the provision of a heterogeneous portfolio of products and services, can be partially automated by deploying advanced technologies and open system exchange networks from a centralised location.

Conjecture 5: Financial institutions – providing a large array of heterogeneous services – exhibit fundamentally different patterns of information and technology requirements than organisations operating in less information intensive environments.

4.5.3 Distinct Areas of Technology in Banking

This section evaluates the important role played by technology in the areas of distribution, globalisation and innovation; areas that have received significant attention from financial institutions over the last decade. The importance that the respondents have attached to these three areas has prompted us to conduct an indepth analyse of these topics. The distribution of financial services is becoming more complex along a number of dimensions as many procedures of the distribution process have been allocated to the virtual domain of the organisational value network. Therefore, the concurrent structure of the branch network system is undergoing significant change; in part prompted by advanced ICTs. Accordingly, we discuss some of these changes and introduce a framework to outline the distribution options for financial institutions – scattered across the virtual as well as physical domain of the organisational value network. The use of technology to reshape the distribution network is not bound to constraints of time and space. As such, the issue of distribution is linked to the role of technology in

the globalisation process of financial institutions (where globalisation may be perceived as an extreme form of distribution). We outline three expansionary strategies and analyse how technology can be deployed to enhanced globalisation. Furthermore, the development and distribution of new financial products and services is often restraint by the existing infrastructure. Thus, we investigate how financial innovation is bound or facilitated by advanced technology.

4.5.3.1 Financial Services Distribution Networks

The current transformation in the distribution of financial- and especially retail banking services is driven by far reaching changes in consumer preferences, aggressive competitive moves by non-banks, and a need to reduce non-interest expenses to match the revenues available (James and Houston, 1996; Kimball and Gregor, 1995; Rajan, 1996). Hence, it does not come as a surprise that many banks are struggling to reconfigure their existing distribution networks. Because reconfiguration in most cases must resolve multiple strategic issues, a variety of approaches have been implemented or are currently under evaluation. Accordingly, our data[82] support the lack of consensus among the surveyed financial institutions as to the emergence of a single new distribution paradigm for banking and financial services[83].

In fact, the distribution of banking and financial services is becoming much more complex along a number of dimensions. In retail banking, for example, customer preferences, the distribution of products and services and the increasing number of non-banking competitors have caused large turmoil in a traditionally quiet industry segment.

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[82] Based on the 87 interviews conducted throughout the period of August 1995 to January 1997 and secondary material. See also Chapter **Research Methodology**.
[83] See also Chapter **Research Methodology**.

A decade ago retail banking had to be concerned with relatively few customer segments (driven primarily by age and income), and one or two distribution channels (direct and indirect), and a small number of relatively simple products and services (e.g., deposits and loans). Today, the number of potential customer segments has expanded greatly (e.g., age, income, distribution across time and space), as has the number of distribution channels (e.g., branches, electronic banking, ATMs, telephone, third party) and products such as deposits, loans, insurance, investment products, and advisory services.

In this section, we analyse recent and concurrent developments in the distribution of banking services and products, with special emphasis on retail banking, and attempt to identify some key trends based on our collected interview data. In particular, we focus on a number of responses from financial institutions to the competitive and economic forces confronting them in their decision to devise an effective and cost-efficient distribution network. First, we analyse structural changes of traditional branch based distribution strategies over the last five years. Second, we turn to non-branch based distribution networks and the modest trend among financial services providers to differentiate themselves in terms of deployed distribution network strategies. We then turn to the problems facing financial institutions in allocating resources between explorative and exploitative alternatives in modifying their distribution networks. Next, we propose a framework to analyse a financial services provider's distribution network strategy within the context of varying degrees of automation and network extension, respectively. Finally, we argue that many of the recent experiments are prone to fail, unless financial institutions can adapt to environmental changes more quickly than in the past.

4.5.3.1.1 Distribution Network Consolidation

The banking landscape has witnessed a slow, yet continuous decline in the number of institutions comprising the industry since the 1970s. In Switzerland, for example, the number of banks has decrease roughly 30 percent over the time period from 1970 to 1995[84]. However, this reduction does not exhibit the same patterns across all categories. Particularly hard hit were the regional savings and loans banks, whose number almost halved from 1990 to 1994. Many of them, along with one cantonal bank, were absorbed by the large three Universal Banks; resulting in higher concentration within the Swiss banking industry. At the other end of the spectrum, the global marketplace, banks and financial institutions are also joining forces to build truly global operations; further promoting the ongoing consolidation process[85]. Consequently, bank branch distribution systems are undergoing significant changes; not least characterised by increasing industry concentration and consolidation.

The move to larger communities of bank branch networks is in part driven by the opportunity they provide to leverage centrally driven expenditures such as systems, marketing, product and services development and overhead (Kimball and Gregor, 1995). By increasing the size of the branch network, constituent banks can spread such centrally driven expenditures over a larger customer base and thereby realise economies of scale[86]. While creating a larger physical distribution network is one important way to realise economies of scale, establishing more versatile networks is a viable alternative. The high fixed cost component of an individual branch, or on an aggregated basis the whole distribution network, makes distribution outlet profitability particularly sensitive

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[84] Gesellschaft zur Foerderung der schweizerischen Wirtschaft, Zahlenspiegel der Schweiz 1996 / 1997. Swiss National Bank Statistics; 1994, 1995, 1996.

[85] See, for example, *Business Week*, November 7, 1994; *Business Week*, February 6, 1995; *Business Week*, October 2, 1995; *Business Week*, March 6, 1995; and *Far Eastern Economic Review*, December 1, 1994.

[86] See, for example, *The Economist*, April 27, 1996; and *The Economist*, April 15, 1995.

to changes in revenues[87] (Kimball and Gregor, 1995). Therefore, larger branches are generally much more profitable than their smaller counterparts. Consequently, many banks have been aggressively rationalising their branch systems at the same time as they strive to increase the size or extension of the network[88]. This rationalisation usually consists of a variety of steps. First, the elimination of acquired branches, with the new customer base being assimilated into the already existing infrastructure where services overlap geographically with existing ones. Second, the substitution of lower cost specialised outlets for traditional branches (e.g., ATMs, kiosks systems and mini branches). Third, the closure of small and unspecialised distribution outlets, which exhibit little growth potential in the near future. This trend of simultaneous consolidation and rationalisation is further magnified by the fact that an increasing proportion of customers, especially young and well educated ones, prefer to do carry out their banking businesses via channels other than the traditional branches (Bednar, Reeves and Lawrence, 1995).

As computer hardware-, software- and telecommunications costs continue to decline, while the overall transaction volume increases, alternative exchange channels have become relatively more cost effective in processing transactions than the branch offices. Consequently, many banks have encouraged customers to use other non-traditional distribution channels[89]. For example, by introducing an account management fee for accounts managed via non-electronic means, or by offering higher interest rates on accounts managed exclusively via electronic means. In addition Swiss Bank Corporation (SBC) is subsidising computer and telecommunication infrastructure to make the transition from paper- to electronic based home banking more attractive.

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[87] Interviews with SBC, Electronic Retail Banking, Basle, 1995, 1996.

[88] Gesellschaft zur Foerderung der schweizerischen Wirtschaft, Zahlenspiegel der Schweiz 1996 / 1997. Swiss National Bank Statistics; 1994, 1995, 1996; *The Economist*, April 27, 1996; *The Economist*, April 15, 1995; *Financial Times*, October 28, 1996; *Financial Times*, October 26, 1995.

Aggressive or active channel management, the substitution of traditional branch based distribution systems with non-branch based distribution channels, can yield impressive short-term savings for financial institutions. In the long term, however, the picture is not so clear[90]. We surmise that in the long term, displacement of bank branches, although in absolute terms a desirable result is likely to accelerate the erosion of the branch network and thus increase the **average** unit cost of a network branch transaction. With transaction volumes being transplanted from the branch to alternative channels, the substantial fixed cost component of branch based networks must be spread over a continuously decreasing amount of traditional transactions; resulting in increased average costs per branch transaction.

> **Conjecture 6**: Unless active distribution channel management is accompanied with substantial restructuring of the traditional branch network – within the broader context of the corporate distribution strategy – the competitive situation of the traditional branch deteriorates further and eventually calls for further rationalisation.

Banks must further restructure the role and processes of the branch; away from routine transaction processing towards the provision of high value added activities (e.g., selling complex products and services, which carry a premium, and establishing and strengthening customer relationships). This indicates a shift from transaction based income to fee generated revenues[91] (James and Houston, 1995). This shift in focus will further require a reconceptualisation of the traditional accounting and measurement systems –

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[89] Interviews with SBC, Electronic Retail Banking, Basle, 1995, 1996; UBS, Corporate Communication, and Telecom, Communications, Zurich, 09/20/95 and personal correspondence, 1995 and 1996.

[90] Interviews with Citibank, Corporate Strategy and Information Technology, 09/27/95; SBC, Electronic Retail Banking, Basle, 22/12/95 and 05/10/96; Bank Cial AG, Basle, 1995, 1996; Bank Sarasin & Co., Corporate Development, Basle, 09/17/95; and Goldman Sachs & Co. Bank, Zurich, Operations, 09/19/95, Corporate Information, 09/19/95; Goldman Sachs & Co. Investment Bank, London, 03/04/96.

[91] Interviews with SBC, Audit, 09/17/95, workshop 10/17/95, and Internal Technology Audit 05/12/96; Strategic Planning, 1995, 1996; Citibank, Corporate Strategy and Technology, London, 09/27/95.

from the present system that emphasises current revenues and costs to one that takes into account the net present value of future activities (Kimball and Gregor, 1995) and fee generated income (James and Houston, 1995).

Although the majority of banking institutions devotes managerial attention and resources to the branch network, most banks pursue a harvest driven branch network strategy[92]. Although reconfiguring the branch network, to better match the dwindling revenue streams (of small and medium sized branches), is certainly needed, this strategy reflects more of a passive than a proactive approach. A relatively large number of surveyed financial institutions have acknowledged (67 percent of respondents: T1 – T4) the fundamental problem facing the bank branch distribution network: "... this network is a high cost distribution channel that appeals to a decreasing population of customers ..."[93]. While short-term gains from consolidation tend to disguise the erosion of the branch facility, banks are well advised to develop alternative distribution channels if they are to survive in the long run (67 percent of respondents agree: T1 – T7). With increasing cross-sectional competition from economic agents other than banks and financial services providers (e.g., Virgin, Microsoft, E*Trade, Quote.Com, a number of insurance companies and in building societies in England), such a strategy has become even more compelling than a few years ago[94].

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[92] Interviews with SBC, Electronic Retail Banking, 22/12/95 and 05/10/96; Oracle, Financial Services Division, New York, Jan., 1997. Personal correspondence with Microsoft, Online Banking Division, '96.

[93] Actual source disguised upon request. Additional interviews with SBC, Electronic Retail Banking, Basle, 22/12/95 and 05/10/96; Bank Cial AG, 1995, 1996; Bank Sarasin & Co. Corporate Development, Basle, 09/17/95; Schorders, Corporate Finance, London, 09/26/95, and Information Technology 09/27/95 have revealed the same opinion. Note however, that a number of private banks already operate an insignificant number of branches that constitute part of the organisations' distribution channels. The majority of private banks use part of their office space as an "in-house mini branch", instead of building dedicated remote branch facilities. Interviews with Bank Cial AG, Accounting and Operations, Basle, 12/21/95 and 05/09/96; Bank Sarasin & Co., Corporate Development, Basle, 09/17/95; and Goldman Sachs & Co. Bank, Zurich, Operations, 09/19/95, Corporate Information, 09/19/95; Goldman Sachs & Co. Investment Bank, London, 03/04/96.

[94] Interviews with SBC, Electronic Retail Banking, Basle, 22/12/95 and 05/10/96.

A note of caution, however, is in place. According to 90 percent of private banks, the large majority of Swiss private banks operate an insignificant number of branches for the sole purpose of distributing financial services and products. A growing number of private banks operate only a designated area (in-house mini branch) within their locales as an exclusive in-house interface for relationship based interactions, which makes traditional branch facilities largely obsolete[95].

4.5.3.1.2 Distribution Modes for Financial Services

While the increased size and reduced density of branch networks and the greater diversity in the types of outlets are highly visible, other not least important developments are likely to demonstrate similar important effects. These developments are mainly driven by the changes in consumer preferences for the consumption of financial services. Alternative distribution channels such as ATMs, PC-based home banking and telephone banking have gained significant inroad over the last two years[96]. A significant number of financial institutions (75 percent of respondents: T1; T5; T6; T7) no longer considers access to a large pool of diverse distribution channels as experimental, but rather as a necessity to build and maintain market share. Thus, financial institutions and especially retail banks have started to differentiate themselves, for the first time, through their distribution strategies.

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[95] Sources disguised upon request.

[96] Interviews with Oracle, Financial Services Division, New York, January 1997; SBC, Electronic Retail Banking, Basle, 22/12/95 and 05/10/96; Microsoft, personal correspondence, 1996; Citibank, Corporate Strategy and Information Technology, 09/27/95. *The Economist*, April 27, 1996; *The Economist*, April 15, 1995.

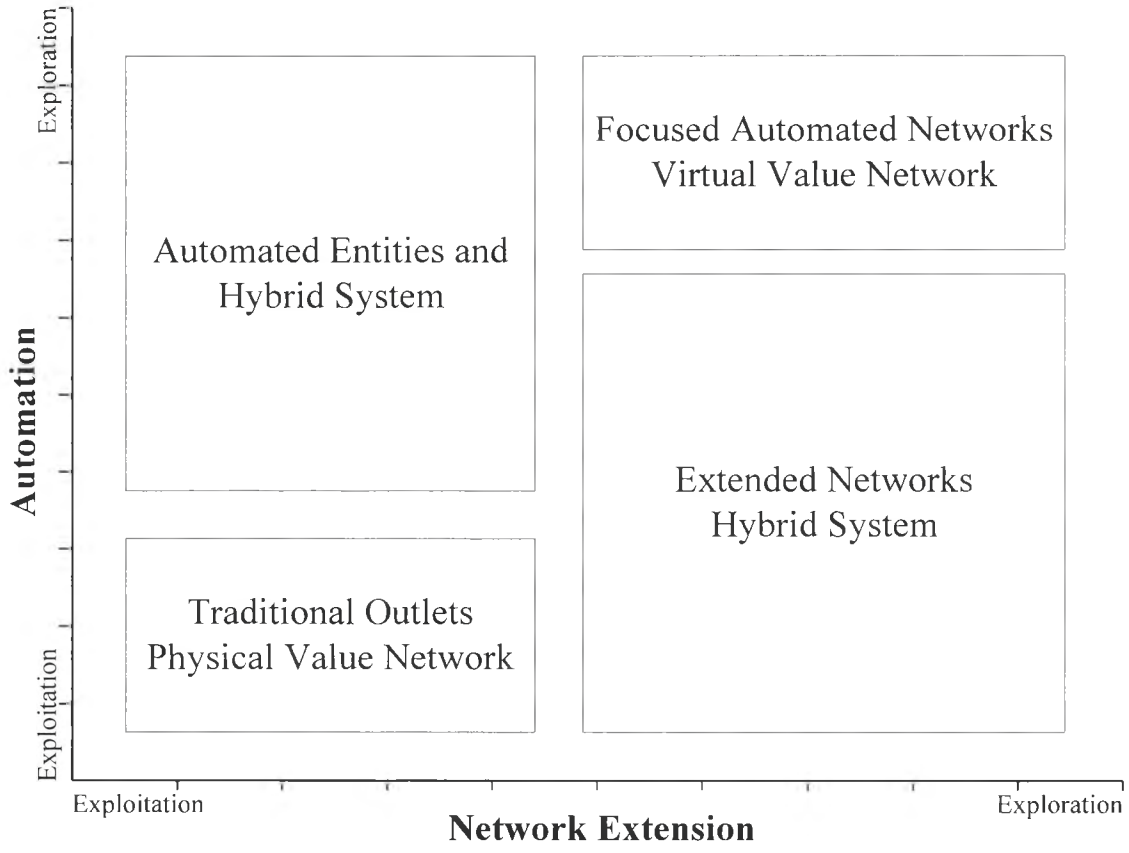

Figure 5 Organisational Adaptation – Network Extension and Automation

Although some form of differentiation has become increasingly important in the area of retail banking, we believe that this discussion can be further extended to serve as a partial framework for new forms of services and products distribution; namely in the context of EC. The distribution network can be distinguished along two dimensions as depicted in Figure 5. Namely the extent of the network (the ratio of advanced technology services interaction points to offsite distribution entities) and the level of automation (the ratio of advanced technology services interaction points to onsite distribution entities). Accordingly, Figure 5 may be divided into four distinct areas (boxes), reflecting the distribution strategies open to financial institutions in each sector. In the lower left box, **Traditional Outlets** reflect banking institutions that exhibit low ratios of both advanced technology services interaction point to on- and offsite distribution entities. For

example, ATMs are viewed only as an accommodation for the existing distribution network, comprised mainly of branch outlets. Accordingly, ATMs or other automated services interaction points do not play a significant role in their distribution strategy. **Automated Entities**, in the upper left rectangle, represent financial institutions (the majority being banks) that have high ratios of advanced technology services interaction points to onsite distribution entities, but low ratios for offsite distribution entities. For example, these banks and financial institutions use ATMs, phone banking and electronic home banking predominantly to replace onsite services interaction points and reduce costs rather than to increase the number of network distribution endpoints. The lower right box, **Extended Networks**, represents retail banks that have low ratios of advanced technology services interaction points to onsite distribution entities, but high ratios for offsite distribution entities. These retail banks, for instance, view ATMs as a way to extend their existing branch distribution networks and increase the number of service distribution endpoints, rather than as part of cost management[97]. **Focused Automated Networks**, constituting the upper right rectangle, exhibit high ratios of both advanced technology services interaction point to on- and offsite distribution entities. These (retail) banks have emphasised automated distribution as a key element of their (retail) banking strategy. Thus, they have made implicit (because of their focus on technology) or explicit decisions to focus predominantly on those customer segments that prefer automated distribution and hence require less direct interaction.

4.5.3.1.3 Adaptation Options: Automation versus Extension

[97] Note that customers using ATMs or bank branches are likely to constitute partially different segments with respect to their distribution channel preferences. However, banks may not have developed extended distribution networks to such a magnitude as dual distribution networks that appeal simultaneously to different, distribution-oriented customer segments.

According to Schumpeter (1934, 1942), a central concern of studies of adaptive processes is the relation between the exploration of new possibilities related to advances in technology (automation) and the exploitation of old certainties (network extension). Both exploration and exploitation are essential for organisations, but they compete for scarce resources[98]. Thus, organisations have to make explicit and implicit choices between the two alternatives. The explicit choices are found in calculated decisions about alternative financial investments and competitive strategies, organisational concepts and paradigms. The implicit choices are embedded in features of the organisational structure, forms, customs and the culture of institutions.

In this context then, the problem of balancing exploration and exploitation is exhibited in distinctions made between refinement of an existing technology and invention of a new one (Levinthal and March, 1981). Consequently, exploration of new alternatives reduces the speed with which skills at existing ones are improved; or vice versa that improvements in competencies at existing procedures make experimentation with others less attractive (Levitt and March, 1988). Thus, an appropriate balance is made particularly difficult by the fact that the same counterbalancing issues occur at various interdependent levels of a nested system – at the cultural level embedded in the organisational social system level, the organisational design level, and the individual level. Furthermore, understanding the choices and improving the balance between exploration and exploitation are complicated by the fact that the financial results from these two options vary not only with respect to their expected returns, but also with respect to their risks expressed in terms of variability, timing, and the distribution of capabilities within and beyond the organisational boundaries. This trade-off between exploitation and ex-

[98] The concept of scarce resource should be understood in the context of the "resource based view of the firm" (Penrose, 1958; Wernerfelt, 1984, 1995; Grant 1991; Mahoney, 1992, 1995; Mahoney and Pandian,

ploration can be observed in the way a large number of banks have approached the problem of establishing new distribution facilities.

Although the majority of financial institutions has indicated that they have committed substantial resources to the process of developing alternative distribution channels over the next two years, these changes are often also initiated in an attempt to reduce cost[99]. Too often, new distribution channels are added incrementally on top of the existing distribution channel portfolio[100]. Incremental changes often defeat the notion of developing a genuine new and segmented distribution network as long as amendments are seen as supplements to the existing distribution system rather than as an integrated part of a diversified distribution strategy. Therefore, we surmise that until financial institutions begin to segment their customers not only along the trajectories of income, age and status but also by taking into account their distribution or mode of access preferences, financial services providers' aspired ability to differentiate themselves through a distribution mix, as outlined in Figure 5, is rather limited. Moreover, they are unlikely to prevent more focused non-traditional competitors, who are not confronted by issues of cannibalisation or alternative resource allocation, from establishing a significant market presence in the financial services industry.

Exemplary, it is mainly the non-traditional competitors and not the banks that have come to realise the opportunities stemming from changing consumer preferences coupled with the simultaneous decline of advanced technology costs. Accordingly, with

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1992), where scarce resources include intangibles (reputation, trust) as well as the traditional neo-classical factors of production.

[99] The banks that have devoted considerable resources to developing new distribution networks are predominantly universal banks and institutions that operate across large geographic areas to serve an often heterogeneous population. On the other hand, the largely homogeneous population of private banks requires less commitment for the development of alternative distribution channels. In addition, a number of private banks have developed limited yet sufficient remote access services which require little resources.

[100] Interviews with Coopers & Lybrand, London, 05/03/96 and 06/17/96; Oracle, Financial Services Division, New York, January 1997; UBS, Telecom, Communications, Zurich, 09/20/95; and personal correspondence with Microsoft, 1996.

the development of specialised distribution networks combined with investments to establish critical mass, non-traditional competitors have transformed a past weakness into a competitive advantage. Given the declining competitive viability of branch distribution networks, banks and financial services providers are well advised to develop alternative distribution channels if they are to retain their current customer base. Traditional financial services providers face two basic options. First, a total transformation of the existing distribution system – an unrealistic solution given the high level of required resources, which is beyond the scope of many organisations. Second, we believe that co-operative solutions, where a number of financial services providers establish a value network, bear a potentially cost-effective solution to overcome the limitations of individual initiatives[101].

An extreme example of the focused automated network approach is a situation, where a financial services institution has no physical distribution facilities, but rather opts to provide all its services via VE systems – independent of time and space constraints. This business system corresponds largely to an Extranet embedded in an EC system or a VE platform[102].

4.5.3.2 Globalisation of Banking Services

The globalisation of capital markets has made it possible for users of capital to lower their funding costs by tapping into multiple markets, and for investors to earn higher

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[101] Examples include the joint development of the Swiss Electronic Exchange (SEE) by the largest five Swiss Banks and the regional Stock Exchanges; the operation of a worldwide computer based communications systems, founded by US and European banks in 1973, to rationalise international payment transfer by the Society for Worldwide Interbank Financial Telecommunication (SWIFT); and the Swiss Securities Clearing Corporation (SEGA), founded in 1970 as a collective securities depository for the Swiss banks.

returns by diversifying their holdings across many countries and currencies (e.g., Jaque and Hawawini, 199?; Ohmae, 1990, 1995a, 1995b; Shapiro, 1996; Stulz, 1995). Consequently, it has become much more important for investment and universal banks to offer customers (e.g., issuers and investors) products and services on a global basis. Indeed, those financial services providers without global capabilities and operations will find it difficult to offer tailored "solutions" to a multinational client's financial problems and requirements. As recently noted by Hunt (1995), solutions carry far higher margins than stand-alone products or services.

However, as financial institutions have endeavoured to establish global operations for more than a decade, they have come to realise that globalisation is a costly and complex process, which involves more than developing new products and services lines and opening new offices around the world. Moreover, at a time of structural change – with disintermediation rapidly spreading from commercial banking to investment banking – even the most complex products and services are quickly commoditised and digitised[103]. Markets have become more volatile over the past decade, while the same period has further witnessed a drastic increase in the level of competition; in part the result of deregulation and advances in ICTs[104].

Under these circumstances, globalisation can be achieved via a number of distinct strategic alternatives. Globalisation per se, however, is only part of the recent global restructuring of international financial services providers. In an attempt to provide services globally, the line between commercial, universal and investment banking is blurring and converging. Thus except for financial specialists or boutiques, some fi-

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[102] For a more detailed discussion about Extranets, see chapter **A Synthesis of Virtual Exchange**.

[103] "How Wall Street Can Securitize Anything – On the Frontier of Creative Finance". *Fortune*, April 28, 1997.

[104] Interviews with Lehman Brothers, London, 1996, 1997; Goldman Sachs & Co., Corporate Sales, London, 03/04/96.

nancial institutions with global ambitions also want to offer, and feel the need to provide, fully integrated product and services lines[105]. In terms of expanding its product and services line, a commercial bank faces the challenge of adding a multitude of financial products and services – ranging from underwriting to derivatives trading and asset and portfolio management – to its core lending business. Conversely, it is relatively easy for an investment bank to add credit products to its existing portfolio of financial products and services. At the same time, European universal banks, which offer both commercial and investment banking services, are striving to bring their products and services to the same high quality standard as their US counterparts[106].

> **Proposition 2**: We surmise that the unbundling of services has precipitated a rise in the importance of product and services expertise at the expense of the overall value of the generalist customer-firm relationship.

> **Proposition 3**: Effective globalisation strategies of financial services providers are likely to yield success in a limited range of core products and services, and not necessarily across the entire line of corporate offerings.

Accordingly, specific product-based relationships have often worked against the traditional scope of European universal banks. As recently noted by Hunt (1995), the main beneficiaries of the recent focus on knowledge and expertise and the ability to provide solutions across the entire spectrum of financial services, have been the US investment banks such as Goldman Sachs, Morgan Stanley and Merrill Lynch. These companies

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[105] Interviews with SBC, Basle, Strategic Planning, 1995, Corporate Information, 1995 – 1996, Corporate Information, Singapore and Hong Kong, 1997; UBS, Communications, Zurich, 09/20/95; Citibank, Strategy and Information Technology, 09/27/95; Goldman Sachs & Co. Bank, Zurich, Corporate Information, 09/19/95. Personal communication with SBC O'Conner, Chicago, 1996 – 1997.

[106] Interviews with SBC, Basle, Strategic Planning, 1995, Corporate Information, 1995 – 1996, Corporate Information, Singapore and Hong Kong, 1997; UBS, Corporate Communication, Zurich, 09/20/95; Citibank, Strategy and Information Technology, 09/27/95; CS Holding, London, 07/31/96; Goldman Sachs & Co. Bank, Zurich, Corporate Information, 09/19/95.

had successfully transferred their core competencies they had developed in the US market – in advisory, asset management and securities – to Europe and Asia.

The products, skills and infrastructures financial services providers require to become truly global players vary according to their size, strategies and cultures, and, ultimately, the scope of their operations. Specialist firms, for example, thrive globally with a relatively narrow span of products and services, distribution and services outlets and hence capital required. By contrast, universal financial services providers need a wider range of outlets and services to compete successfully on a global basis. Thus, commercial banks with global ambitions should establish a presence in all major locales, where their corporate clients do business. Unfortunately, the high investments required for establishing global operations leave room for only a few global, broad-based financial services providers. Presence in multiple financial markets, products and services entails high cost structures – particularly in ICT – that are beyond the scope of only but a few players (Hunt, 1995). Nevertheless, there are a number of globalisation strategies open for those willing to incur the high investments in infrastructure, knowledge and eventually the development of locale relationships.

4.5.3.2.1 Globalisation Strategies

Multiple products and services across a large number of potential markets, combined with the rapid pace of change, furnish a rich array of potential ways to compete. Therefore, the objective must be to define a role that can be defended against the forces that undermine profitability and the globalisation strategy per se.

Expansion	Organic Growth	Mergers & Acquisition
Geographic	Initial home country focus is being extended as major clients pursue business in a number of remote locales – EC systems extend the reach of corporate activities.	Acquisition of desirable core capabilities in remote locales to quickly achieve critical mass and needed expertise – EC systems provide the foundation to extend the non-physical reach of corporate operations.
Content	Expansion in adjacent areas of existing products and/or services; EC systems provide an alternative distribution vehicle for existing content portfolios.	Acquisition of knowledge and expertise in adjacent or portfolio complementary areas – increasingly, expertise is also being sought in non-financial areas such as information and communication technology.
Customer	Expansion in conjunction with content diversification.	Active enlargement of the existing customer base; e.g., sell products to new customers via mergers and acquisitions (active customer integration).

Table 4 Globalisation Strategies for Financial Services Providers

While many options exist, including combinations of different expansion modes for different products and markets, a quick review of three basic options – as illustrated in Table 4 – will illustrate the point. Note, however, that all three strategic expansion options can be achieved via either "organic growth" or interorganisational collaboration – with the extreme case being an acquisition – or any combination thereof.

First, a geographic focus is centred on the provision of a broad range of products and services within a specific geographic area. For example, a European universal bank would refrain from competing globally with a US investment bank in global equity offerings. Conversely, it would offer origination, trading, and advisory services to European clients where deep local market knowledge and relationships are crucial. Second, specialisation along the dimension of product and services content may also grant financial services providers sufficient distinctiveness to protect their profit margins. Such an approach to globalisation might involve a complete reformulation of existing products and/or services or the creation of new ones. We believe that this approach, as a re-

sult of the recent technological advances in ICT, represents significant potential for effective globalisation strategies along the content trajectory. For example, the convergence of sophisticated and complex derivatives, index products, insurance and reinsurance products could provide the nucleus of a genuinely new risk management package, made available in real-time via interorganisational digital value networks. Third, customer group focus is expected to yield attractive returns to financial services providers that provide tailored content to specific customer segments. For example, venture capitalism for start-up companies in Continental Europe, the provision of junk bonds to finance risky undertakings, and emerging forms of EC systems, all provide the opportunity to focus on limited customer segments with distinct business requirements.

Successful implementation of any of these strategies will be challenging and risky. Organic growth may not generate the critical mass quickly enough, while culture and personalities in mergers and acquisitions are notoriously difficult to manage in financial services, where individual talent counts for so much[107]. The number of possible options leads one to conclude that there is no single best way of building or organising global banking institutions. In the early days of globalisation, institutions tended to be run on geographic lines, with regional managers responsible for most aspects of the business[108]. Such an approach made sense at a time when financial services providers sought to establish them in the major financial centres. Nevertheless, there were a number of disadvantages associated with a geographic expansion strategy, namely the costly

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[107] Issues related to organisational culture are beyond the scope of this research, however a more detailed discussion about organisational culture is provided in Bate (1994); Bikhachandani, Hirschleifer and Welch (1992); Boisot (1995); Campbell and Verbeke (1994); Choi (1994); Choi and Kelemen (1995); Fedor and Werther (1995); Nahavandi and Malekzadeh (1988); and Trompenaars (1993). Likewise, the issue of interorganisational collaboration is beyond the scope of this work. However, a sound discussion is provided in the works of Bleeke and Ernst (1991, 1993, 1995); Borys and Jemison (1989); Bronder and Pritzl (1992); Garcia-Canal (1996); Gomes-Casseres (1993a, 1993b, 1994); Gulati (1993, 1995a, 1995b); Hamel, Doz and Prahalad (1989); Lorange (1996); Mohr and Spekman (1994); Ohmae (1989); Osborn and Allio (1990); and Ring Smith and Van de Ven (1992, 1994).

duplication of resources, logistical difficulties, lack of adequate corporate risk procedures and the low diffusion of skills throughout a globally scattered organisation. By the late 1980s some of the US investment banks began to aggressively shift their international operations from geography towards an emphasis of content or product and services lines. In 1993, CS First Boston, as part of the CS Holding, has shifted from a geographic to a functional structure under the banner of "one firm, one name, one mission." Nevertheless, the transition has not produced the expected returns – rather it spawned a highly creative but unruly institution beset by big cyclical income swings. As a consequence, CS Fist Boston has not been able to show comparable pre-transition results. Today, the investment bank is run – largely along product lines – out of New York, although it is more closely tied to Zurich than before, the headquarters of the Credit Suisse Holding[109].

The fact is that no single approach provides all the answers. The financial institutions that embraced functionalism have on average been better able to assess the profitability of each product and services line and accordingly devise distinctive high value added offerings. On the other hand, a pure product orientation tends to limit intraorganisational communication processes across distinct product and services lines. Likewise, a pure product orientation tends to impede successful corporate cross-selling activities that require high information exchange among product and services lines (*Institutional Investor*, 1995). In addition, a pure product orientation tends to foster potentially damaging competitive forces between the various product and services groups of a financial organisation[110].

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[108] *Institutional Investor* (1995); interviews with Citibank Corporate Strategy and IT, London, 09/27/95; personal correspondence with Coop Bank GZB, Relationship Banking, Basle, 1995 – 1996

[109] Interview with CS Holding and Credit Suisse, Economic Research, London and Basle, 07/31/96, and personal correspondence 1995 – 1996.

[110] Sources disguised upon request.

In summary, existing and aspired organisational structures are unlikely to be the sole driver in the corporate globalisation process of financial services organisations. Although flexible structures and operations are preconditions for success in an environment characterised by rapid change, a number of financial services providers believes that fair compensation and performance ethics are of equal importance for a successful globalisation strategy[111].

The recent proliferation of digital ICTs, embedded in VE systems, provides an alternative platform to the contemporary corporate globalisation and expansion efforts. A globally available EC system provides a viable alternative to traditional forms of physical corporate expansion. In addition, EC systems and VE platforms are not subject to the traditional constraints of time and space in the distribution and dissemination of information, services and products. However, further research is required in a number of areas to assess the benefits of deploying EC systems as surrogates for physical presence. More specifically, further research is required to assess the non-monetary value associated with customer confidence in advanced technology as compared to traditional face to face interactions. EC systems that provide VE platforms are often still in experimental stages or provide little incentives over traditional exchange platforms. Nevertheless, the structural contingencies of these VE systems are of paramount importance for financial services institutions planning to provide their services and products on VE platforms embedded in EC systems. If these services are to be provided via proprietary information network systems, **total** costs need to be contrasted against traditional globalisation procedures. A considerable risk of being global, is the lack of market volume to support the established infrastructure; likewise, in a world of rapid commoditisation,

it is harder to maintain sustainable competitive advantages. Furthermore, if the infrastructure is based on public networks such as the Internet, security, reliability and the impact of these contingencies on the customer trust relationship need to be balanced against the lower expected setup costs of these services.

4.5.3.3 Innovation in Financial Services[112]

As recently noted by Drew (1995), the development of new financial products and services is important for the growth and the survival of financial institutions. The recent literature on product and services innovation in financial services shows that success and failure is influenced by factors similar to those encountered in industrial production or manufacturing (e.g., Cooper and de Brentani, 1991; Currie, 1995; Deakin and Goddard, 1994a,b; Griffin and Page, 1993; Meyer and Zack, 1996). Differences may arise though because financial products are services and thus largely intangible (e.g., Bharadwaj, Varadarajan and Fahy, 1993; Golder, Choi and Kim, 1997). Likewise, they may be complex and their production and provision may rely extensively on ICTs (Drew, 1995; Golder, Choi and Kim, 1997). Stalk and Hout (1990) further point out that the speed to market is becoming critical in securing competitive advantages for financial institutions and their products and services just as time is a crucial factor for manufacturing enterprises. Pressure is further exacerbated from the pace of innovation in advanced ICTs per se, rapid changes in industry regulation and fast changing customer preferences and requirements (Bettis and Hitt, 1995; Prahalad and Hamel, 1994). On the other hand, reasons for decreased time to market for new products and the development of new services include the need to retain existing customers (and support

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[111] Sources disguised upon request.

their existing infrastructure), meet competitive market pressures (price competition and amortisation of existing technology) and cater to customer requirements (the resistance to adapt to new products and services). However, few senior managers believe that major increases in market share or revenue would result as a consequence of faster product and services innovation, since most businesses and core products and services have reached the mature stage of their life cycle[113]. However, respondents felt that firm reputation, image and customer loyalty could be enhanced and intensified by accelerated innovations and thus determine the competitive position of a firm[114].

Therefore, innovation and development and the associated requirements for advanced ICT infrastructure investments are frequently perceived as the ubiquitous ticket to play[115]. Most respondents felt that they had little choice but to accelerate the development of new products and services, since customers were demanding faster responsiveness while they had simultaneous access to alternative supplier and distribution sources. At the same time, the ease of copying existing digital information and technology based financial services and the entry of new competitors have significantly increased competitive pressures in the financial services industry[116]. Consequently,

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[112] The data and content of this section are largely based on case studies of SBC and Bank Sarasin & Co.

[113] Interviews with SBC, Electronic Retail Banking, 05/10/96; SBC, Technology Audit, 05/12/95; Bank Sarasin, Technology, 09/15/95 and Corporate Development 09/17/95. The following additional interviews have confirmed the data of the two case studies; Citibank, Corporate Strategy and Information Technology, London, 09/27/95; Robert Fleming, Strategy and Operations, London, 09/25/95; Schroder, Corporate Finance, London, 09/26/95 and Information Technology, 09/27/95.

[114] Interviews with Bank Sarasin & Co., Corporate Development, Basle, 09/17/95 and 09/15/95; SBC, Strategic Planning, Basle and London, 1995, and Electronic Retail Banking, Basle, 22/12/95. These findings and results also correspond with the results of Lawler (1992).

[115] Interviews with SBC Warburg, Corporate Development, London, 09/29/95; Schroder, Information Technology, London, 09/27/95; and Robert Fleming, Strategy and Operations, London, 09/25/95; SBC, Electronic Retail Banking, 05/10/96; Bank Cial, Accounting and MIS, 09/14/95; Bank Sarasin & Co. Technology, 09/15/95 and Corporate Development, 09/17/95; Goldman Sachs & Co. Bank, Operations and Corporate Development, 09/19/95 and 05/05/96.

[116] The term **digital** information and technology **based** financial products and **services** (digital products) is referred to products and services that are being created, distributed and disseminated via digital technology. Examples are cash management systems, back office operations (e.g., settlement), and the design and application of derivatives. Note that the SEE can be perceived as a digital environment, which facilitates the exchange of financial products.

banking institutions face a dilemma between rolling out beta versions of their digital products and services in order to reduce time to market. Alternatively, they develop state of the art digital and information based products only to realise at a later stage that a competitor has already successfully launched the same product or service.

Adoption of advanced technology, new work styles and new organisational forms are assumed to be closely related and mutually reinforcing in the process of innovation and the development of new enhanced services and products (Drew, 1995). Accelerated new product and services development can then contribute to improvements in organisational performance in a number of ways, including enhanced profits, larger market share, reduced time to market, image and reputation (Griffin and Page, 1993). The nature of new product and/or services development is determined, for example, by the degree of risk, firm size, complexity, novelty, technological infrastructure required, and the amount of specialist knowledge required[117].

In financial services, success further hinges on the amount of intermediary involvement (Golder, Choi and Kim, 1997). The relative change in the distribution of individual products and services versus bundles of products and services further alters the speed and scope of developments. Thus, the decision to sell products individually or in bundles, the packaging of individual services and products in one product, may further shape the design of the new offerings. For example, a financial institution may provide new and enhanced distribution facilities based on an EC system; although the basic products and services being distributed and disseminated may remain relatively unchanged. Hence, in the financial services industry, the organisational ability to over-

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[117] Interviews with SBC, Electronic Retail Banking, 05/10/96; Bank Cial, Accounting and MIS, 09/14/95; Bank Sarasin & Co. Technology, 09/15/95 and Corporate Development, 09/17/95; Robert Fleming, Strategy and Operations, London, 09/25/95; Schroder, Corporate Finance, London, 09/26/95 and Information Technology, 09/27/95.

come barriers to product and services innovation plays a significant role for the competitive market position of a financial organisation.

Type	Characteristics
Vision	The inability of an organisation to [1] decipher its environment and/or [2] the inability to initiate strategic alignment processes between its business capabilities and environmental requirements.
Costs	Innovation of products and services bear high costs in a highly competitive environment, where payoffs are uncertain and life cycles constantly decreasing.
Inflexibility	The lack of organisational flexibility impairs corporate mobility and thus the ability to react quickly to market developments. Deeply rooted corporate culture may be a further rigidity to change and thus impair a firm's capacity to navigate successfully in turbulent and dynamic environments.
Support	Lack of top management support creates unproductive yet highly sophisticated political environments; with nobody ultimately being responsible for corporate strategy.

Table 5 Barriers to Product and Services Innovation in Financial Services

Table 5 above illustrates four major barriers to product and services innovation. Furthermore, the challenges and time required to design new products and services will further differ significantly according to the level of specialisation and the genuine operations of a specific financial sector[118]. In derivatives trading, for example, new product cycles maybe measured in days and development time in hours[119]. Conversely, retail banking innovations may require large-scale investments, in new information and communication systems, allocated over a number of years. Independent of the type of anticipated financial innovation, top-level support may be inevitable for more rapid and ultimately successful product and services innovation[120]. In such a rapidly changing en-

[118] Data based on interviews with Bank Sarasin & Co. Technology, 09/15/95 and Corporate Development, 09/17/95; SBC, Electronic Retail Banking, 05/10/96; and personal communication with SBC O' Conner & Associates, Chicago, 1996 – 1997.

[119] Personal communication with SBC O' Conner & Associates, Chicago, 1996 – 1997.

[120] Note, that top level support for all kinds of innovation and new products and services development has been mentioned by a majority of financial services providers. Interviews with SBC, Electronic Retail

vironment, traditional corporate cultures and value systems have frequently been mentioned as potential barriers to reduce development-time and time to market for new products and services[121]. For example, on the business side, marketing and account managers often had great difficulties understanding new types of derivative products and the financial engineering performed by a new breed of rocket scientists. On the other hand, information and communication redesign projects experienced significant delays because of the enormous inheritance of the mainframe legacy systems.

Accordingly, CEOs and CIOs can have a powerful influence, not only by making corporate funds available for new projects, but also by encouraging rapid innovation and installing an apt corporate reward system that supports innovation. Novel and rapid product and services development may also require new organisational frameworks for project selection and approval and the integration with the existing environment and corporate infrastructure. Hence, support from senior executives may emphasise a strategic or systemic approach, considering the overall long-term direction and priorities of an organisation, rather than a focus on short-term financial results. The example of Bank XYZ[122], in Appendix 5, illustrates how new technology, process redesign, and restructuring can interact to decrease the time to market of new product and services developments in the larger context of corporate adaptation.

Banking, 05/10/96; Bank Cial, Accounting and MIS, 09/14/95; Bank Sarasin & Co. Technology, 09/15/95 and Corporate Development, 09/17/95; Goldman Sachs & Co. Bank, Operations and Corporate Development, 09/19/95 and 05/05/96; Robert Fleming, Strategy and Operations, 09/25/95; UBS, Corporate Communication, 09/20/95.

[121] Sources disguised upon request.

[122] Name disguised upon request.

4.6 Summary – Structures of Advanced Technology

We have reviewed the literature on the use technology in organisations. We introduced the concept of disaggregation to distinguish and analyse the various technology components of an organisation. We have analysed three levels of technological sophistication to investigate their potential for exploitation and exploration, respectively. The first level T_1 is generic and comprises basic technology elements that provide little competitive advantage per se. However, such investments need to be incurred as they represent the ubiquitous ticket to play. The second level T_2 comprises the advanced technology components of an organisation, which include proprietary systems, workflow and the application portfolio. While the technology related to T_1 lends itself to the exploitation of existing capabilities, the knowledge and expertise associated with T_2 are likely to provide the basis for the exploration of advanced technology and organisational capabilities. Thus, the competition is in the application of T_2 technology – not the technology itself. However, our data has indicated that most T_2 investments convey little competitive advantage as too many financial institutions have an undistinguished proprietary T_2 infrastructure in place. The third level T_3, the strategic level, represents the actual business requirements. Accordingly, T_3 is not a specific technology but rather the set of business requirements that determines the technological requirements of T_1 and T_2, respectively. Thus, the T_1 profile should be driven by the technological requirements of T_2 and ultimately the business requirements of T_3. Accordingly, appropriate technology is the driving force behind companies that successfully operate various business lines and hence deploy various forms of technology simultaneously.

In the second part of this chapter we have analysed the way technology is affecting the distribution of financial services across time and space. We conjectured that advanced technology constitutes one of the primary resources upon which decentralised

and yet fully integrated information services can thrive in a global economy. It enables an organisation to maintain communication links among its different network nodes. Simultaneously, the organisational value network may provide the basic virtual interorganisational exchange platform. We proposed that VE systems may benefit from advanced technology as a means to perform and execute different production technologies in centralised locations and hence achieve high levels of market segmentation or customisation of services and products.

In the following chapter we provide a detailed account of the exploitative use of advanced technology and organisational capabilities in the context of four value network constituting elements: retail banking, capital markets, infrastructure, and knowledge – all embedded in a dynamically changing global environment. Accordingly, the effects of technology on globalisation will be analysed separately.

5 Exploitation – Results and Conjectures

5.1 Introduction[123]

Since the early 1980s, advanced technologies have been instrumental in the development of new financial products and services and the delivery thereof. It was, for example, largely the widespread use of computers and ubiquity of computing power that led to the development of the fast growing and profitable derivatives markets. Without abundant computing power financial services organisations would also not have been able to develop such delivery mechanisms as basic forms of electronic banking, automated teller machines (ATMs), and screen trading. Some of the changes in market structure and product positioning fostered by technology have been immensely profitable for the industry, others have stripped away both market imperfections and the highly profitable market niches of some other players.

The focus of this discussion rests primarily on aspects of advanced technologies in the context of the financial services value network. Four value network aspects are being discussed below with respect to advanced information and communications technologies. These four organisational value network-constituting elements, as depicted in Figure 6, are retail banking, capital markets, infrastructure, and knowledge. Note that these elements are embedded in a dynamically changing environment as indicated by the term globalisation. A number of authors, however, consider globalisation as an important variable in its own right[124]. Likewise, 90 percent of surveyed financial institu-

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[123] Note that all numerical data provided are being given as averages across all surveyed financial institutions. All interviewees have expressed concern as far as the disclosure of competitive strategic information is concerned. A compromise has been found in averaging confidential information across all participating institutions in order to withhold firm specific data.

[124] See, for example, Aharoni (1993); Baden-Fuller and Stopford (1991); Calas (1994); Campbell and Verbeke (1994); and Yoshino and Rangan (1995).

tions have indicated that the development of sophisticated distribution strategies hinges upon an organisation's aspiration and scope to provide its services and products globally (T1; T3 – T7). Thus, globalisation marks the fifth variable in the following discussion.

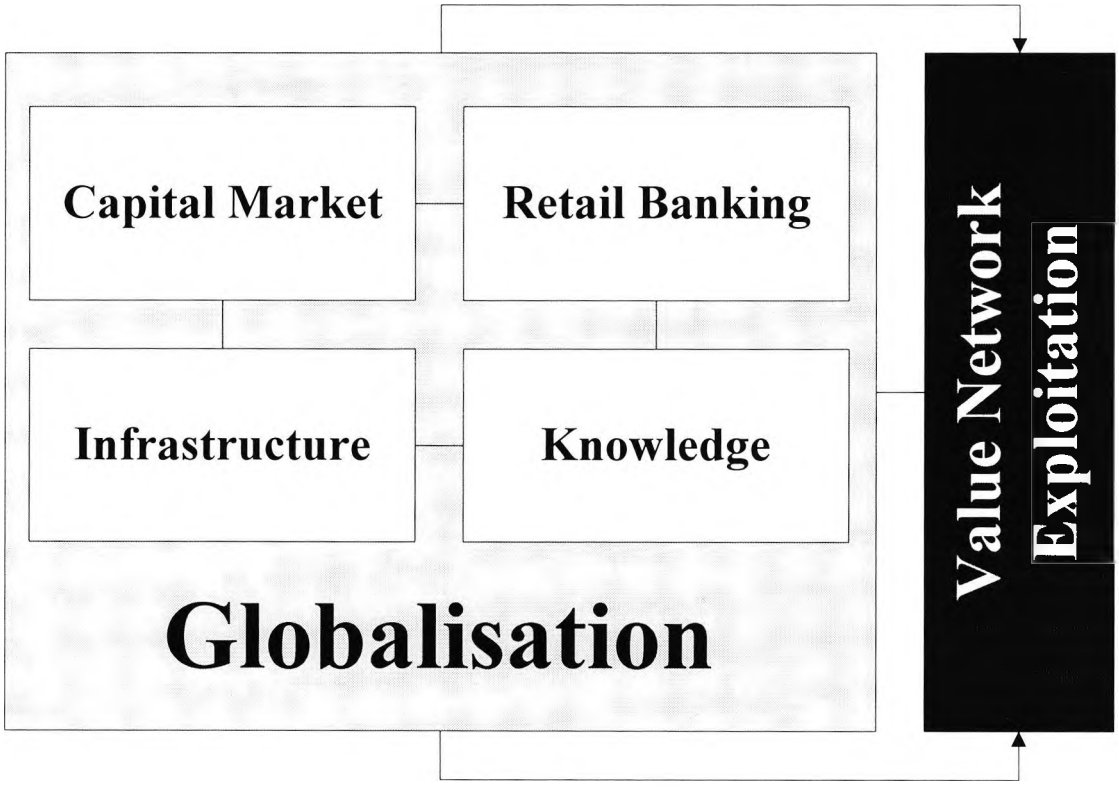

Figure 6 Results and Conjectures – Advanced Technology and Value Networks

The analysis of the four aspect of the financial value network – embedded in a dynamically changing environment (the fifth variable), as illustrated in Figure 6, have been selected on the basis of aggregated frequencies[125]. Additional elements, although less im-

[125] Aggregated frequencies correspond to the accumulated number of times a topic has been referred to as significant by the interviewees.

portant on an aggregated basis, have been virtual and EC systems (discussed in the pervious sections) and the paradigm of outsourcing (subject to further research)[126]. The value contribution and scope of each of these five elements, within the overall value network, is dispersed over the physical marketplace and virtual marketspace alike.

The emergence of this financial value network, however, needs to been seen in a broader context, that is the rise of value networks and EC platforms in general. Consequently, the eventual transition towards a virtual value network is embedded in the broader discussion of the marketplace to marketspace transition (Armstong and Hagel III, 1995, 1996; Benjamin and Wigand, 1995; Burke, 1996; Castells, 1996; Chesbrough and Teece, 1996; Davidow and Malone, 1992; Handy, 1995b; Rayport and Sviokla, 1994, 1995; Rheingold, 1992, 1994; Upton and McAfee, 1996). Therefore, we conceive the financial services value network to comprise value contributing elements from both the physical marketplace as well as those from the virtual marketspace. The results and conjectures, as derived from the interview data, secondary resources and personal observations are structured along the five major aspects of the financial service value network.

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[126] Outsourcing is strongly linked to the outsourcing of technology functions (Alexander and Young, 1996; Cheon, Grover and Teng, 1995; Choi and Willcocks, 1995; Clark, Zmund and McCray, 1995; Cross, 1995; De Looff, 1995; Drtina, 1994; Duncan, 1995; Earl, 1996; Elfring and Baven, 1994; Jennings, 1996; Jurison, 1996; Lacity and Hirschheim, 1993, 1995; McLellan and Beamish, 1994; and Quinn and Hilmer, 1994). However, there are a number of issues that are not primarily aspects of technology. Handy (1995a,b) and Hendry (1995) have recently pointed out that hidden costs of outsourcing surface over time in areas such interorganisational trust and culture clashes. Moreover, we conjecture that the relevant outsourcing question should rather be "what cannot be outsourced" instead of the usual approach "what can be outsourced." Thus, we think that outsourcing should be analysed in its own right rather than in the context of advanced technology – although aspects of basic technology can be found in almost all corporate activities.

5.2 Results and Conjectures Retail Banking

Although the subject of analysis of this study has primarily been a bank or similar provider of financial services, the term financial services institutions here includes information services provider such as, information networks, and data processing organisations. The transition from traditional forms of retail banking to value networks is driven by a host of factors. For example, customer demand for a full range of financial service; increased competition from non-banks; disintermediation of retail banking; and the combined effects of mergers and acquisitions; and finally the effects of deregulation in Europe and the US[127].

Most of the value networks involve forms of either intraorganisational or interorganisational collaboration, each focused on one of the key financial services competencies (e.g. transaction processing, asset management, customer services, network management). Value networks further provide banks with the opportunity to take leadership roles in a trend that is expected to reshape the competitive financial services landscape. This trend is significantly driven by the possibilities of advanced ICTs as exemplified in the development of EC systems that serve as platforms for virtual economic exchange systems.

> **Conjecture 7**: The development of value networks among financial institutions will significantly increase the ability of a single financial organisation to remain competitive and sustain its competitive advantage in the financial services industry.

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[127] Interviews with CS Holding, CS Economic Research, London, 07/31/96; Citibank, Corporate Strategy, London, 09/27/95; and Coop Bank AG / GZB, Relationship Banking, Basle, 1995, 1996; Goldman Sachs & Co. Bank, Zurich, 09/19/95; Bank Sarasin & Co., Basle, 09/15/96; Bank Cial, Basle, 09/14/95, 12/21/95; and SBC Warburg, Corporate Development, London, 09/29/95.

In the evolving global financial marketplace, including EC based VE systems, banks' best chance to survive is to join forces with other financial services providers. These collaborative arrangements provide the foundation to build value networks that deliver the full spectrum of financial services to customers through an array of distribution channels. Furthermore, digital convergence demands a strategic perspective that views channel and distribution decisions as choices from a continually changing array of alternatives for achieving market coverage and competitive advantage – subject to the constraints of cost, investment, and organisational flexibility. Accordingly, distribution channels have become dynamic webs – comprising many direct and indirect ways to reach and serve customers in the marketplace and marketspace, respectively. Theoretically, the higher the required investments in specialised assets for the distribution of products and services, the more appropriate are direct dissemination and distribution channels (Williamson, 1985). However, these guidelines are obscured when markets are fragmented into segments so diverse that many products are mass customised (Pine II, 1993). These new distribution channels will be unconstraint by the limits of traditional branch based distribution system. For banks and financial institutions, building a value network will involve dramatic change. Many players will be reluctant to share valuable customer information and relationships with competitors, while others will be deterred by the large investments in advanced technologies that will be required to link separate organisational entities. On the other hand, consolidation provides financial institutions with the opportunity to eliminate redundant services, cut costs, enlarge their customer base, and generate the financial resources to invest in advanced technologies. With the emergence of VE environments, a large number of financial institutions is seeking for new opportunities to reach a new level of customer services and hence enlarge its existing customer base and eventually generate additional profits.

On average, the three large universal Swiss banks expect that transactions processed by traditional branches will decline approximately one third by the end of the century[128]. However, branch-based banking will continue, but alternative distribution channels, which compromise the virtual bank, are posed to gain significantly in importance over the next five years. All three surveyed Swiss universal banks intend to open new branches over the next five years – 67 percent plan full services branches and 33 percent plan special services branches (T4 – T7)[129]. Surveyed private banks, however, anticipated no significant structural changes in their (geographically limited) retail distribution system. However, they all have indicated that they plan to initiate limited experiments that evaluate the various possibilities of virtual banking in a network system[130]. The total number of branches is expected to fall, but customers will have a variety of surrogates, including new redesigned branches, home banking facilities, in-store branches, kiosks, and enhanced ATMs systems. While 75 percent of respondents expect to close conventional branches (T4 – T7), an almost equal number (66 percent: T4 – T7) plan to open redesigned and relocated facilities. These are more conductive to offer a simultaneous mix of services. For example, a redesigned bank branch in the city centre might provide traditional services facilities in one area and advanced technology based services[131] in an adjacent, yet separated area within the same branch.

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[128] This calculation is based on data collected from SBC, UBS and CS Holding.

[129] Interviews with SBC, Audit, Basle, 05/13/96, Electronic Retail Banking, Basle, 05/10/96, 12/22/95, 11/03/95; UBS, Corporate Communications, Zurich, 09/20/95; CS Holding, CS Economic Research, London, 07/31/96; Citibank, Corporate Strategy, London, 09/27/95; and Coop Bank AG / GZB, Relationship Banking, Basle, 1995, 1996.

[130] Interviews with Goldman Sachs & Co. Bank, Zurich, 09/19/95; Bank Sarasin & Co., Basle, 09/15/96; Bank Cial, Basle, 09/14/95, 12/21/95; SBC Warburg, Corporate Development, London, 09/29/95.

[131] Advanced technology based services may include interactive enhanced ATMs, digital information services and special interactive video-links to remote knowledge bases. The functionality of enhanced ATMs is manifested in a number of new functions and services being provided at the convenience of the customer. For example, approximately 75 percent of all respondents have indicated that forthcoming ATMs are likely to support more sophisticated financial transactions (T1 – T4). Among the new functions are complex payment services, cross selling of bank and non-bank products and services, basic in-

Many financial institutions plan to make available their services and products via alternative distribution and delivery channels. Moreover, this transformation is simultaneously aimed at significantly extending the geographic reach of a specific financial institution. For example, the average number of enhanced ATMs operated by the large three universal banks in Switzerland is expected to rise by 17 percent by 1999[132]. Approximately two-thirds of these new installations will be at non-branch locations[133]. These measures need to be seen as an interim step towards a total liberation of the concurrent banking system from the traditional constraints of time and space. However, financial services providers cautiously point out that these initiatives are only the first step in the transition to an eventual VE environment.

Line based banking, comprising both phone and home or PC based banking is expected to grow considerably until the year 2000 (69 percent of respondents agree: T4 – T7). Phone banking, according to the three Swiss universal banks, is anticipated to grow by about 50 percent until 1999[134]. The services most commonly offered to customers by phone are: account inquiries, the transfer of funds, the ability to open additional accounts, and access to investments and basic asset management facilities[135]. PC based banking is expected to become one of the most used delivery channels in the near future (71 percent of respondents agree: T5 – T7). A significant number of small businesses already make use of proprietary videotext based payment systems that allow a limited number of financial services to be carried out from remote locations. The lack

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vestment functions such as the purchase and sale of a limited number of financial instruments, and videolinks to access remote repositories of knowledge.

[132] Swiss National Bank Statistics, 1995, 1996.

[133] Interviews with SBC, Audit, Basle, 05/13/96, Electronic Retail Banking, Basle, 05/10/96, 12/22/95, 11/03/95; UBS, Telecom, Zurich, 09/20/95; CS Holding, CS Economic Research, London, 07/31/96.

[134] Interviews with CS Holding, CS Economic Research, London, 07/31/96; SBC, Electronic Retail Banking, Basle, 05/10/96, 12/22/95, 11/03/95; and UBS, Corporate Communications, Zurich, 09/20/95.

[135] English financial institutions have indicated that they also plan to offer sophisticated loan servicing operations. Conversely, Swiss financial institutions have indicated that in the near future the provision of mortgages and loans will continue to be offered via traditional services outlets.

of integration with other software packages and the complicated administration of these systems are expected to make way for open systems based PC banking facilities that provide simultaneous or sequential access to all financial institutions offering such services. Over the next five years, all banks plan to offer PC banking, although to varying degrees of functionality and flexibility. Simultaneously, a number of banks have started to introduce maintenance fees for accounts if managed by means other than those provided via on-line facilities (e.g., SBC). The introduction of a "penalty" for using traditional means of conduct indicates the strategic direction banks would like to pursue. Although, the Internet is currently the obvious platform for the establishment of open system on-line banking facilities, it is however not the medium of choice for the majority of banks (56 percent of respondents agree: T6). Exchange of information is already provided on a number of VE platforms by all large Swiss banks and the majority of all surveyed financial institutions. However, the perceived level of Internet security is at present too low to deploy sophisticated VE systems that provide monetary exchange on open network systems. Nevertheless, universal banks and large financial institutions believe that their secure monetary exchange systems, although based on open system design specifications (e.g., communication protocols), will be available on the WWW within the next few years[136]. Private banks, although offering a number of proprietary electronic services, have indicated that the majority of their clients prefer a relationship based on face to face interactions over digitally provided means of communication (71 percent of private banks agree: T1; T6; T7, trust). However, private banks have pointed out that there are some notable exceptions. For example, cash management systems for institutional clients, where the client and the financial institution are

[136] Among the large financial institutions, including universal banks, 81 percent agree with this statement (T5, areas of exploration; T6; T7, value, segmentation, distribution; T4).

linked in real-time and thus elevated from time and space constraints of traditional line based services.

5.2.1 Virtual Retail Value Networks

The virtual network links services and products on nearly real-time basis; hence the value network enables financial institutions to maintain digital links with one another. At present, virtual banking is limited, from a customer's perspective, to one exchange node per connection; namely the customer's access to accounts with that specific bank. Value networks, however, will allow access to accounts, products and services held by different organisations on the virtual network, encompassing a customer's entire financial portfolio. From an individual bank's perspective, laying the foundation for an Extranet or interorganisational value network requires strategic planning to overcome a potential prisoner dilemma situation. Investments in advanced information technologies by themselves do not ensure the potential long-term success of a financial services value network. There are a minimum number of two interdependent requirements that need to be met on the macro- and micro-level, respectively. On the macro level, the range of potential benefits will only unfold if competition is eventually supplanted by interorganisational collaboration for issues related to infrastructure. Communication and infrastructure requirements must be planned such that all potential community participants have the possibility to participate and establish themselves along the space of flows and planes of time of the virtual financial services community. In addition, financial institutions need to identify and form partnerships with other financial and non-financial services providers to build a maximum added value into the architecture of the

financial services value network[137]. On the micro-level, financial institutions need to effectively segment and **identify** customers. The traditional identification mechanism, based on age, sex and ethnical background, matters less in a VE environment[138]. The fix character of these three traditional criteria, used to describe and define customer segments, cannot convey the plethora of information required in an added value network environment. In such an environment, added value is often a function of customising basic services and products according to the specifications and requirements of specific customers. Therefore, the identification process of VE environments is primarily driven by customer interest and to a limited extend status (75 percent of respondents agree; *Business Week*, February 27, 1995; May 5, 1997). Both characteristics are variable over time and space. Hence, a clear understanding of these two customer characteristics, in addition to the fundamental customer data are vital for the continuous partnership between customer and financial institution.

Consequently, financial services providers need to understand what services their customer require, when and how the delivery should take place and the fee that each segment will support. Answering these questions will guide financial institutions in their quest to provide the highest possible level of added value to customers. Therefore, making a **value proposition** – a clear statement of value – is the first step in breaking with the past when a passive provision of branch based services was sufficient. Banks and financial services providers alike have come to realise the importance of a

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[137] A number of financial services providers have built a distribution network aimed at providing flawless services to their customers. Citibank, for example, has forged a strategic alliance with Motorola aimed at providing a global cash management system for institutional clients. Interviews with Citibank, Corporate Strategy, London, 09/27/95; Holland, Lockett, Richard and Blackman (1994) and Holland and Lockett (1996).

[138] Interviews with SBC, Electronic Retail Banking, Basle, 05/10/96, 12/22/95, and personal correspondence 1995, 1996; personal correspondence with Microsoft, Online Banking, 1996. Choi and Hilton (1995b) further point out that the "age" of the firm can serve as a surrogate for quality if quality is difficult to asses or unknown prior to purchase and/or consumption.

customer-centric focus. Therefore, many financial institutions have reengineered back-office operations to facilitate interactive customer services at the front office, which represents the interface between supply and demand[139]. Banks have started to perform profound market research to segment customers and to determine how to exceed the perceived value added of competitors. The process involves demographic and psychographic profiling, and other studies to measure acquisition, customer development potential, and minimum retention requirements[140]. Given this information, a financial institution can create complex models to predict individual, cluster and community banking patterns segregated and aggregated over time and space. The aim of this analysis is to explore eventual demand patterns and to reveal their dynamic interdependence over time and space. Based on these results, financial institutions are able to determine a more flexible fee structure according to the price sensitivity of each customer segment. With finite resources, financial institutions will position their offerings and distribution channels to serve their customers in an optimal possible way. However, this process needs to be understood dynamically; over time, delivery channels can be augmented, and profitability influenced by changing fee structures.

The mix of virtual banking capabilities will of course vary by segment and by community. Small towns and rural areas are likely to maintain a relatively high ATM to branch ratio. Large urban areas, on the other hand, with high real estate values and

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[139] Interviews with Citibank, Corporate Strategy, London, 09/27/95; SBC, Corporate Strategic Planning, Basle, 1995; CS Holding, CS Economic Research, London, 07/31/96; UBS, Corporate Communication, Communications, Telecom, Zurich, 09/20/95; Coop Bank AG / GZB, Relationship Banking, Basle, 1995, 1996; and Bank Cial AG, Basle, 12/21/95 and 05/09/96.

[140] Interviews with SBC, Electronic Retail Banking, Basle, 05/10/96, 05/13/96, 12/21/95, 11/03/95; Oracle, New York, January 1997; and personal correspondence with Microsoft, Online Banking Division, 1995, 1996, and 1997.

limited access space – where customers desire more virtual services[141] – may see a lower comparable ratio.

> **Proposition 4**: Customer segmentation and aspired levels of profitability will help financial institutions to determine the optimal balance of explorative and exploitative delivery channels.

Virtual banking, however, will only satisfy a certain extent of a financial institution's value proposition. In addition, financial services providers must push new and more comprehensive services and products. Such a strategy may require the introduction of non-traditional financial services and products to the mix of existing offerings in a way that they amend the overall value provided[142]. A value added network plays to financial institutions and banks greatest strengths: the provision of basic financial services and a well-established presence in a community[143]. Although the eventual transition from the physical to virtual domain is inevitable, millions of customers still rely on bank checking, and teller access as their primary channel to payment systems. Banks still have a unique image and reputation that inspire trust – a measure for the likelihood of future co-operation (Williamson, 1993a). Non-bank competitors have no equivalent that can match the strength of the relationships between customers and banks. Likewise, the benevolence of many of their public functions, and the macro-economic function they maintain in their embedded social and economic environment create strong bonds be-

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[141] The desire to access virtual services, in this context, refers to the ability of having access to information and knowledge without being constraint by limits of time and space.

[142] UBS, for example, provides a full set of complex and advanced communication services for its customers. Interview with UBS, Corporate Communication, Zurich, 09/20/95. SBC, on the other hand, has licensed part of its banking software system to other financial services providers. In addition, SBC plans to offer outsourcing services for both financial and non-financial customers. Interviews with SBC, Audit, Basle, 05/13/96; and Bank Cial AG, Corporate Finance, Accounting, Basle, 05/09/96.

[143] Physical community presence can also be used to distribute services and products of non-financial character. Increasingly, branch networks sell, in collaboration with information and entertainment providers, information products and concert tickets to social events. Interviews with SBC, Strategic Plan-

tween customers and banks. In contrast, non-financial services providers such as Microsoft, Intuit, E*Trade or Quote.Com, to name but a few, do not offer the face to face interaction customers are used from dealing with a bank. Likewise, they do not have an established name or brand in finance that emits a strong reputation or trustworthiness[144]. Microsoft, for example, boosts a strong brand name. Yet, this brand name conveys value in areas that are largely associated with domains other than finance. In addition, the brand name Microsoft has recently been associated with various cases of anti competitive practice and may further be linked with various potential anti-trust litigations in the US[145].

In a value network, other banking functions, such as transaction processing and asset management, can be left to institutions that specialise in these areas. For example, banks make excessive use of services offered by SWIFT[146] to settle their international payments. Similarly, relationship banking, for small and medium sized financial institutions in Switzerland, is almost exclusively provided by one institution[147]. Furthermore, many US banks and financial services providers have either established their own data processing centres in cost-effective locations or alternatively outsourced transaction processing to specialised data processors[148]. Conversely, the financial institution

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ning, Basle, 1995, 1996; Electronic Retail Banking, Basle, personal correspondence, 1995, 1996; Oracle, New York, January 1997; and Coopers & Lybrand, London, 05/03/96, 06/17/96.

[144] As outlined above, an exchange partner is deemed trustworthy if he is worthy the trust of others, thus an exchange partner worthy of trust is one that will not exploit other's exchange vulnerabilities. Note that while trust is an attribute of a relationship, trustworthiness is an attribute of individual exchange partners (Barney and Hansen, 1994).

[145] Personal correspondence with Microsoft 1995 and 1996; interview with the Financial Services Group, American Stock Exchange, New York, January 1997.

[146] Society for World-wide Interbank Financial Telecommunications. A dedicated computer network to support funds transfer messages internationally between over 900 member banks world-wide.

[147] Interviews and personal correspondence with the Coop Bank AG / GZB, Relationship Banking, Basle, 1995, 1996.

[148] Author's observations, Raymond James Financial, Eagle Asset Management, St. Petersburg, Florida, 1991; and interview with Oracle, Financial Services Division, New York, January 1997.

provides added value to customers in the form of ease of access, speed, superior financial advice and accuracy.

What value added, then does the bank provide to the value network? With its large established pool of customer relationships, its insights of customer requirements and its strong brand name, the bank with its widely visible community presence excels as a financial interface to customers. Even as the use of virtual banking increases, the traditional form of retail banking, namely via branch networks, remains, for the foreseeable future the dominant interface between the banks and their customers.

5.2.2 Retail Banking – Conclusion and Outlook

Access to and deployment of advanced technologies remains one of the most critical success factors in a bank's future and particular in its retail operations[149]. Without massive deployment of advanced ICTs, retail services and products will be inconsequential in today's financial value network – including both the physical and the virtual domain of organisational value networks. Unless advanced technologies are applied effectively, however, exploration and exploitation of expensive advanced technology systems, are likely to simply remain additional costs of doing business the traditional way. Therefore, we surmise that the use of advanced technologies in an assertive way requires the following management activities. First, financial institutions must determine the value they want to provide to certain customer segments, which in turn requires strong strategic planning skills and effective access to a plethora of consumer information. Moreover, management must devise a corporate vision. The conjunction of consumer data and

[149] Interviews with SBC, Electronic Retail Banking, Basle, 11/03/95, 12/21/95, 05/10/96; UBS, Corporate Communication, Zurich, 09/20/95; CS Holding, CS Economic Research, London, 07/31/96; Coopers

the corporate vision forms a bank's blueprint for the future of its retail banking operations as part of virtual banking and the anticipated role it expects to play in such an environment. Second, advanced technologies and interactive communication network nodes are the very foundation of VE and virtual banking. Thus, financial institutions without access to multiple delivery channels run the risk of being left without adequate time to establish or join virtual banking networks. Eventually, the development of a secure, seamless infrastructure to connect the network's participating organisations may be a profitable endeavour. Third, active participation in a value network should be based on an assessment of the role an organisation aspires, and how it expects to contribute and benefit from the value network[150]. It can be expected that great dividends await the institution that initiates and develops a value network. A potential initial scenario emerges from the fact that a bank, or rather its existing banking infrastructure, can temporarily serve as a gatekeeper to the value network[151]. Such a scenario would initially hand banks the power to manage user fees and process assets as customers and other institutions enter the network.

However, it remains unclear at present, as to the aspiration of a single organisation within a financial value network. Hence, further research is required to determine the value associated with holding a specific position in the financial value network; itself embedded in a sociocultural value network. Special emphasis needs to be paid to [1] the path dependent cultural heritage of a strong form environment, [2] the dynamic

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& Lybrand, London, 05/03/96, 06/17/96; Lehman Brothers, London, 1996; Goldman Sachs & Co. Bank, Communication and IT, Zurich, 09/19/95; and Oracle, Financial Services Division, New York, 01/1997.

[150] Participation, in this context, does not preclude the active formation of the value network itself. Likewise, participation within the network in a strategic position, both with respect to space and time and combinations thereof, is not a priori excluded.

[151] This scenario is based on personal correspondence with a senior executive at one of Switzerland's leading retail banking institutions. Source disguised upon request.

interaction of flows across both time and space, and [3] the relative position of an organisation over time[152].

5.3 Results and Conjectures Capital Markets

Capital market activities have gained increasing importance among the surveyed financial services institutions as the intense competition between financial institutions shows no sign of slackening. More than one-third of financial institutions have reported trades in excess of 1,000 per day, while the remaining institutions log a trading volume in excess of 5,000 transactions per day. These financial transactions include both proprietary and non-proprietary forms of trading (e.g., equities, commodities, interest rate, foreign exchange and derivatives). A large majority of financial institutions (97 percent of respondents) engages in proprietary forms of trading. However, 83 percent are also engaged in non-proprietary forms of trading (e.g., institutional trading and mutual funds).

Capital markets can, among other elements, be characterised by [1] increasing levels of complexity as a function of globalisation and technology, [2] a growing concentration of corporate activities in a few locales, and [3] the absolute increase in volume traded across time and space. However, given the number of recent crises and the rapidly increasing complexity of capital markets per se, it is natural to ask why this business segment is highly attractive. What is driving the demand for capital markets activity in financial institutions? In short, high potential revenues and profitability drive the demand for capital markets. Although not without considerable risks, capital markets related services bear the potential to support sustainable higher margins than retail

[152] The relative position of an organisation, in this context, refers to an organisation's position in a value network when compared with that of other institutions and itself relative to time. Hence, an organisation

banking over the foreseeable future and provide the foundation for a substantial sustainable revenue increase for the next few years. Therefore, many banks have increased their capital-markets activities. Eight-seven percent of all surveyed financial services institutions provide some form of capital markets services to their clients. However, the level of sophistication, complexity and services coverage varies considerably from financial institution to financial institution, many respondents expect to augment their presence in all three domains. However, it is likely to expect that the current high level of profitability in capital market activities will eventually result in intense competition and subsequent erosion of the high profit margins. Therefore, financial institutions will have to differentiate their services from their competition through their ability to handle complex and sophisticated products and services and any combination thereof. The underlying transition towards mass customisation requires the mastery of complex forms of advanced technologies in the area of asset management, settlement and distribution (93 percent of respondents agree: T2; T4 – T7).

Banks and financial services providers without capital market functions alike are acquiring organisations that have a strong expertise in this area to quickly establish a visible market presence and/or enhance their current set of capital market capabilities. SBC's recent acquisitions of S. G. Warburg Plc (investment banking experience), O'Connor & Associates (derivatives and trading experience), and Brinson Partners Inc (asset and fund management experience) are examples of this strategy. Because of the ongoing globalisation, many large financial institutions will be required to deliver capital markets related services to their customers around the globe. Thus, financial services institutions, eager to extend their customer relationships into the future, are re-

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can take a number of distinct positions long a continuum of active and passive leadership relative to its competitors.

quired to make their financial services and products available independent from constraints of time and space. Hence, financial institutions are in the process of putting together a virtual value network of exchange nodes that directly links client sites from around the globe to a financial institution's information and exchange infrastructure. Consequently, many of these newly emerging services require technology transfers from the financial institution to the clients and hence initially tie a client closer to the services provider. Yet, at the same time the formation of various small virtual networks, which ultimately are all interconnect via capital markets, provides an ideal starting point to rise to the top of a global interconnected virtual financial services value network.

Financial institutions strive to enhance the added value they provide to institutional clients[153]. One way financial services providers create added value is by delivering to clients the information they can use to research, trade and monitor various financial instruments and other contingencies that influence their strategic decision making. For example, foreign investments and the development of an adequate hedging strategy hinge upon predictions of foreign exchange rates. Advanced technologies of course have always played a key role in this process and continue to do so as financial institutions aspire new ways to integrate their trading infrastructure with their clients. The following functional areas are particular well suited for further integration: account management, product development, pricing, portfolio management, and risk management information[154]. These interorganisational efforts are further complemented by the recent efforts of financial institutions to fully integrate isolated intraorganisational

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[153] Lehman Brothers, Institutional Sales, London, 02/19/97.

[154] Interviews with Lehman Brothers, Institutional Sales, London, 02/17/97; SBC, Audit, Basle, 1995, 1996, and 09/17/95; Schroder, Technology, and Corporate Finance Division, London, 09/26/95 and 09/27/95; Robert Fleming, Strategy and Operations, London, 09/25/95; Bank Sarasin & Co., Corporate Development, 09/17/95; and Technology, 09/15/95.

trading systems into a coherent and consistent value network interface that can be used across all organisational entities[155].

Many financial institutions operate proprietary advanced ICT environments that can be customised to organisational idiosyncrasies and changing environmental requirements[156]. There is a trend in capital markets towards the use of externally developed integrated software solutions supporting the value network concept (e.g., open systems design). A number of financial institutions are also updating their proprietary software systems to provide a robust information and exchange platform based on VE systems, which by definition provides global coverage. More specifically, this process involves the integration of all relevant information so that a financial institution can continuously share all critical and relevant information with its clients. Note, however, that significant customisation efforts are required to provide the full range of financial services across the entire value network. Notwithstanding the fact that there is an increasing trend towards implementing third party software solutions, the development of capital market solutions for high risk high value added areas continues to be provided from internal sources. In many cases, effective integration requires reengineering of current processes and an ability to implement and support global communication installations. Thus, financial institutions are increasingly turning to outside organisations or forming value networks to effectively deliver these integrated financial solutions[157].

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[155] Interviews with UBS, Corporate Communication, Communications, Zurich, 09/20/95; UBS, Singapore, personal correspondence, 1996; SBC, Strategic Planning, Basle, 1995, 1996 and SBC, Hong Kong, personal correspondence, 1996; CS Holding, personal correspondence, 1996; and Oracle, Financial Services Division, New York, January 1997.

[156] This is especially evident for large financial institutions that have the necessary resources to maintain proprietary information and tradition systems. For example, the core of the capital markets software systems of all three large Swiss universal banks is based on a proprietary information system. These modules will eventually be replaced by non-proprietary solutions or gradually updated to keep pace with recent industry developments.

[157] Software and hardware vendors, communication providers, outsourcers, and consulting firms are all considering the creation of such interorganisational financial value networks. One example is the centralisation of the treasury, cash- and portfolio management functions of multinational corporations. Inter-

In the next paragraph we briefly outline, based on interview data, such a feasible integrated financial value management system.

Based on a VE platform, a **consistent integrated financial management system** combines, accessible via a coherent interface, all the information and applications needed to analyse, make financial and management and trading decisions, and execute those trades[158]. This would require sufficient integration of the financial institution's systems with the clients' operating, financial and strategic decision making systems. Current cash management systems that link various organisational sites and entities across time and space are modest examples of the forthcoming possibilities driven to a significant amount by advanced ICTs. For example, given the capabilities of some disjoint or standalone systems, an integrate financial management system might have the capacity to aggregate world-wide risk exposures, and suggest, based on complex risk management models, suitable hedging strategies. Direct links with financial institutions provide a firm with the necessary communication facilities to analyse and eventually correct suggested transactions with financial advisors via video link and ultimately execute the transactions. For a customer, advanced technology in this context grants instant access and feedback mechanisms to the financial institutions knowledge database. In addition, central maintenance services could simultaneously be made accessible to clients and trading floors alike. Furthermore, the system could prepare performance and asset allocation results and store a wide selection of reports; to be sent to clients at predesignated points of time or based upon certain other criteria. Conversely, clients could

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views with Andersen Consulting, London, 03/27/96; and Coopers & Lybrand, London, 05/03/96, 06/17/96.

[158] The integrated financial management system concept has been devised based on interviews with Schroder, Information Management, London, 09/27/95; SBC, Audit, Basle, 05/13/96, 1995, 1996, and

access daily performance evaluations at both a consolidated and/or detailed level. Likewise, customers could use a financial institution's analytical models to perform what-if scenarios supported by a quasi real time data feed. Thus, the integration of various financial management systems provides an opportunity for financial institutions to link currently disconnected information sources. This knowledge database could further be linked to a software decision support systems – accessible via a single coherent and consistent interface.

However, before such a system becomes viable, financial institutions must overcome a number of problems. First, although existing databases capture an increasing amount of information, they remain segregated across the entire organisation. Integration needs to incorporate multiple databases across functional areas and ultimately expanding the software to incorporate institution's traditional information infrastructure, including its mainframe legacy systems. In addition, the development of apt tools to explore and exploit the growing repositories of data and information has not yet reached a satisfactory level. Recent advances in data warehousing technology and data mining promise to overcome some of the limitations of traditional database administration[159].

Ultimately, this approach promises beneficial for both the financial institution and its clientele. Such an approach offers institutional clients comprehensive banking and investment services and forges a closer link between the customers and the financial services institution. In addition, this method considerably increases the level of services

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Internal Information Technology Audit, 05/12/96; Goldman Sachs & Co. Bank, Zurich, Operations, 09/19/95, Corporate Information, 09/19/95; and Oracle, Financial Services Division, New York, 01/1997.

[159] Data warehousing technologies are well positioned to bridge the gap between legacy database systems run on mainframe systems, and distributed client server systems. In addition, data warehousing technologies aim at providing a consistent end user interface (e.g., a Web browser). Data mining refers to the exploration and exploitation of dependencies and relationships in the data structure. A more detailed discussion about data warehousing is provided in Horrocks (1996), Mattison (1996), and McElreath (1996).

available to the customer and eventually increases customer loyalty, which in turn provides the foundation for a potential competitive advantage.

5.3.1 Capital Markets – Conclusion and Outlook

Although there is a clear trend towards the use of external software and solutions providers, few interorganisational partnership exist in capital markets activities on the scale of those that exist within the domain of retail banking. At present, only a small number of financial institutions outsource capital market activities, which are predominantly in the area of equity management[160]. Nevertheless, there is significant evidence that this is about to change. For example, an attempt to implement open systems software solutions, which provide seamless access to the emerging financial value network. It can further be anticipated that this outsourcing trend will continue as financial institutions focus on the core capital markets competencies that differentiate them from their competitors. Financial institutions are now in a process of opening their proprietary systems to emerging open system value networks and thus indirectly give third party solutions providers potential access to their organisations. This current trend is further supported by the fact that non-strategic back-office operations, such as payments, transfer of funds, settlement and credit card processing, are increasingly being performed at a number of specialised data processing organisations. Furthermore, the form and scope of these collaborative ventures is often based on strategic alliances and partnerships that

[160] The majority of large financial institutions operate their own advanced technology subsidiaries that provide their information services not only to the holding organisation but also to third parties. This then is a special form of outsourcing in as far as the third party vendor is not independent from the holding organisation. However, as indicated above, outsourcing and other types of interorganisational collaborative arrangements are beyond the cope of this work.

may grow in importance as financial institutions continue to concentrate on core capital markets activities that differentiate them from their competitors.

Value networks within capital markets will continue to take shape over the next few years (67 percent of respondents agree: T3; T6: T7). In the meantime, financial institutions face a number of challenges that must be addressed. Financial institution must improve their ability to monitor all types of risks on a more frequent basis. New financial products and services, for instance, require new ways of managing risk, especially for the prolific trading activities of the bank; both proprietary and non-proprietary. As capital markets expand and become global in scope, it will be crucial for institutions to create and share knowledge associated with risk throughout the organisation. Respondents believe that investments in advanced integrated risk management software solutions (e.g., Value at Risk or VAR) will be a differentiating force in capital markets (89 percent agree: T4)[161]. However, respondents have voiced their concern about the rapidly growing costs associated with the design of sophisticated software solutions systems such as corporate risk management tools (91 percent agree: T4; T7; T2). Therefore, we conjecture that whenever possible, financial institutions should refrain from developing basic proprietary software systems and instead opt for pre-designed commodity software solutions. However, financial institutions should maintain and continue to develop software solutions and systems, compatible with existing market solutions that will differentiate them from their competitors.

To remain competitive in capital markets, financial institutions will need to integrate sophisticated risk management techniques and portfolio management competencies in the emerging value network, which contains valuable information for both cus-

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[161] Value at Risk (VAR) measures the worst expected loss over a given time interval under *normal* market conditions at a given confidence interval (Jorin, 1996). Thus, based on scientific foundations, VAR provides users with a summary measure of market risk.

tomers and financial institutions. We have called this integrated system the integrated financial management approach. As standards in software, methodology and communications continue to emerge, existing value networks are likely to expand in both scope and scale, while new value networks are expected to be built around new organisations. For the time being, financial institutions must strive to discover their optimal balance between applications development and information delivery. The increase of networking capacity and outsourcing capabilities should prompt financial institutions to re-evaluate their current strategies and correct the course should the gap between organisational capabilities and environmental requirements reach a critical level.

5.4 Results and Conjectures Infrastructure

A financial institution's infrastructure provides the foundation to co-ordinate an organisation's knowledge base – embedded in advanced ICT systems, processes and people. The organisation's information infrastructure, maintained and managed by an internal division[162], is designed to manage information and knowledge within and across organisational boundaries. In the context of advanced technology, infrastructure refers to the organisational facilities and systems that support moving information. Therefore, advanced and basic ICT infrastructures have long been crucial elements in the value creating process of the financial services industry[163].

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[162] Although all surveyed organisations have a dedicated organisational entity responsible for technologies and information management, the scope, responsibility, size and structure of these entities varies considerably across organisations. Extreme cases include, [1] technology and information management as part of the accounting division, and [2] technology and information management as an independent organisation, although a wholly owned subsidiary, which provides information and technology services to the holding company as well as the open market.

[163] Interviews with UBS, Corporate Communication, Zurich, 1995; SBC, Audit, Basle, 05/13/95, 1995, 1996, Internal Information Audit, 05/12/95; Schroder, Information Management, London, 09/27/95; SBC Warburg, Corporate Development, London, 09/29/95; Citibank, Corporate Strategy, London, 09/27/95; and Goldman Sachs & Co. Bank, Operations, 09/19/95, Corporate Information, Zurich, 09/19/95.

Although all stakeholders of a financial organisation have raised their demand for corporate as well as business or transaction information, customers have become one the most demanding interest groups[164]. This has been manifested along three dimensions. The first dimension is the absolute amount or volume of information requested. The second dimension refers to the scope of information requested, that is customers request more detailed information about a potential transaction, which in turn further increases the first dimension, the absolute amount of information requested. Third, customers prefer to "consume" or access the information at their convenience rather than that of the organisation they are dealing with. In other words, customers attach a high value to the ability to receive information independent of time and space constraints – under the assumption that interactions do not undermine the trust relationship. Increasingly, financial institutions are attempting to meet these demands through a virtual value network (VVN). The sophisticated infrastructure of a VVN can disseminate information from multiple business units and network partners directly to internal and external network users.

In the late 1960s and 1970s the financial services industry has witnessed an era when technology was dominated by mainframe system and centralised information and data processing facilities. Although these systems were a sharp departure from the paper based transaction-processing systems, direct access to the infrastructure's data and information was not possible in most cases. Therefore, obtaining information required an intermediary – a teller for the customer and a programmer for the financial institution's internal users. In an attempt to make the infrastructure more responsive and less monolithic, financial organisations successively decentralised the information technol-

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[164] Interviews with Bank Cial AG, Basle, 1995, 1996; CS Holding, London and Zurich, 1996; Lehman Brother, London, 1996; SBC, Basle, 1996, and UBS, Corporate Communication, Zurich, 1995.

ogy organisation; giving business units their own information- and data processing infrastructures. This solution, however, came with its own problems. The dispersed information and data management infrastructure was difficult to manage. Access to specific information required aggregation across several, not necessarily compatible, infrastructures. In addition, a lack of co-ordination often resulted in duplication of infrastructures and resources dedicated to solve a specific problem. Intraorganisational compatibility and integration with existing information systems has generally received little attention[165]. The business unit's primary concern rested with processing capabilities and the logic of these systems. Hence, the organisation's data were fragmented and the decentralised approach was costly to maintain. The information and data processing infrastructure of the 1980s was largely based on open client server systems that were loosely connected to the organisation's primary mainframe data sources.

The 1990s so far reflect a balanced approach to achieve simultaneously maximum information responsiveness and organisational flexibility. The infrastructure had to remain responsive and available to every user, especially the customer. At the same time, the infrastructure's people, processes and technology needed to be more closely integrated. We conjecture that the purchase of advanced information technology systems without apt considerations of the implications on the organisation are poised to damage corporate infrastructure integrity. However, management is in many cases aware about the existing solutions, but lacks the ability to commit to them as a result of prior expensive commitments to other infrastructure platforms. Moreover, advanced information and technology systems are often purchased – especially in highly decentralised environments – without understanding the implicit standards that come with

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[165] Interviews with UBS, Corporate Communication, Zurich, 1995; SBC, Audit, Basle, 05/13/95, 1995, 1996, Internal Information Audit, 05/12/95; Schroder, Information Management, London, 09/27/95; SBC

them[166]. Therefore, defining fundamental infrastructure targets will enable an organisation to stay focused without being distracted by new advanced technologies that do not correspond to the contingencies require for the provision of added value. Hence, without a clear vision and long term strategy, an inexpensive solution purchased today may require expensive replacement down the road as technologies continue to advance or new operational capabilities are required.

> **Conjecture 8**: The establishment of corporate wide infrastructure standards, even if they will take years and consume a significant amount of resources, is an investment that is certain to bring rewards.

Functionality and capability had to grow to deal with the unprecedented amounts of information coming from the various input sites along the value network. For example, from the growing networks of ATMs, the emerging PC based home banking systems, from the ongoing monitoring process of outsourcing partners, financial markets, and new functional information systems such as corporate risk management[167].

A solution that has been adopted by the majority of surveyed organisations is based on the concept of a distributed database infrastructure[168]. Technically, such a

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Warburg, Corporate Development, London, 09/29/95.

[166] Interviews with Goldman Sachs & Co. Bank, Operations, Zurich, 09/19/95; SBC, Audit, Basle, 05/13/96, 1995, 1996, and Internal Technology Audit, 05/12/96. Other sources disguised upon request.

[167] Interviews with SBC, Audit, Basle, 05/13/95, 1995, 1996, Internal Information Audit, Basle, 05/12/95; Schroder, Information Management, London, 09/27/95; SBC Warburg, Corporate Development, London, 09/29/95; Citibank, Corporate Strategy, London, 09/27/95; Goldman Sachs & Co. Bank, Zurich, Operations, 09/19/95, Corporate Information, 09/19/95.

[168] The organisation of a distributed corporate database infrastructure can be achieved by following one of the following three strategies. First mainframe or multiserver data storage. Legacy mainframe systems remain the backbone of a financial organisation's information infrastructure for the foreseeable future. However, client server systems exhibit higher levels of flexibility and scalability. In addition, functionality and capability can both be enhanced with the incremental addition of hardware and software components. Second, grouped or distributed data storage facilities. Central grouping of the stored data has technical advantages. Data management systems from Oracle, for example, manage disbursed servers as if they were grouped – thus creating a virtual data centre. The distributed database approach introduces security concerns, but can offer lower telecommunication costs, as information is maintained physically closer to users and providers. A distributed database infrastructure, by virtue of the fact that it has more entry points, is more vulnerable to security threats; subject to both internal and external tampering (e.g.,

system is based on physically separate databases, which are managed centrally by the advanced information technology unit by means of remote system management software. The critical element in a distributed database environment is the partnership between the advanced information technology unit and the business units; people, processes are all aligned so information flows freely to the authorised users in a comprehensive and convenient way. The major benefit of distributed database management is that it puts advanced information technology in the direct jurisdiction of the business units while allowing the corporation to control the overall infrastructure. This allows the corporation to fully leverage its investments in information infrastructure. The primary technologies deployed in such an infrastructure approach are data warehousing, data mining and a modified client server system.

An effective information infrastructure facilitates the building of internal and external networks. Both of them exert a direct impact on an organisation and ultimately provide added value for the customer. Internally, the information technology infrastructure links organisational entities and builds information and exchange platforms, which facilitates the move of information to and from the data warehouse. The data warehouse must be designed to pick up information from all connected yet disparate sources scattered across space. The next phase in the assemblage of the Extranet or interorganisational value network is bridging the internal and external networks; specifically the data warehouses of other value network members. The dynamic flow of in-

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Financial Times, Friday, November 29, 1996:1,15). Thus, organisations must establish security guidelines, outlining networking criteria and limiting access only to qualified, approved users. Third, centrally dispersed management systems. Remote systems and network management products allow the information technology organisation to managed remote servers from a central location. Interviews with Robert Fleming, Strategy and Operations, London, 09/25/95; Lehman Brothers, London, 1996; Oracle, Financial Services Division, New York, January 1997; SBC, Audit, Basle, 05/13/95, 1995, 1996, Internal Information Audit, 05/12/95; Schroder, Information Management, London, 09/27/95; SBC Warburg, Corporate Development, London, 09/29/95; Citibank, Corporate Strategy, London, 09/27/95; Goldman Sachs & Co. Bank, Zurich, Operations, 09/19/95, Corporate Information, 09/19/95; and personal correspondence with Microsoft 1996 and 1997.

formation across internal and external value networks provides the financial institution with distinct operational and informational capabilities.

On an operational level, the infrastructure supports day-to-day bank administration and customer interaction – that is the tactical aspects of banking. Integrated account information, from internal and if relevant external networks, flows from the data warehouses to customer services remote access points. Through these information outlets, the customer or the employee has the possibility to access up date information; the prerequisite to perform economic transactions and initiate exchange.

> **Proposition 5**: Higher levels of operational information- and data processing value network infrastructure capacity, imply ceteris paribus, a higher level of customer service and satisfaction.

Operations and research data stored in the data warehouse help the financial services provider make decisions about future financial, credit and lending, and marketing initiatives. The nexus between **operational capability** and the quality of available data is referred to as **informational capability** of a networked infrastructure.

> **Conjecture 9**: The higher the level of informational capability, supported by a value network, the higher the long-term value a financial institution can offer to its clients.

5.4.1 Infrastructure – Conclusion and Outlook

Financial institutions must see beyond applications that provide solutions to today's problems. Instead, they need to develop a vision of a comprehensive sustainable infrastructure – comprising both internal and external value networks capable of moving information instantaneously between the network nodes. Effectiveness and efficiency of a

value network, embedded in an interorganisational informational and operational infrastructure, can be measured in terms of added value it generates for customers. Therefore, business units and individual economic agents that are not part of the internal and/or external network diminish the added value.

To conclude, the people, processes and advanced technologies that constitute a financial institution's infrastructure are fundamental to the operation of the value network. The infrastructure that can accomplish these ends is expected to posses the following three critical qualities. First, internal and external networks, connecting organisation within the enterprise to another – and ultimately to every value network partner – while providing a coherent and consistent interface to customers. Second, maintain the right balance between operational and informational capabilities. This optimal mix will support economic transactions, social exchange, and provide the basis to carry out sound environmental analysis and long term strategic planning. Third, the corporate infrastructure needs to have a high level of built-in flexibility and responsiveness to individual business units, while always maintaining structural integrity.

5.5 Results and Conjectures Globalisation

In a world that is increasingly interconnected, value networks will eventually have significant global implications. The aim of global banking is to provide retail and commercial customers seamless, comprehensive, consistent, cross-border financial services. In an increasingly cosmopolitan and commercially integrated world, financial services providers also face strong pressures to enrich their offerings with more genuine international products and services, such as the provision of global corporate cash management

facilities. As a consequence, it is likely to expect that the strongest value networks will be partially or fully embedded in globe spanning VE platforms.

Value networks are both a cause and an effect of globalisation. Retail and commercial customers, especially multinational corporations, demanding seamless financial services in foreign locales, pressure banks to aggregate their capabilities and competencies on an international or virtual level. As investment in foreign, predominantly emerging, markets increases, new national financial institutions appear, many seeking partners in more mature financial markets to leverage their capabilities and knowledge beyond their traditional domain. We surmise that the effect will eventually result in convergence and standardisation of banking capabilities around the world (71 percent of respondents agree: T4; T6). Furthermore, we believe that this convergence will open the gate for the rise of new genuine exchange platform such as EC systems (87 percent of respondents agree: T6; T7; T3).

Financial institutions are typically limited in terms of the number of simultaneous interactions they maintain with customers at a specific point in time. Advanced ICTs allow banks and other financial organisations to expand that paradigm by incorporating EC; and hence create a multi-user, time and space independent exchange and trading system. For example, financial institutions could simultaneously facilitate settlement between parties around the globe, minimising their foreign exchange risk and generating greater transaction fees[169].

Consequently, information about the possibilities, capabilities and risks of new markets, regions and countries is of paramount importance for a successful active par-

[169] Interviews with SBC, Electronic Retail Banking, Basle, 11/03/95, 12/22/95; and Citibank, Corporate Strategy and Information Technology, London, 09/27/95.

ticipation in a value network. Leading financial institutions in mature markets are rapidly expanding traditional capabilities by forming value networks to deliver products and services to customers outside of their traditional domain of space and scope. These financial institutions are one of the main drivers in the globalisation process of the financial services industry.

Nevertheless, there are some genuine differences between globalisation of banking and international banking. Some financial organisation and banks are expanding international to take advantage of locale opportunities, often in areas that are underserved by existing banks. By consolidating, or forming joint ventures with local financial institutions, these banks fragment their risk and successively grow into new markets and opportunities[170]. The vehemence of recent global mergers and acquisitions and strategic alliances activities indicates that financial institutions pursue customer relationships across broad areas and consolidate their operations in an attempt to minimise costs[171]. The result of such economic activities is financial institutions with a wide geographical dispersion and diversified revenue sources. Although these financial institutions may have access to many customers internationally, their customers may not necessarily have global reach through the internationally active financial institution[172]. Therefore, globalisation of financial services needs to be understood as the genuine pro-

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[170] See, for example, *Financial Times*, Friday October 25, 1996:14; *Business Week*, Special Report: Banking Showdown, October 2, 1995, pp. 38 – 49. Interviews with SBC Warburg, Corporate Development, London, 09/29/95; UBS, Corporate Communication, Zurich, 09/20/95; CS Holding, CS Economic Research, London and Zurich, 1996.

[171] Most of the recent mergers and acquisition activities are concentrated in Asia Pacific, Europe and North America (Interview with CS Holding, CS Economic Research, London, 31/07/1997). For example, Allfinanz mergers have been assembled between The UBS and Swiss Life and SBC and Zurich Insurance, respectively. In addition, customer demand for global reach and coverage is helping to eliminate remaining national regulatory boundaries, linked for example to currency export restrictions, and the limited ability to freely convert foreign currencies. Furthermore, on-line and quasi-real-time banking across all time zones now appear to be only a question of resource dedication and political barriers – not insignificant obstacles, but these are likely to be overcome in the near future. Interviews with Citibank, Corporate Strategy and Information Technology, London, 09/27/95; Andersen Consulting, London, 03/27/96; and Coopers & Lybrand, London, 05/03/96, 06/17/96.

cess of providing customer value without constraints of time and space or any other boundaries.

Therefore, financial institutions that are networking to meet the needs of global customers focus not just on revenue opportunities but also on creating consistently high levels of added value for their customers[173]. They expand or network – wherever direct presence is not feasible – to provide customers with seamless global financial services and products. In addition, powerful virtual banking capabilities allow them to integrate all lines of business, and to take advantage of the competencies of network partners. As a result, these financial institutions achieve high levels of space coverage and simultaneously provide their customers with the possibility to reach remote markets and facilities via their global infrastructure in an attempt to provide the highest possible value added. Likewise, financial services providers seek to deepen their market penetration by offering multiple financial products and services accessible via the plethora of informational dissemination channels on the value network; in an attempt to further consolidate operations and correspondingly lower costs.

For example, strategic alliances, mergers, acquisitions, and consortia are being formed to advance EC and VE platforms and create a standard worldwide payment system[174]. For instance, pilot testing of smart cards, already popular in various European countries, is set to begin in several areas of the United States. Tied to the ATM infrastructure and backed by global organisations like Visa and MasterCard, smart cards have immediate international applications; and hence are well positioned to change the

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[172] Interviews with SBC, Electronic Retail Banking Division, Basle, 05/10/96, personal correspondence 1995, 1996; and Oracle, Financial Services Division, New York, January 1997.
[173] Interviews with SBC, Corporate Information, Basle, 1995, 1996; CS Holding, CS Economic Research, London, 31/07/96; Robert Fleming, Strategy and Operations, London, 09/25/97.
[174] Interview with SBC, Electronic Retail Banking, Basle, 05/10/96.

way money is being transfer and/or used as a payment instrument[175]. Major regulatory obstacles remain however, before financial institutions can fully exploit smart cards. Simultaneously, a growing number of financial institutions have established sites on the WWW, which by nature is an international communication and exchange system. Financial institutions recognise the Internet as an important future delivery channel: 90 percent of interviewees plan to pilot PC-based banking services that are accessible through the Internet. However, only 40 percent already use Internet based services as a viable exchange and information dissemination channel. At present, however, none of the respondents deploys Internet based services for monetary transactions; instead all available transactions are genuine forms of information exchange, though often related to monetary transactions. Many financial organisations are currently exploring full transaction and exchange capabilities through the Internet or proprietary services providers such as America Online and CompuServe. However, the same infrastructure is also being deployed by a growing number of non-banks to provide similar financial services facilities.

Although financial institutions may share the same technology, markets and exchanges financial organisations differ according to their environment. They respond to local customs, laws and regulations, and have unique corporate cultures and strategic focus. Likewise, financial institutions around the world also embark on different paths to forming value networks, which in an ideal world may ultimately all be linked together. While "core competencies" is a rather universal concept, getting back to basics means different things in different places[176]. Financial institutions anchored in the An-

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[175] See, for example, *Secure Electronic Transaction Specification – Book 1: Business Description.* Visa and MasterCard, Draft for Public Comment, February 23, 1996.

[176] Interviews with SBC, Audit, Basle, 05/13/95, 1995, 1996, Internal Information Audit, 05/12/95; Schroder, Information Management, London, 09/27/95; SBC Warburg, Corporate Development, London,

glo-Saxon world exhibit a certain tendency to pare away non-critical service lines and products; the trend is towards specialisation and consolidation. By contrast, under the European, or Communitarian system (Choi, Golder, and Lee, 1996), the same dynamic may lead financial institutions to continue extending their Allfinanz service portfolio to include advisory services, such as tax, insurance, estate and investment planning.

> **Proposition 6**: European Allfinanz services may be initial better suited to develop virtual banking activities and lay the foundation to form sophisticated technology partnerships to build a virtual value network.

Independent of the underlying banking model – Communitarian Allfinanz versus Anglo-Saxon specialisation and consolidation – the surveyed financial institutions indicated that the current transition of the industry towards virtual banking is a fact rather than one possible future scenario[177]. Thus, a new era in banking will begin with the spread of virtual banking and electronic financial transactions. The surveyed financial organisations further anticipate that they soon will be in a position to broker EC over global area networks. The on-line character of these technologies, it is argued, will allow financial institutions to dynamically assemble, configure and reconfigure their capabilities, associations, products and services to meet the requirements of their global clientele[178]. Simultaneously, however, a rapidly growing number of non-banking organisations, such as E*Trade, Quote.Com, Microsoft, Intuit, Oracle, First Virtual

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09/29/95; Citibank, Corporate Strategy, London, 09/27/95; and Goldman Sachs & Co. Bank, Zurich, Operations, 09/19/95, Corporate Information, 09/19/95.

[177] Interviews with Robert Fleming, Strategy and Operations, London, 09/25/95; Lehman Brothers, London, 1996; Oracle, Financial Services Division, New York, January 1997; SBC, Audit, Basle, 05/13/95, 1995, 1996, Internal Information Audit, 05/12/95; Schroder, Information Management, London, 09/27/95; SBC Warburg, Corporate Development, London, 09/29/95; Citibank, Corporate Strategy, London, 09/27/95; Goldman Sachs & Co. Bank, Operations, Zurich, 09/19/95, Corporate Information, 09/19/95; and personal correspondence with Microsoft 1996 and 1997.

[178] Interviews with SBC, Electronic Retail Banking, Basle, 1995, 1996; UBS, Corporate Communication, Zurich, 09/20/95; Coopers & Lybrand, London, 05/03/96, 06/17/96; personal correspondence with Microsoft, Online Banking, 1996; Oracle, Financial Services Division, New York, January 1997.

Holdings and IBM, are expanding EC and virtual financial services capabilities. Unconstrained by traditional banking regulations, such companies may significantly intrude upon the traditional market and the role of traditional financial institutions; most notably the role of banks. Slow to recognise the potential of these new advanced technologies, banks face the possibility of being excluded from the emerging global EC networks that are eventually setting a new standard for the conduct of economic exchange. The popularity of PC-based banking programmes such as Microsoft Money and Intuit Quicken raise a challenge for long established traditional banks. As customers use these programmes increasingly to connect to financial institutions, software companies will be in a favourable position to emerge as a new type of financial intermediaries (e.g., consolidation of financial services). On a more abstract level, a number of financial institutions have raised their concern about the increasing use of software interfaces between customers and banks[179]. The interface between customers and financial institutions is the communication point where the customer relationship is being nurtured.

However, if the existing interface is substituted for a graphical user interface, bearing the name of a software company, financial institutions may eventually end up playing a marginal role in the exchange process. Moreover, customers may start associating financial services with the software companies rather than the underlying financial institutions. Likewise, a significant number of financial institutions have pointed out that if software companies use the information that transcends their information and exchange channels, they are in a favourable position to also provide other financial services, including advisory and financial management[180]. Consequently, the implicit threat

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[179] Sources disguised upon request.
[180] Sources disguised upon request.

is that software providers will be influencing, if not significantly defining, users' approach to banking and financial management. However, banks still possess an image and reputation of trust and certainty; in addition, many banks are members of government insurance plans such as FDIC in the US[181]. Their position in their communities and the array of financial services that they offer through their value networks should make them the likely cornerstone of any financial enterprise.

5.5.1 Globalisation – Conclusion and Outlook

Going global means more than opening new branches in remote areas, investing in foreign operations and partnerships or trading in foreign exchange derivatives. The truly global financial institution operates an electronic network of interconnected subsidiaries, third parties and other constituents. The electronic exchange platform is able to support economic exchange, advisory services and a host of other common financial services activities. Retail and commercial customers of the global bank will have universal access from virtually anywhere at any time. At present, few financial institutions have made that high level of commitment required to build truly global banking facilities. However, the advanced ICTs to span space and time are available and leading financial institutions, by further consolidating their operations in interorganisational collaborative arrangements, are in the process of establishing global operations. The following elements and strategic issues have been named by the surveyed financial organisations to be of paramount importance in this globalisation process. First, management

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[181] The Federal Deposit Insurance Corporation (FDIC) is a US federal agency established in 1933 that guarantees within limits (currently US$ 100,000) funds on deposit in member banks and performs other functions such as marketing loans to or buying assets from member banks to facilitate mergers or prevent failures. Barron's Financial Guides (1987) *Dictionary of Finance and Investment Terms*. Second Edition, Barron's New York.

must select a model for the financial institution's global operations; including both corporate activities in the marketplace and marketspace. With this basic model in place, the financial institution can then plan its delivery channels and service pathways and align partners and advanced technologies accordingly to bring its global operations online. In addition, a financial institution must define corporate risk management strategies to handle its rapidly growing risk exposure and determine ways to overcome disparities (e.g., culture, law, technological systems) among an increasing number of network partners. Second, all surveyed financial institutions have indicated that operations in the US are essential for the success of global banking[182]. For example, SBC's recent acquisition of Chicago based O'Conner and Associates and, New York based Brinson Partners; CS Holding's 80 percent ownership of New York based BEA Associates; and UBS's acquisition of the institutional money management division of Chase Manhattan, need all to be seen as part of an ongoing process of establishing a strong foothold in the US market[183]. Third, with initial basic networks in place to serve multinationals, global financial institutions will eventually be in a strong position to serve other emerging areas and hence broaden both their scope and geographic coverage. Simultaneously, financial institutions can extend the scope and coverage of their virtual banking capabilities and lay the groundwork for virtual value added networks.

To conclude, the banking industry is entering an era when financial services and the provision thereof are being redefined. Virtual value networks threaten financial institutions by giving non-financial services providers access to banking activities. Fur-

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[182] Private banks and other small financial institutions have indicated that such ambitions often lie beyond their mission and scope, respectively. However, they have clearly pointed out the significance of a visible US market presence. US market presence is thought of as indispensable in the process of establishing a global financial services value network. Interviews with Bank Cial AG, Accounting, Basle, 09/14/95, 12/21/95, 05/09/96; Bank Sarasin & Co., Basle, Finance, 09/15/95, and Corporate Development, 09/17/95; and Goldman Sachs & Co. Bank, Zurich, Corporate Sales, 03/04/96.

[183] *Euroweek* (1994) "Asset Management Holds the Key". September 9, p. 19.

thermore, the use of infrastructure with global reach further intensifies global competition. However, we postulate that banks are well positioned to make use of the same infrastructure and successfully master the eventual transition from marketplace to marketspace. Financial institutions must recognise both the threats and opportunities of EC systems. They must act quickly to extend their unique experience and insight to electronic exchange platforms[184], before network architects and software makers, who have no banking experience, redefine a significant part of the electronic banking landscape. Ultimately, global market share will rest, not just on control of the EC media, but on knowing the behaviour and preferences of customers and the ability to create value for them. New electronic delivery channels, and the extended space presence they facilitate, can help traditional financial institutions to market high quality, comprehensive financial products and services, and to maintain high levels of privacy and trust – independent of time and space constraints.

5.6 Results and Conjectures Knowledge

The essence of the virtual bank is its ability to overcome constraints of time and space. From a single point of access and interaction, the customer or network constituent can access prior authorised information, using data resources from diverse areas of the financial institution and/or other network constituents. Thus, a value network extends network participants' leverage beyond the wall of a single corporation and makes it possible for network constituents to simultaneously benefit from services of multiple value network organisations.

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[184] Such experience includes SWIFT, EDI, EFT and other early forms of electronic exchange and electronic transaction management.

A financial institution with access to a virtual network, leveraged by a corporate data warehouse, is finally in a position to effectively customise portfolios and financial services to specific individuals or groups of people exhibiting homogeneous preferences. Consequently, knowledge about customer preferences and behaviour has become an indispensable input factor in the pursuit of virtual banking. Powerful systems and networks allow the bank to process and analyse massive amounts of data and information. However, the successful network embodies something beyond the infrastructure and networked databases. It includes **knowledge and algorithms to manage and leverage this knowledge across the value network**. Although not strictly sequential, a financial services organisation's **knowledge cycle** typically involves the following three phases[185]. First, the acquisitions of data form multiple virtual value network constituents and/or from third parties beyond the boundaries of the virtual value network. Second, the transformation of data into information via data mining and other algorithms embedded in data warehouse management systems. Third, the conversion of information into knowledge can subsequently be deployed in decision making. Thus, the ideal knowledge management process would work as follows[186]. Data enters the financial institution's information systems in the form of transactions performed by customer using an interactive interface (e.g., ATM, customer services representatives, virtual bank interfaces). The data then becomes information when it is analysed to create summaries of customer, account, service line, product and/or service, and business

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[185] The concept of the **knowledge cycle** has been developed based on interviews with SBC, Electronic Retail Banking, Basle, 1995, 1996; UBS, Corporate Communication, Zurich, 09/20/95; Coopers & Lybrand, London, 05/03/96, 06/17/96; Microsoft, Online Banking, personal correspondence, 1996; Oracle, Financial Services Division, New York, January 1997; Robert Fleming, Strategy and Operations, London, 09/25/95; Lehman Brothers, London, 1996; SBC, Audit, Basle, 05/13/95, 1995, 1996, Internal Information Audit, 05/12/95; Schroder, Information Management, London, 09/27/95; SBC Warburg, Corporate Development, London, 09/29/95; Citibank, Corporate Strategy, London, 09/27/95; and Goldman Sachs & Co. Bank, Zurich, Operations, 09/19/95, Corporate Information, 09/19/95.

[186] This process is, in part, based a workshop with SBC, Audit, Internal Audit, and Electronic Retail Banking, Basle, 10/17/95

unit activity and performance. This information then populates databases embedded in the corporate data warehouse, where it can be further integrated with other relevant information. Knowledge then is created when data and information from these corporate repositories are used in the course of business and the results are recorded, codified, and made available for future applications. For example, a financial institution can use this knowledge about the customer to determine what products or services will provide value for the customer.

Knowledge is hereby referred to as information that resides in the nodes along the value network. It is a fluid mix of contextual information, values and experiences and rules to process accumulated data and information. Corporate knowledge management then is the enterprise wide leverage of network nodes' experiences in using information and data to create value. Therefore, a corporate knowledge culture is built on the ability to integrated people, processes and advanced technologies – the major constituents of the value network. Knowledge management, embedded in the cultural sphere of the organisation, is conceived as a strategic initiative to devise a process of mutual understanding, sharing, and using information and data to create and protect value[187].

Over the last decade, banks have made considerable progress in storing data and information[188]. However, these advances have predominantly addressed technological issues and operational issues. Consequently, financial institutions have significantly neglected corporate intelligence or the design and maintenance of enterprise-wide knowledge management systems[189]. Many surveyed financial institutions have pointed out that it has always been difficult for large institutions to compile data and informa-

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[187] These definitions are, in part, based on interviews with SBC, Basle, 10/17/95; Coopers & Lybrand, London, 05/03/96; and the American Stock Exchange, New York, January 1997.
[188] For example, interview with Oracle, Financial Services Division, New York, January 1997.

tion on a single customer from multiple points of interaction. Customer interaction with services and products from individual functional areas are typically treated as separate relationships within the exclusive domain of each functional area and not the corporation per se. Due to the lack of a sophisticated customer-centric infrastructure at a significant number of financial institutions, customer services representatives do not have the infrastructural support to establish a holistic picture of a customer situation at given point in time[190].

Hence, knowledge management addresses this problem by fully integrating the organisation's use of people, processes, and technology to focus on the best practices for sharing information and to utilise knowledge from similar previous situations to inform current decisions. Because of these shortcomings, various financial services providers are currently in the process of building a knowledge culture to codify and make available experience, information and data; with the idea of developing and leveraging enterprise-wide corporate knowledge repositories. Technically, such a system is supported by the removal of artificial walls around the separate stores of information for individual business units. Thus, information can freely flow between the distinct business units. An improved intraorganisational, and eventually interorganisational, flow of information allows management to make more efficient and effective strategic decisions with respect to customers, markets, products, services and operations. We conjecture that the better the information, the more likely the financial institution to align products and services with the true preferences of its customers. The use of better information is aimed at [1] providing a better foundation for cross-selling activities and relationship management (97 percent of respondents: T4; T5; T7) and [2] improving the knowledge

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[189] Sources disguised upon request.
[190] Sources disguised upon request.

basis of the front-line operations (93 percent of respondents: T4; T7). The benefits of these improvements are largely conceived as an increase in the overall level of productivity (95 percent of respondents: T2; T4) and an increase in transaction efficiency. Note, that transactions carried out on VE systems are conceived as a reduction in the resources that need to be dedicated to a single transaction (87 percent of respondents: T3, interorganisational exchange; T5, VE; T6, T7).

Nevertheless, knowledge management per se is not a new concept; rather the focus on corporate knowledge management has received renewed attention[191]. Earlier attempts at information management concentrated on the amount of information accumulated and the efficiency of data processing, or the speed with which an organisation could move data among its disparate constituents over time and space[192]. Mounting competitive pressures have further prompted financial institutions to institutionalise knowledge management processes. Likewise, the same pressures have led to the construction of an infrastructure that can disseminate knowledge to a wider constituency of network nodes that can leverage the knowledge for the benefit of the institution's customers[193]. In addition, customers have increasingly grown accustomed to consume comprehensive financial services from a single point of contact[194]. Furthermore, customers are attracted by new financial products and services that continue to be offered by non-banking institutions[195].

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[191] Interview with Oracle, Financial Services Division, New York, January 1997.
[192] Interview with Oracle, Financial Services Division, New York, January 1997.
[193] Interviews with SBC, Electronic Retail Banking, Basle, 05/10/96, 1995, 1996; UBS, Corporate Communication, Zurich, 09/20/95, and personal correspondence 1996.
[194] For example, American Express provides a host of financial services via various distribution and dissemination channels. Likewise, a number of financial institutions have setup single contact points on the WWW, where via a comprehensive user-interface, customers can execute a wide range of financial transactions. Examples include: First Virtual, E*Trade, IBM, Quote.Com, JP Morgan and Lehman Brothers.
[195] Interview with Oracle, Financial Services Division, New York, January 1997; and personal correspondence with Microsoft, Online Banking, 1996.

Therefore, the challenge for financial institutions is to package customised products and services and make them available through a number of user-friendly distribution channels, independent of time and space constraints. Note, however, that the values and requirements underlying the financial institution customer relationship are subject to constant change. Thus, value networks must be flexible and adaptable to the underlying changes in services, products, the availability of delivery channels and other environmental contingencies. Accordingly, knowledge must be dynamic to reflect the latest changes in one or a combination of contingencies. From the financial institutions surveyed, 60 percent have indicated that they considering forming knowledge value networks with other financial or non-financial services providers (T3; T6, T7). These arrangements are scheduled to enhance the total value delivered to the customers (90 percent of respondents agree: T7, value creation). Conversely, only a relatively small number of respondents (39 percent of respondents: T3) reckon that these new collaborative interorganisational arrangements will eventually impose additional tolls on the organisation. Although confidentiality of customer information continues to be a dominant aspect in the provision of financial services, the exploitation of information and knowledge – stored in the network nodes of a value network – requires broad availability of information across a value network.

The increase in information and knowledge transfer between network constituents further alters the relationship between consumers and financial institutions. For example, for customers valuable knowledge might be reflected in the performance of their financial portfolio or in the ease and success of making transactions. Data warehouse and graphical user interfaces on the WWW that interactively support the customer's portfolio provide quasi-real-time access to all customer accounts and present them in an integrated interface. For the bank, advanced technologies create a tool for

gathering data, information and knowledge about customers' financial preferences, risk behaviour, purchasing proclivities, consolidated and individual portfolio performance, and the bank's relative competitive advantage in the market.

Profitability and performance evaluations not only determine a financial institution's relative competitive position compared with other financial institutions, but also provides the necessary impetus to conduct a thorough analysis of individual customer profitability. Profitability analysis is crucial to the financial organisation's customer relationships since it helps identify alternative possibilities for delivering value to customers[196]. Driven by recent advances in technology and information management, a majority of banks (75 percent of respondents) is currently in the process of redefining customer profitability in terms of customer relationship profitability. Customer relationship profitability includes not only a single functional oriented customer account but also the full relationship, which might extend to include personal checking, business accounts, mortgages, and an investment account, etc.

5.6.1 Knowledge – Conclusion and Outlook

The majority of banks today practice some form of knowledge management – often on the basis of informal and verbal communication processes (e.g., corporate knowledge centres). However, 75 percent of surveyed banks are striving to distribute more information and data to other value network constituents (T3; T6). Interviewees (69 percent of respondents: T4, knowledge; T3; T6; T7) have indicated that they expect greater benefits to accrue to banks that have successfully established knowledge management

[196] Interviews with Bank Cial AG, Accounting, Basle, 09/14/95, 12/21/95, 05/09/96; Bank Sarasin & Co., Finance, Basle, 09/15/95, and Corporate Development, 09/17/95; Goldman Sachs & Co. Bank, Corporate Sales, Zurich, 03/04/96; and SBC, Audit, Basle, 05/13/96.

capabilities at the enterprise level. The value of knowledge sharing grows with the scale of the initiative, as the information can be collected, processed and disseminated among a larger number of network constituents.

Virtual banking and the establishment of interorganisational value networks or Extranets make corporate knowledge management technically feasible. However, as financial institutions rush to build advanced ICT infrastructures that extend the scope of products and services, they should not lose sight of creating sustainable trust based relationships with their customers. We believe that knowledge management is unique because it does more than just manage and present information. It unlocks the contextual value and includes assumptions and experiences. Therefore, effective knowledge management is fast becoming one of the most important processes in retaining a stable customer base and provides the foundation to explore new possibilities to continuously expand the organisational value network.

5.7 Summary – Exploitation

A viable virtual banking model has begun to emerge. Many surveyed financial institutions have taken first steps towards building value networks and, in the process, discovered the potential of virtual banking and electronic commerce. Value networks are formed when financial institutions collaborate to offer their customers comprehensive packages of financial services and products, which are delivered via a plethora of distribution channels embedded in both the physical and the virtual domain of the organisational value network. We have analysed the following four value network constituting

elements: retail banking, capital markets, infrastructure, and knowledge – all embedded in a dynamically changing environment (indicated by the term globalisation).

Technology makes the network of multiple organisations possible, although it does not guarantee that it will be valuable. To do that, value network constituents must know who their customers are, what they need, and how they wish to be served. Accordingly, we have argued that managing this knowledge is just as important as managing financial capital and the information technology infrastructure. The value network is about choices. Financial institutions must decide where they will focus their activities and energies: who will be served and how will the financial institution provide the services? With these questions answered, management can focus on core competencies and partner with other organisations to forge alliances to provide services and products that are beyond the possibilities and scope of the organisation. Because of their expertise, knowledge and long-standing customer relationships, banks are well positioned to build, exploit and explore profitable value networks. However, banks must act soon. Competitors, whose strong brand name and performance convey security and trust, are initiating their own value networks and virtual exchange platforms.

In retail banking, bank customers consider ease of use and convenience as two primary elements of value and items they seek when selecting a bank. Our data has indicated that transactions through branches will decline by about one-third until the year 2000. However, banks expect this to be more than offset by a rise in transactions in other areas (e.g., ATMs, home banking, call centres, telephone banking and EC). The branch network will be rejuvenated: conventional branches will be closed while redesigned and relocated specialist branches will be opened. In the capital market area, banks are expanding their activities to meet the growing needs of customers around the world. To better monitor and enhance risk exposure, the surveyed financial institutions

are finding it necessary to undertake significant technology investments and changes in the way they currently conduct capital market activities. The infrastructure of value networks requires dynamic co-ordination of processes, people and technology. Distributed database management, client server technology, Intranet and Extranet methodologies support more fluid, interactive exchanges of information, and allow the financial institution to readily link with customers across traditional constraints of time and space. Knowledge management is founded on the desire of financial institutions to know more about their customers. Surveyed financial institutions have indicated that this repository of knowledge, when properly managed and leveraged by advanced information technology, will be a "true" competitive advantage in the dawning era of digital value networks and EC. Those four value network elements are embedded in a dynamically changing environment driven by the desire of financial institutions to provide customers seamless, comprehensive services without the constraints of time and space. Thus, (digital) value networks are both a cause and effect of globalisation. In conclusion, each financial institution must ultimately decide whether it will be a co-ordinator or a supplier of core competencies to a value network and the extent of its involvement. These strategic decisions will significantly define the financial institution's role and scope in the future.

6 Virtual Forms of Economic Exchange

6.1 Abstract

This chapter sets out to explore VE platforms or EC systems. These platforms serve as substitutes and/or complements for existing operations in the physical domain of the organisational value network. This chapter comprises two parts. The first part introduces the concept of VE and specifies some of the technological requirements for VE systems. We discuss the distribution of "digitally rendered" services and products. We introduce the VE framework to evaluate governance modes or institutional settings for the conduct of EC. Our data has revealed that the image and reputation of a financial organisation are of crucial importance for the conduct of economic exchange. Accordingly, we evaluate their role in the context of virtual economic exchange systems. Subsequently, we explore the possibilities of multimedia banking – based on digital modes of exchange that are made available via various distribution channels. We then discuss some of the genuine idiosyncrasies and contingencies of multimedia banking and evaluate the likely development of multimedia and various VE modes for the provision of financial services. The second part of this chapter provides an indepth analysis of the risks associated with the exchange of "information" via digital channels or virtual forms of economic exchange. We provide a framework to assess potential sources where tampering, as a significant source of risk, can occur. We further discuss the nature of interlinked digital systems such a globe spanning payment systems and their eventual vulnerability to tampering. We examine interorganisational information sharing systems and intermediation and the risks associated with them. We argue that a new form of intermediation, which is largely based on interorganisational trust, may eventually overcome higher levels of environmental uncertainty. Finally, we analyse how EC based products and services are being provided and more specifically, the impact of "packaging and bundling" on intermediation and virtual economic exchange.

6.2 Digital and Virtual Exchange Systems

The number of strategic alliances, joint ventures, or other forms of interorganisational collaboration have increased substantially over the last decade[197]. Likewise, a number of scholars have introduced business and management models that are based on collaboration rather than pure competition (Hamel, Doz and Prahalad, 1989; Kreiner and

[197] The following authors provided an analysis of interorganisational arrangements: Benjamin and Wigand (1995); Bleeke and Ernst (1993, 1995); Borys and Jemison (1989); Dunning (1995); Gomes-Casseres (1993b); Gualti (1993); Lorange (1996); Nalebuff and Brandenburger (1996); Ohmae (1989); and Ring Smith and Van de Ven (1992, 1994).

Schultz, 1993; Moore, 1993; Shaughnessy, 1995). The nexus of value network collaboration is maintained via interorganisational forms of information sharing and the conduct of economic exchange in flexible and highly adaptable networks of organisations (Jarillo, 1988; Lea, O'Shea and Fung, 1995; Nohria and Eccles, 1992a,b; Powell, 1987; Ring Smith, 1996a; Thorelli, 1986). A substantive amount of these links between organisations are digital (*Business Week*, June 13, 1994).

However, Upton and McAfee (1996) have recently pointed out that true electronic communication and exchange remains elusive in even the most sophisticated interorganisational arrangements. The task of creating seamless integrated intra- and interorganisational electronic networks has proved to be difficult and frustrating for many companies (Upton and McAfee, 1996). The three main technologies that companies have employed to create virtual operations – electronic data interchange (EDI), proprietary GroupWare (e.g., Lotus Notes), and dedicated wide-area networks (WANs) – are not complete solutions for the setting up of virtual environments such as EC systems (Upton and McAfee, 1996). The reasons become obvious if one looks at the three basic demands that a large digital network system, underlying any large scale EC and/or virtual digital network operation, must meet[198].

First, the ability to accommodate network members whose level of technological sophistication varies considerably (e.g., smooth integration of PCs and mainframe systems). To support relationships at any stages of technological sophistication, information network systems must be designed to easily facilitate entry and exit of players. In addition, information networks need to be secure: potential participants will be reluctant to join a system that will expose their internal networks, transmissions and data to un-

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[198] The following debate about different interorganisational data exchange systems has greatly benefited from the author's numerous discussions with Enzo Leone, information and telecommunications director at Klopman International, London and Rome; 1996 – 1997.

known parties. Second, the provision of high levels of security, while dealing with a constantly changing pool of network members, featuring various levels of intimacy and scope, must be maintained consistently. Third, VE systems must provide extensive network functionality. Some of these functions include the capacity to transfer files across the network, the power to access common pools of information, and the capability to administer access rights and set permissions to utilise programs on remote computers. Sharing and manipulating all information on a network system involve three distinct types of functionality.

In ascending order of complexity, they comprise ordinary data transmission, remote data access, and finally access to remote applications and data or what may be referred to as "information omni-presence". A capability that allows all authorised network members to see and use the remote sources – independent of time and space constraints. This is especially useful within a virtual environment since it permits customers to check the status of an account balance by logging on to a service provider's computer systems. This kind of activity can even be performed by means of a home page on the WWW[199]. A virtual environment then provides these services regardless of the level of technological sophistication of a specific network constituent. EDI, GroupWare and WAN systems can each deal with some of these demands, yet none can deal with all of them, nor can combinations of the three technologies (Upton and McAfee, 1996).

EDI is the oldest form of interorganisational digital data collaboration. EDI standards specify how information should be structured so that any party using these formats can accept transmission from any other party using them. However, despite the existence of some common standards, many systems are still inflexible and proprie-

[199] Interview with Citibank, Strategy Division, London, September 27, 1995; and personal communication with Wells Fargo & Company, San Francisco, September 1996.

tary[200]. For example, it can be prohibitively expensive to add EDI links and to mould one's own computer data transmission protocols to those proprietary protocols of important clients. Consequently, this solution is expensive and time consuming both to add new members to such a network and to expand the types of information exchanged on it. Such attributes mean that conventional EDI is best suited for linking the members of a relatively small and stable community – particularly if one of the community members is strong enough to command adherence to his communication- and data exchange standards. Conversely, EDI is ill suited for communities with a large number of transient members with various levels of technological sophistication – as a new member joining the system requires a dedicated line to be installed. Other limitations of conventional EDI systems include the overall limited capability and capacity to exchange information between members, since an EDI system needs to be specifically configured for each communication link between different network entities. The sequential batch configuration of EDI networks does not permit real-time links between network constituents. Finally, the inability of EDI to allow network members to operate another network entity's computer and software applications from a remote location make this architecture largely unsuitable for EC.

GroupWare addresses some of EDI's drawbacks and incorporates tools and applications for highly collaborative environments. GroupWare is able to support and coordinate workflows in three distinct ways. First, it makes available a common and up-to-date body of knowledge across an authorised userbase. Second, it ads workflow capabilities, enabling group members – from remote locations – to collaborate on documents and projects. Third, the software provides a platform for interactive communication. However, GroupWare systems are often proprietary and expensive to install and

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[200] Interview with UBS, Telecommunications, Zurich, September 20, 1995.

administer. Another, drawback of GroupWare solutions is the lack of information omni-presence capabilities; users cannot run applications on remote machines.

Wide-Area Networks provide dedicated high-speed links that connect individual local-area networks (LANs). Unlike GroupWare and EDI solutions, WANs provide all (remote) users with universal communication, data- and application access capabilities; thus providing information omni-presence capabilities as required by a VE environment. Despite, WANs' various information omni-presence features, this particular solution is exclusive (e.g., firm specific communication protocols) and expensive[201]. In addition, the administration of a dispersed network is complicated and the network entities need a relative high level of technological sophistication. Nevertheless, in situations where issues of security precede over other contingencies, a WAN solution may be the only feasible solution to achieve a near virtual environment (e.g., international payment systems such as SWIFT).

6.2.1 Virtual Exchange System Requirements

Due to the shortcomings of the three traditional data exchange systems, as discussed above, the design of digital network exchange systems hinges on the provision of a number of requirements for a large scale interorganisational value network to succeed[202]. First, advanced forms of technology must be able to accommodate network constituents whose ICT capabilities vary considerably – for example, integration and exchange of data among mainframe based and PC based network members. Second, while maintaining a high level of network data security, it must be able to cope with a constantly

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[201] Interview with UBS, Telecommunications, Zurich, September 20, 1995.
[202] Interview with UBS, Telecommunications, Zurich, September 20, 1995; personal communication with Enzo Leone, 1996, 1997.

changing pool of value network constituents including customers, suppliers, financial services providers and genuine network services providers. Moreover, these often time limited relationships among network constituents vary enormously in intimacy and scope. Third, the design and architecture of the underlying exchange and data networks must adhere to an unforeseeable plethora of possible functions and procedures that will be carried out over these networks.

For example, these networks must have the power to access remote pools of information and the capability of computing and utilising all the programmes and data sources on a computer located anywhere along the virtual value network. Thus, based on these VE platform requirements, the virtual value network must be able to adhere to the following three requirements[203]. First, it must be able to incorporate value network constituents at any stage of the value creation process (or relationship). Therefore, the second requirements is that the value network can deal with and incorporate partners in the value creation process that exhibit varying levels of technological sophistication. Third, the virtual value network must be able to provide all eventually requested functionality.

Therefore, to support simultaneously a large number of intraorganisational cooperative arrangements at varying stages of the value creation process, an information system (virtual value networks and/or VE platforms) must be easy to enter and leave. A network that is expensive or difficult to join will discourage exploitation of existing capabilities and the exploration of new ones. However, easy access can be foregone for the eventual lack of security; potential participants are unlikely to join a network system that will expose their internal data networks or communication procedures to unauthor-

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[203] Interviews with SBC, Audit, Basle, 05/13/96, Electronic Retail Banking, Basle, 05/10/96, 12/22/95, 11/03/95; UBS, Corporate Communications, Zurich, 09/20/95; Bank Sarasin & Co., Basle, 09/15/96;

ised third parties. Likewise, value network constituents will vary significantly in their level of technological sophistication – regardless of the stages of value creation.

The level of sophistication is a function, of the type and power of the hardware and software installed; the bandwidth of the interorganisational corporate communication channels deployed; the average and highest level of knowledge and experience within a corporation; and finally the prevailing degree of interconnectedness at the stage of joining the virtual value network (Upton and McAfee, 1996). In like manner, sharing and manipulating all information and data on an interorganisational virtual value network involve various yet distinct types of functionality. Simple data transmission is the most basic form of interorganisational collaboration along virtual value networks. With increasing functional complexity, access to data and remote applications becomes of paramount importance to carry out flexible virtual value network operations[204]. These capabilities allow all authorised users to see, use and manipulate data and programmes resident on a specific network node, independent of whether the users belong to the organisation in question; or whether they are onsite or in a remote locale. Furthermore, these omni-presence capabilities permit a customer in a remote location to access value network constituents' virtual services; regardless of the nature and scope of the relationship, the nature of the business or the level of technological sophistication.

The primary importance of the WWW, for the development of VE platforms, is that it provides both [1] a common and standardised interface and [2] a more flexible and less expensive alternative for setting up virtual environments and/or to connect to a large-

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Oracle, New York, January 1997; and Coopers & Lybrand, London, 05/03/96, 06/17/96; and personal communication with Enzo Leone, 1996, 1997.

[204] A TCP/IP communication protocols based interorganisational data exchange network provides the foundation to carry out all three levels of functionality (data transmission, access to data and remote ap-

scale interorganisational digital network. The confluence of several trends makes this approach feasible. The emergence of widely accepted, open standards (e.g., TCP/IP, HTML); ever cheaper computing power; increasingly abundant bandwidth; the development of secure data protection algorithms; and finally a large and growing user base accustomed to the workings of the WWW and its derivatives. Thus, a rapidly increasing number of companies are embracing standard visual Web browsers and data communication protocols as a means for dispersed sites and different organisations to communicate with one another[205]. In addition, an information intermediary can add functionality and additional value to a digital network environment by helping network entities identify which information has value to particular constituents and how revenue might be generated from this information. However, this potential hinges upon an information intermediary's knowledge of a particular industry and his capability to identify information sharing opportunities and possibilities to create (added) value. This broad acceptance of common de facto standards, embedded in the Internet and the WWW, make the Web an immensely powerful tool for intercompany transactions[206]. We thus conjecture that the power and ubiquity of these digital interorganisational exchange modes and protocols will make the WWW one of the main VE platforms.

6.2.2 Distribution – Value Network Channels

The cost effective and efficient distribution of services and products in conjunction with the provision of high levels of convenience has long dominated the physical domain of

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plication manipulation). These open standard protocols are helpful in that they are comprehensive, open (published), and non-proprietary (free).

[205] See, for example, *Business Week* (1997) May 5; *Business Week* (1994) May 2, June 13; and *Business Week* (1995) February 27.

the financial services value network[207]. Traditionally, distribution of services and products in the financial services industry has predominantly been achieved via extensive branch networks. The constant rise of operating costs in the financial services industry over the last decade has forced industry constituents to look at alternative distribution channels. Industry players can view their distribution channels as webs of capabilities embedded in an extended organisational network (Narus and Anderson, 1996). Accordingly, financial services providers have come to realise that by sharing their resources and capabilities in novel ways and new situations, they can take advantage of profitable opportunities that they could not have exploited individually (e.g., Moore, 1993; Nalebuff and Brandenburger, 1996). SBC, for example, has opened Box Offices for cultural events in several of its branches in Switzerland to attract customers.

Business dynamics and a high level of environmental uncertainty coupled with emerging ICTs make this new digital approach to distribution both essential and feasible. As noted above, though competition is forcing management to scrutinise every aspect of their operations on the corporate value network. Thus, financial services providers, among a host of other industries, are recognising their shared distribution channels – such as VE platforms embedded on the Internet – to exploit largely untapped opportunities for major cost savings and productivity improvements. The potential benefits of these collaborative distribution channels come from the opportunity to leverage resources and share capabilities within and across these channels. These distribution channels can be divided into three broad categories (Narus and Anderson, 1996).

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[206] The Internet may be conceived as a collection of value added services that are transported over the existing telephone and cable networks.

[207] Interviews with SBC, Electronic Retail Banking, Basle, 22/12/95, 05/10/96; UBS, Corporate Communication, Zurich, 09/20/95; UBS, Singapore, personal correspondence, 1996; Schorders, Information Technology, London, 09/27/95; Citibank, Corporate Strategy and Information Technology, London, 09/27/95; Oracle, Financial Services Division, New York, 1997; and personal correspondence with Microsoft, Online Banking, 1996.

The first set of distribution channels is designed to ensure that existing customers and users continue to have access to the same level of services that they have enjoyed up to now. Simultaneously, users should be handed a tool to routinely cope with unexpected and/or unusual service and product requirements. Second, these new distribution arrangements should provide the foundation for the provision of services to appease customers' growing demand for broader market offerings and convenient access to them – products and services that have traditionally not been offered by a large number of financial services providers. Third, the objective of these new collaborative interorganisational distribution arrangements is to improve the quality of services throughout the value network; by substituting the superior capabilities and procedures for their inferior counterparts. The idea being, that a portfolio of distribution channels – provided by a number of services providers in the marketplace and marketspace – can offer a greater number of superior and cost-effective high quality distribution services than a single distribution channel. Furthermore, each contributing distributor should receive appropriate compensation when he shares his superior distribution channel capabilities with other value network constituents.

6.3 Virtual Exchange Platforms[208]

Interorganisational data exchange and basic forms of interorganisational collaboration based solely on digital data exchange networks are not new. These systems are complex in nature and require an abundance of processing power – both have traditionally inhibited the process of establishing easy to use yet sophisticated interorganisational

virtual data, information and services exchange platforms. The recent advances in technology, however, have provided the means to build such systems.

The beginning of the 1970s has witnessed a number of technological installations between organisations dedicated to the exchange of data, as a means to support single-source sales channels[209]. Thus, an electronic terminal on the premises of a customer would link the customer and the sponsoring vendor – although only for that specific vendor's products and services. According to Malone, Yates and Benjamin (1989) and Benjamin and Wigand (1995), some of those electronic sales channels have failed, but others have grown and changed. The electronic sales channels that worked have done so largely because they have given customers something of real value (Benjamin and Wigand, 1995; Malone, Yates and Benjamin, 1989). Customers, who have become accustomed to the convenience of having remote electronic access to a number of vendor facilities from their local electronic terminals, give the vendor a quasi captive audience (Arthur, 1989; David, 1985; Liebowitz and Margolis, 1990, 1996b). However, even customers who appreciate the eventual convenience and potential savings of single-source sales channels do not like to be locked into one supplier (Arthur, 1989; Benjamin and Wigand, 1995; Liebowitz and Margolis, 1996b). Conversely, they would rather be able to compare a number of competing offerings to obtain the product and services features they want at the best available price.

Unlike single sales channels, electronic markets offer cross company electronic connections, just as single source channels do, and therefore give customers the same level of convenience. Furthermore, electronic markets (alternatively also referred to as

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[208] This discussion has greatly benefited from the workshops held at the [1] financial services division at Oracle in New York, January 21 1997; [2] Lehman Brothers, Trading and Corporate Finance, London, January 27 1997.

[209] The term single source sales channel is here referred to as a direct link between two economic agents involved in economic exchange; in this context, conducted on a VE platform.

Extranets [digital business to business connections via secure yet open system based exchange channels]) include offerings from competing suppliers[210]. Accordingly, customers not only have electronic connections to their suppliers, but they are also in a position to select the supplier they want to use for a specific economic transaction. Therefore, from the customers' point of view, electronic markets are more desirable than single source sales channels. Moreover, because electronic markets are essentially a brokering service they offer an opportunity as well as threat to existing brokers. Therefore, as electronic markets prompt firms to rethink and reposition themselves along the interorganisational value network, virtual modes of exchange are expected to eventually change the way economic exchange is performed in the economy.

The emergence of interorganisational electronic links and ultimately the rise of electronic markets will reduce the benefits of vertical integration for many organisations (Benjamin and Wigand, 1995; Chesbrough and Teece, 1996; Davidow and Malone, 1993; Hess and Kemerer, 1994; Malone, Yates and Banjamin, 1989; Rayport and Sviokla, 1994, 1995; Venkatesan, 1992). Distinct interconnected network nodes – not vertically integrated companies – are expected to carry out different operations and procedures along the interorganisational value network (Benjamin and Wigand, 1995; Venkatesan, 1992). Consequently, the value creation process and the subsequent exchange of services and products among value network constituents becomes more efficient and effective as the size of VE platforms continues to grow (Arthur, 1989, 1990, 1996; David, 1985; Liebowitz and Margolis, 1990, 1994, 1996a, 1996b; Katz and Sha-

[210] One way suppliers can decide if electronic markets are likely to be useful in their industries, is to consider whether customers can make a sensible purchase decision based on information in a computerised corporate database. If the answer is affirmative, then a full electronic market is feasible. For example, highly standardised products and services such as financial commodities and other basic financial services and products that are simple to define, lend themselves to exchange on electronic markets. Conversely, when products and services are unique, there may be little added value in being able to compare alternative corporate offerings electronically. Nevertheless, we conjecture that even if a product or service is

piro, 1985, 1994). Moreover, the actual costs associated with the economic transaction via secure yet open standard networks are likely to decrease over time (Benjamin and Wigand, 1995; Upton and McAfee, 1996; Malone, Yates and Benjamin, 1989). Therefore, the traditional economic rational to produce or perform certain activities in-house no longer prevails. Thus, an increasing amount of transactions and procedures are being sought after in the open electronic market rather than in-house (Venkatesan, 1992). Hence, the overall size of VE platforms is expected to grow; leading eventually to the exploitation of economies of scale and scope.

Based on our analysis, we can identify a number of potential areas of opportunity and risk for value network constituents. First, the consumer will have de facto free[211] market access to all network interconnected suppliers (willing to set up shop on a VE platform). Thus, a consumer will eventually have maximum choice at the lowest possible price. With the advent of more advanced or intelligent interactive software agents (Halfhill, 1996; Reinhardt, 1994; Varian, 1995b), consumers may eventually have access to a market price without the market maker's profit attached to it (Benjamin and Wigand, 1995). Second, co-ordination of market activities in the marketspace as opposed in the marketplace should result in overall lower co-ordination costs (as ICTs continue to advanced and produce cost effective exchange systems [Narus and Anderson, 1996; Benjamin and Wigand, 1995; Upton and McAfee, 1996]). Interlinked exchange network constituents will be likely to reduce their co-ordination- and exchange costs by reducing the number of intermediary transactions and unneeded co-ordination

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somewhat complex, an electronic market that provides a means to let potential customers narrow their search according to a few key product and/or service requirements might succeed.

[211] Once the distribution infrastructure is in place, an additional customer represents near-zero variable costs per unit of service. We therefore believe that Internet access will eventually be given away for free as a basic service to attract new customers or maintain existing ones. The value added of providing basic online connections has decreased considerably over the last five years and this trend is expected to continue (personal correspondence with Microsoft, 1996). Therefore, online services providers have an in-

as VE platforms provide direct links between supply and demand. Likewise, the actual costs associated with the distribution of digital and electronic based services and products are expected to decrease over time – as advances in information and communications technologies provide more cost effective distribution solutions. Delivery costs can be reduced in two major ways. First, information will be transmitted electronically in compressed form, and lower electronic distribution costs are likely to be substituted (Benjamin and Wigand, 1995; Narus and Anderson, 1996; Novich, 1990; Thompson, 1996). Second, as a substantial number of elements along the value chain are bypassed, physical distribution and related inventory carrying costs will eventually be eliminated (Benjamin and Wigand, 1995; Normann and Ramirez, 1993; Porter and Millar, 1985; Rayport and Sviokla, 1995; Thompson, 1996).

The experience of early electronic market systems such as the electronic airline reservation system indicates that profits are likely to be redistributed among network constituents and that the overall level of profits may well decrease. Nevertheless, smaller profit margins may be compensated for by an increase in transaction volume.

6.3.1 Virtual Exchange Markets

The information technology literature offers a framework upon which to base predictions about the future scope of electronic exchange markets (Bakos, 1991a,b; 1992) and more specifically the electronic financial services market (Hess and Kemerer, 1994)[212].

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centive to subsidise free basic online access in anticipation for a higher return from customers' subscriptions to high value added online services.

[212] In their industry case study Hess and Kemerer (1994) have analysed, based on the electronic market hypothesis as outlined by Malone, Yates and Benjamin (1987, 1989), the implications of computerised loan origination systems on the home mortgage industry.

A framework developed by Malone, Yates and Benjamin (1987, 1989) and here referred to as the Virtual Exchange Framework (VEF), suggests that the introduction of advanced and basic forms of ICTs are likely, ceteris paribus, to lead to an increased use of (electronic) market based exchange modes at the expense of (electronic) hierarchical modes of economic exchange.

6.3.1.1 The Virtual Exchange Framework

Numerous authors have suggested that there are significant benefits available to market participants, who rethink and recast the nature of their organisations' economic activities based on looming advances in ICTs[213]. The basic argument put forward is that by decreasing many of the co-ordination costs associated with doing business both within and outside organisational confines, ICTs will provide opportunities for cost reduction and revenue expansion that entail either changes in the market structures or the boundaries separating the organisations within those markets. Co-ordination costs refer to the resources depleted processing information for the selection process of suppliers, contracts, scheduled delivery and other corporate activities associated with economic exchange and the associated transactions. Specifically two structural adjustments of exchange procedures have been identified that have been made possible by relatively recent improvements in ICTs and thus the co-ordination of economic activities (Malone, Yates and Benjamin, 1987).

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[213] See, for example, Malone and Rockart (1991); Malone, Yates and Benjamin (1987, 1989); Rockart and Hofman (1992); Rockart and Scott Morton (1984); Rockart and Short (1989); Rockart, Earl and Ross (1996); Quinn (1992a, 1992b); Galliers, Swatman and Swatman (1995); Porter and Millar (1985); Price (1996); Ramarapu and Lado (1995); Vasudevan, Smith and Tanniru (1995); Vankatraman (1991, 1994); Venkartraman, Henderson and Oldach (1993); and Zahra, Nash and Bickford (1995).

Electronic markets and electronic hierarchies both co-ordinate the flow of digitally replicated products and services through adjacent steps in the value added network (Hess and Kemerer, 1994; Malone, Yates and Benjamin, 1987, 1989; Rayport and Sviokla, 1992, 1994). In market environments, the basic forces of supply and demand (what quantity at what price given a certain quality) determine how products and services are transferred between multiple organisations and their customers across the virtual value network. Correspondingly, customers compare offerings from a large number of potential vendors in order to find the highest match between their requirements and the suppliers' offerings, with regard to product and services attributes, support, price and additional factors. Therefore, comparing a larger number of offerings is likely to provide a better match between customer requirements and vendor offerings; although such an extended search also adds to a customer's overall search costs. In electronic markets, ICTs facilitate customers' comparison of purchase alternatives. Therefore, electronic markets – supported by technology – bear the potential to both improve the amount of information available to customers and eventually lower their search costs, enabling volumes and speed that traditional forms of intermediation were unlikely to provide (Hess and Kemerer, 1994).

In traditional hierarchies, there is ownership and common, centralised managerial control, and this, rather than market forces, dictates how goods and services are transferred between economic agents. Malone, Yates and Benjamin (1987) coined the term "electronic hierarchy" to include the situation where the demand side is linked by information and telecommunication technologies to a predetermined source of supply for the products and/or services in question. Although this arrangement forfeits the access to multiple providers that markets feature, it eliminates all the costs associated with identifying and trading with more than one economic agent. As customers move from

one to many suppliers, the cost of co-ordinating economic exchange activities may eventually rise. Conversely, as the number of competing suppliers falls, production costs tend to rise because of the absence of price competition to encourage firms to carefully manage production costs (Hess and Kemerer, 1994). From this analysis, it follows that if, ceteris paribus, co-ordination costs are decreased, customers will naturally tend to favour markets because they will pay lower prices without paying as much in co-ordination costs (Hess and Kemerer, 1994). Malone, Yates and Benjamin (1987, 1989) argued that producers are, in general, motivated to support hierarchies as the co-ordinating scheme of choice. Producers do not like price competition with other firms, which drives down margins and requires producers to focus more of their resources on advertising and controlling production costs. Most importantly, though, Malone, Yates and Benjamin (1987, 1989) suggested that the benefits to buyers are likely to surpass the benefits to suppliers, as ICTs drive down the costs of co-ordination through electronic markets.

Malone, Yates and Benjamin (1987, 1989) proposed an "evolutionary" path that organisations will eventually follow to join or form electronic markets and communities, respectively. Beginning with a single source interorganisational electronic channel the first step is the biased electronic market, where suppliers, often the providers of the co-ordinating technology, use the technology to push customers toward their product or service, while providing access to other firms' offerings (Hess and Kemerer, 1994). The next step is the unbiased electronic market, where all vendors are given equal chance to win customers based on the merits of their products and services. A third and final evolutionary step is the transition to an electronic market, which provides decision support facilities for customers. These systems provide customers, who may find that they now have more product and vendor information than they can efficiently analyse to

make an effective decision, with decision support systems that range from filtering to the provision of smart software systems[214].

In addition to co-ordination costs, Malone, Yates and Benjamin (1987, 1989) argued that **lower** levels of asset specificity[215] and complexity of description, respectively, may eventually favour markets in a given industry. Complexity of description is defined as the amount of information that must be transferred between buyers and sellers of a given good or service in order to describe its attributes in sufficient detail that buyers can make an informed choice between competing suppliers (Malone, Yates and Benjamin, 1987). Malone, Yates and Benjamin, (1987, 1989) specifically suggest that (standardised) stocks and bonds – as a narrow extract of all publicly traded financial securities – are examples of products with low levels of description complexity.

In general, from the beginning of the value chain to the end, the provision of financial services is concerned with managing predominately only one resource: **information**. Fund and ownership transfers, applications, under-writing, and monthly payments – all are, in essence, just transmitting or verifying digitally embedded bits of information. Therefore, based on the information provided by the VEF framework, it would appear that financial transactions could provide an opportunity for an electronic market to arise. Given this potential, what changes does the VEF predict for the financial services industry – and more specifically for the provision of financial services? As ICTs eventually reduce the unit costs of co-ordination, markets will be substituted for hierarchies. This occurs because relatively lower co-ordination costs are a traditional

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[214] A more detailed discussion about smart software systems for the analysis of information content is provided in Halfhill (1996); Heygate (1994); Reinhardt (1994); and Varian (1995a,b; 1996a,b).

[215] Asset specificity refers to the degree to which an asset can be redeployed to alternative uses and by alternative users without sacrifice of product value (Williamson, 1975). Williamson's (1975, 1985, 1991a, 1991b) examples of asset specificity include site specificity and physical asset specificity. Other types of asset specificity include human asset specificity such as knowledge and experience, dedicated assets, and brand name reputational capital.

source of advantage for hierarchies in environments with no or limited ICTs. The benefits of electronic tools in matching buyers and suppliers are referred to as the electronic brokerage effect, and this further contributes to the trend toward electronic markets (Hess and Kemerer, 1994).

> **Proposition 7**: In virtual environments, advanced information and communication technology, aimed at the co-ordination of economic exchange, provides opportunities to lessen or alleviate market imperfections.

> **Proposition 8**: Advanced information and communication technologies – aimed at facilitating and enhancing EC – provide opportunities to lessen or alleviate value network exchange imperfections.

A related effect of electronic co-ordination would be a significant reduction in the search efforts required on the part of financial services providers' customers to compare a larger number of available alternatives and surrogates. Thus, it also follows from the general VEF framework that there will be fundamental changes in the structure of the market when catalysed by electronic co-ordination mechanisms. The VEF framework suggests that financial intermediaries are threatened by electronic co-ordination and should expect to be impaired or eventually be made obsolete by electronic markets. Furthermore, the framework suggests that agents – or alternatively intermediaries deploying artificial software agents – who take advantage of electronic co-ordination, will have some initial competitive edge over their counterparts who do not use these mechanisms.

6.3.1.1.1 Alternative Views of Virtual Exchange Platforms

Recently, a number of authors have suggested alternative views as to how information and communications technologies will affect market structures[216]. In particular, they independently argue that the introduction of information technology may result in fewer, rather than more, suppliers, despite the reduction in transaction costs.

The first such objection to the VEF is rooted in the transaction cost economics literature[217]. While advanced ICTs may reduce co-ordination costs, increasing volumes of interorganisational co-ordination can create transaction risks (Sherer, 1995a), specifically, increasing one's exposure to opportunistic behaviour on the part of other parties in these co-operative arrangements (Hill, 1990). However, advanced ICTs may also reduce these transaction risks (e.g., digital monitoring of partner activities [Sherer, 1995a]), which, combined with the reduced costs of co-ordination, suggests a move toward tightly coupled, co-operative relationships (Hess and Kemerer, 1994). These relationships are neither transactions in the spot market, nor are they a vertical integration of the firm, and therefore, they represent a middle position between these two extremes (Clemons, Reddi and Row, 1993; Clemons and Row, 1993). Clemons, Reddi and Row (1993) argued for an amended version of the VEF, which they term the **move to the middle** (Clemons and Row, 1992; Clemons, Reddi and Row, 1993). Clemons, Reddi and Row (1993) further decomposed transactions costs into co-ordination costs, opportunism risk, and operations risks (e.g., uncertainty regarding the quality of the product

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[216] See, for example, Anderton, Davis, Hussain and Staley (1995); Clemons (1995); Clemons and Row (1992a, 1992b); Clemons, Reddi and Row (1993); Eriksson and Mattsson (1996); Jacobides (199?); Steinfeld, Kraut and Plummer (1995); and Thompson (1996).

[217] The transactions cost theory as originally outlined by Williamson (1975, 1985, 1991a, 1991b, 1994a, 1994b, 1996) is beyond the scope of this work. However, the following works provide a more detailed discussion about the transaction costs theory: Alvesson and Lindkvist (1993); Chi (1994); Chiles and McMackin (1996); Ghoshal and Moran (1996); Hill (1990); Johanson and Mattsson (1987); and Zajac and Olsen (1993). Additional discussions related to the transaction cost theory can further be found in

being supplied), and proposed that the monitoring use of ICTs is favourable toward all three dimensions. Clemons, Reddi and Row (1993), and Clemons and Row (1992) concluded that there will be increased co-ordination (e.g., outsourcing), although via a limited number of long-term suppliers. Thus according to this view, a true VE platform, as proposed by the original VEF, would be unlikely.

A second objection to the VEF is related to the effects on market exchange structures linked to the adoption of basic electronic exchange systems such as Electronic Data Interchange (EDI)[218]. More specifically, a case where a single economic agent faces a number of competing heterogeneous suppliers. A simple analysis of basic electronic exchange systems may reveal that since EDI reduces transaction costs, all suppliers would agree to participate in the arrangement, assuming that the costs to do so are not prohibitive. Moreover, the larger such a system, the more likely it is to exhibit economies of scale and scope (Arthur, 1996; Liebowitz and Margolis, 1994). However, such a case tends to be rather unlikely as most of the benefits tend to be captured by the demand side (Hess and Kemerer, 1994). More importantly, there are declining marginal returns to the suppliers with each subsequent supplier added. This eventually creates a situation whereby the buyer will encourage early suppliers' adoption (perhaps even providing subsidies for adoption), but where equilibrium may be reached before complete adoption by all current suppliers (Hess and Kemerer, 1994).

> **Proposition 9**: The price offered to "non-EC adopting" suppliers will eventually be lower than the price before the introduction of a basic electronic exchange system. Thus, the resulting cost differentials may result in fewer total suppliers than was originally the case, despite the

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Bradach and Eccles (1989); Dosi (1995); Noria and Eccles (1992); Ouchi (1980, 1981); Spulber (1994, 1996); and Thorelli (1986).

[218] For a more detailed discussion about EDI and the integration of EDI systems in concurrent organisational infrastructures see, for example, Cipparone (1996a,b); Lu (1993); Murray (1993); Sprague (1995).

fact that basic electronic exchange systems have reduced transaction costs.

Proposition 10: The introduction of information and communication technologies may not necessarily lead to a larger volume of spot market transactions – as some firms may choose not to participate.

A third objection to the VEF comes from the economics literature on incomplete contracts, but was motivated by empirical observations in the US and Japan that recognised a general movement toward fewer, rather than more, suppliers (Bakos, 1991a, 1991b, 1992; Bakos and Brynjolfsson, 1993). In particular, Bakos and Brynjolfsson (1993) noted that in (intangible) economic exchange relationships there are likely to be a set of attributes such as quality, responsiveness, and innovation that are non-contractible investments and hence difficult to assess. Nelson (1970) has referred to products and services where quality can rarely be learnt even after purchase as credence goods. This uncertainty is largely due to the difficulty facing economic agents in their attempt to capture a priori all possible states and outcomes in a contract. Bakos and Brynjolfsson (1993) argued that the introduction of advanced ICTs is likely to increase the importance of these non-contractibles (e.g., the ability to monitor an outsourcing vendor). Thus, the supply side is likely to undertake such investments only if they perceive their ability to capture the ex post benefits as high, which in turn depends on their relative ex post bargaining power[219]. Thus, to the degree to which such non-contractibles are important in the exchange relationship, buyers will find it in their best interests to limit the number of suppliers so as to provide the remaining suppliers with sufficient bargaining power and the resulting incentives to make non-contractible investments.

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[219] Bakos (1991a,b) argued that electronic marketplaces usually favour the demand side by lowering search costs, thus reducing the market power and profits of sellers. Accordingly, suppliers will be reluctant to develop such systems, in markets such as consumer markets, where the suppliers are highly con-

The net result is a smaller number of suppliers; all of whom have sufficient incentives to invest in those "non-contractibles" that will eventually also benefit the buyer (Hess and Kemerer, 1994). While drawing from different economic theories, the Bakos and Brynjolfsson (1993) model provides complementary explanations for why the resulting equilibrium number of suppliers may be smaller after the introduction of ICTs. These alternative views of electronic mediation focus on the repeated nature of transactions and economic exchange. They note that information technology costs, while rapidly declining on a per unit basis, still represents a significant investment when employed on the scale required to transform an entire industry or a significant part thereof.

6.4 Summary, Conjectures – Virtual Exchange

In summary, what can be said about the applicability of the VEF to the financial services industry and more specifically, electronic economic exchange in the domain of capital markets and electronic retail banking[220]?

	VEF Framework in Banking	Results and Conjectures
VEF 1	Advanced information and communication technologies will result in the development of electronic markets for financial services.	Large potential, although at present the actual development of fully commercial VE platforms is largely limited to a number of proprietary system – a number of initiatives have the po-

centrated relative to the consumers. Thus, providers of services may have incentives to slow or even halt the development of sophisticated VE systems that undermine their economic power.

[220] The data for this analysis have been obtained from a customer survey jointly conducted with a Swiss universal bank during the time period 1995 – 1996. All sources have been disclosed upon request and results can only be published to a very limited extent. However, in accordance with the Bank, partial results can be revealed in the context of this chapter. While the author has provided most of the questions and ideas for the creation of the survey, the data collection and the analysis thereof have been exclusively carried out by the Bank. Thus, the following results need to be seen and contrasted against the scope of a globally active universal Bank. More specifically, the Bank's primary interest of this analysis is based on an assessment of customers' reaction to the eventual introduction of advanced VE systems. Capital markets and retail banking activities have received primary attention – as these areas have been identified as some of the most promising areas for the application of advanced ICTs.

	VEF Framework in Banking	Results and Conjectures
		tential to eventually change the industry structure.
VEF 2	Advanced information and communication technologies will introduce fundamental changes in the market structure; financial intermediaries will be threatened.	Although no actual large-scale structural changes have occurred, financial intermediaries have expressed concern over the potential of disintermediation.
VEF 3	Customers will press for the development of electronic markets over electronic hierarchies.	Not supported; rather structural changes are driven by a small number of large industry players.

Table 6 Virtual Exchange Framework – Results and Conjectures

All surveyed financial services providers that have deployed varying levels and complexities of electronic exchange systems, report that ICTs have reduced the time and effort required selecting and carrying out a financial transaction. In terms of reducing market imperfections, there is some evidence that customers who use VE systems compare more alternatives than they would have without access to such systems. The VEF's prediction that customer would be one of the key factors driving the evolution of VE platforms appears inconsistent with the fact that the majority of VE systems are based on hierarchical arrangements.

Bakos and Byrjolfsson's (1993) description of the role of non-contractible investments serves as a potential explanation for the present failure of the financial services industry to develop a full electronic exchange market. Likewise, the credence good character (Nelson, 1970) of financial services has been perceived as a potential impediment for the establishment of fully developed electronic markets. Furthermore, the high costs of setting up a VE system and the eventual loss of supplier power reduce suppliers' willingness to set up sophisticated open VE systems. Moreover, our data suggests that customers often lack the in-depth knowledge to demand new, VE based services. Thus, financial services providers introduce and supply new services and install new

information dissemination and distribution systems according to their perceived customer requirements. An additional explanation for the slow adaptation of sophisticated open VE systems in the financial services industry may be psychological (e.g., customers' inability or unwillingness) – given the relative complexity and credence character of financial services and products. Likewise, the perceived lack of security of the WWW, and the trust and reputation based relationships between a financial services provider and its customers have been recognised as potential inhibitors for the establishment of VE platforms. We believe that one cannot just buy into trust. If it is not already in place, trust has to be built up. It is as much the result of co-operation as a condition for it (Nooteboom, 1996). Similarly, Good (1988) has noted that interfirm trust is incrementally built as firms repeatedly interact. Accordingly, we conjecture, that a more sophisticated and trustworthy VE systems may be needed that provides ease of access yet does not come short on providing some sort of a secure intermediation facility (e.g., advisory services). The provision of a familiar yet flexible interface – for example an electronic community – in a digitally secure environment may provide a market niche for new competitors in the development of sophisticated VE systems (Rheingold, 1994; Spar and Bussgang, 1996).

According to our interview data and the customer survey, the most adamant detractor in the establishment of VE systems continues to be the smaller players in the banking community. Their intermediary niche positions are often squeezed by automated vertical integration (Hess and Kemerer, 1994). The ICTs required to build VE platforms are being explored most aggressively by firms interested in building electronic hierarchies rather than markets – since the former exhibit higher customer lock-in potential than the latter.

What then are some of the generally applicable lessons for practice and further research inherent in the VEF to the financial services industry? The presented data appear to support some aspects of the VEF, in particular the potential danger of disintermediation to the current set of financial intermediaries. Thus, we believe that concurrent market intermediaries in the financial services industry – particularly in retail banking – should carefully examine the potential for disintermediation of existing operations under the intervention of advanced ICTs. Accordingly, they should devise alternative scenarios that indicate their market position in a VE environment. More proactively, a financial services provider, facing the potential of disintermediation, may assess whether to establish a VE environment, and thereby secure and eventually enhance his current market position.

On the other hand, the failure to establish an electronic market platform, despite a significant amount of corporate effort, suggests that significant barriers can exist. These barriers to entry and exit must be acknowledged and accommodated by any party, who wishes to create or participate in an electronic market. One clear lesson from the alternative views of the VEF, and one that appears consistent with our data, is the need for correct and efficient alignment of incentives in the market. Suppliers only have incentives to participate in VE systems where they can either differentiate their products and/or directly compete with a relatively small number of other suppliers[221]. Therefore choosing the participants to be initially included in setting up the VE platform (or electronic community) may be the most critical decision in establishing such a VE system, or more specifically, **a financial services oriented electronic community**. This is

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[221] Interviews with SBC, Strategic Planning, Basle, 1995, 1996; Electronic Retail Banking, Basle, personal correspondence, 1995, 1996; Oracle, New York, Jan. '97; Andersen Consulting, Financial Services; London, 03/27/96; Coopers & Lybrand, London, 05/03/96, 06/17/96; personal correspondence with Microsoft, 1995, 1996; and the Financial Services Group, American Stock Exchange, New York, January 1997.

clearly related to the role of market power, a notion that is underemphasised in both the original VEF and the alternative views. Few real world markets exhibit the perfect characteristics of markets described in neo-classical economics. Thus, if such a framework is to be directly applied to a specific market, then that market's local imperfections or real structures must be taken into account. The financial services providers exercise – as a relatively concentrated and homogeneous set of organisations – a rather high degree of market power vis a vis their counterparts (Hess and Kemerer, 1994). In addition, the financial services industry and banking are both strongly affected by government regulations. According to Hess and Kemerer (1994), the writings on the effect of information and communications technologies on market structure to date have largely ignored the role of regulations.

Finally, the analysis of the VEF in the context of financial services raises some additional question for future research. Although, there is a plethora of contemporary literature on the issue of organisational structural change, the academic community has to date shown little interest about the identity and structural design of a VE system or a virtual community[222]. More specifically, further research is required to assess the role of both financial and non-financial organisations in the development of VE systems. Likewise, institutional questions such as the level of technical and contractual security within a community and the enforcement thereof need to be addressed.

In like manner, the traditional VEF neglects issues related to the timing of corporate activities in the developmental process of virtual market environments – and ultimately the time required to establish such an electronic market system. However, our data suggests that even basic indications about the time required to build and establish a

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[222] Personal correspondence with Microsoft 1995, 1996; interviews with Oracle, New York, January 1997; and Andersen Consulting, Financial Services Practice; London, 03/27/96.

presence on a VE system could be a valuable tool in the strategic planning process. The current analysis suggest that the process of constituting a VE system or alternatively joining an existing one might not be as straight forward as suggested by the VEF. Note however, that Malone, Yates and Benjamin (1987, 1989) caution the reader by pointing out that, in addition to changes in ICTs, a number of additional factors need to be taken into account when analysing what might affect firm and market structures. Although the VEF has been successful in pointing out the significant potential impacts of ICTs on economic exchange, we surmise that further empirical research is required to augment our understanding of the relationship between advanced technology, virtual economic exchange and the required structural and institutional changes.

6.5 Virtual Exchange – A Note on Price and Brand

Advanced forms of technology provide the means to carry out transactions on a narrow margin basis (Hart, 1995; Kotha, 1995; Lampel and Mintzberg, 1996; Pine, 1993; Pine, Victor and Boynton, 1993). These technological refinements will facilitate rapid and frequent price changes, provide higher levels of price differentiation and eventually facilitate price discrimination to a much more minute degree than has previously been achieved. Prices can be customised and "broadcasted" to an individual user, dependent on his IP address[223] (Quelch and Klein, 1996). This provides the possibility for instant customisation of information and prices across traditional boundaries; furthering the potential for more efficient (electronic) markets (Quelch and Klein, 1996). While pricing may become both less standardised and more volatile, users will eventually become

aware of price discrimination and are unlikely to tolerate it. Furthermore, smart agents, software programmes that can search the realm of a VE platform for products and services meeting prespecified criteria (Halfhill, 1996; Reinhardt, 1994), may further combat attempts at price discrimination. In summary, the advent of transparent VE platforms suggests that prices will ultimately be more standardised across the entire domain of the VE platform, or at least narrow existing price spreads to prevent the possibilities of arbitrage.

Therefore, a VE platform provides a cost effective and efficient vehicle to link end users directly with producers (Narus and Anderson, 1996); thereby eventually reducing the importance of the traditional intermediary. However, as recently noted by Sarkar, Butler and Steinfeld (1995), if intermediaries can provide a different mixture of services, made necessary by the nature of VE platforms, they are likely to continue to play an important role. While a VE platform enables and promotes direct interactions among a large number of end users and producers, this may also be less efficient over the long term and across a broad range of products and services. This direct interaction between supply and demand side provides a plethora of available data that need to be analysed and evaluated. Accordingly, an intermediary's value-added may no longer be linked to the distribution of products and services, but in the collection, collation, evaluation, interpretation and dissemination of information (as opposed to data)[224].

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[223] The Internet Protocol (IP) is one of the main protocols on which the Internet is based. It allows a packet (a piece of digitally encoded information) to traverse multiple networks on the way to its final destination.

[224] Interview with Oracle, New York, January 1997; and personal correspondence with Microsoft 1996.

6.5.1 Virtual Exchange and Corporate Brands[225]

The decision to establish an online presence is accompanied with several major challenges. Although technology continuous to be a challenge for a number of organisations, our data has revealed that the actual size of an organisation plays a crucial role in the design and structure of the corporate activities on VE platforms. From the small and medium sized financial institutions with established online presence, the majority has not had major difficulties with the design and the allocation of responsibility for the management and maintenance of the VE platforms. Seventy nine percent of the respondents of small and medium organisations have had only one exclusive division in charge of all VE operations (of those 95 percent have been maintained by the ICT- or MIS division). However, the picture looks distinctly different across the landscape of large corporations; predominantly universal banks.

With the instantaneous and global reach of VE platforms and virtual communities, embedded on open network systems, the management of brands is of paramount importance since these brands provide corporate name or logo identification and carry the reputation of an organisation (Fombrun, 1996; Fombrun and Rindova, 199?; Fombrun and Shanley, 1990; Golder, Choi, and Kim, 1997; Rao, 1994; Smythe, Dorward and Reback, 1992; Weigelt and Camerer, 1988). Accordingly, consumers may be confused if a company and its divisions or subsidiaries operate multiple VE platforms, each communicating a different format, message and content. Nevertheless, Quelch and Klein (1996) have pointed out that developing one "exchange site" for each brand – while costly and limiting the ability to cross-sell – is often preferable if the brands have distinct markets and images. Services, and financial services in particular, often operate

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[225] This **case study** is largely based on data collected from Swiss and American universal banks. However, all names and departments have been disguised upon request from participating organisations.

under an umbrella brand name, making it difficult to separate individual products and services and sell them under their own brand (e.g., Goldman Sachs is primarily known for its investment banking competence and not its expertise in derivatives). Moreover, it is often the umbrella brand name that permits cross-selling activities in the first place. In addition, new online users tend to explore and visit sites of familiar brands first (Cronk, 1993; Quelch and Harding, 1996). However, a number of financial organisations have expressed their concern with the use of umbrella-branding techniques[226]. They correctly point out that failure to deliver a secure and efficient online service may exhibit repercussions that could spill over to all existing operations; thus decreasing the overall value of all corporate activities (under the umbrella).

> **Conjecture 10**: Brand, image, reputation and the level of customer trust in a financial institution are critical factors in stimulating initial interactive forms of economic exchange on virtual platforms.

Therefore, sites or virtual communities with well know brands carry a premium in that they enhance the credibility of the site or virtual community sponsor, as well as the medium (e.g., the WWW). However, should tampering or other forms of damage occur on a virtual platform, it is likely that these impairments have detrimental repercussions for other corporate activities – both in the marketplace and in the marketspace[227].

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[226] Interviews with Bank Cial AG, Accounting and Finance 12/21/95, Accounting 05/09/96; and Bank Sarasin & Co. Basle, Corporate Development, 09/15/95, and Technology and MIS, 09/17/95.

[227] For a more detailed discussion about the risk of interorganisational digital exchange and EC, see **Risks in Interorganisational Exchange** later in this chapter.

6.6 Virtual Exchange – Multimedia Banking[228]

Traditional financial services provider have recently been faced with competition from an number of players that have risen from emerging industries such as ICT, software, and information based services – often on the basis of strategic alliances. At the cross-road of these alliances are services and applications that often provide the impetus for further development of VE systems. Traditional financial services providers have started to sense the threat of these emerging VE platforms. However, Johnson, Ott, Stephenson and Weberg (1995) have recently pointed out that it is impossible to predict the speed with which these changes are taking place and envision the final shape of electronic or VE systems. Nevertheless, we believe – based on our data – that new VE platforms will ultimately alter the way financial services are being provided.

The value network offers a framework for analysing these changes, in that it provides a tool to dissect the changes that occur in the virtual realm and contrast qualitative benefits against qualitative costs[229]. An actual quantification of total profit and loss, related to the installation of VE systems, has proved to be a difficult if not impossible endeavour at a large number of financial services providers (87 percent of respondents agree). Loyalty and reputation in a trust-based relationship are elements that are notoriously difficult to quantify (93 percent of respondents agree [see also Fombrun, 1996; Weigelt and Camerer, 1988]). Therefore, VE systems have largely evaded attempts of value quantification or assessments that strive to determine the monetary value of EC systems. However, the same pool of organisations contemplates that the

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[228] Earlier versions of this paper have been presented at the Central European University in Prague, Czech Republic in 1995. This section is largely the result of a **case study** on the Electronic Retail Banking Division of SBC in Basle, Switzerland; additional data has been obtained from interviews conducted at Bank Cial AG, Switzerland and Bank Sarasin & Co., Basle.

eventual benefits of VE are likely to outweigh its costs (89 percent agree). Thus, financial organisations exhibit a **conservative enthusiasm** for building a multimedia or VE based banking infrastructure. These expectations are in part fuelled by the superior distribution economics of these emerging virtual financial services exchange systems (Arthur, 1994, 1996; Economides, 1996; Liebowitz and Margolis, 1994; Katz and Shapiro, 1985, 1994). Simultaneously, VE based financial services distribution systems exhibit a higher levels of convenience for customers than traditional branch based distribution systems.

6.6.1 A Multimedia Bank – Virtual Exchange Platform

An number of financial services providers, in an attempt to deliver distinct products and services to well-defined sets of customers, have started to operate VE platforms for their existing portfolio of products, services and the distribution thereof. VE platforms provide the capacity to support a number of cost-effective differentiated distribution formats, while existing products and services (or their digital replications) can be combined in various and innovative ways. Moreover, the digitalisation of information-based products and services provides the potential to devise genuinely new products and services that will only be available via VE platforms (e.g., the consolidation of multiple accounts held with different firms).

A VE system – one type being a multimedia bank – bears very little resemblance with a traditional organisation (Dustdar, 1994; Golder and Turner, 1996; Johnson, Ott and Stephenson, 1995). Although it provides ready access to organisational processes,

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[229] For example, interviews with Bank Cial, Accounting, Basle, 09/14/95, 05/09/96, 12/21/95; SBC, Audit, Basle, 05/13/96, Technology Audit, 05/12/96; UBS, Corporate Communications, Zurich, 09/20/95; Bank Sarasin & Co., Corporate Development, Basle, 09/17/95, MIS, 09/15/95.

capabilities, and a variety of financial services in an integrated account, physical proximity is not a prerequisite. Instead, services are being provided via electronic and digital means such as the WWW, the Internet and other data exchange networks. The advantages over conventional forms of banking are numerous. For example, multimedia banking – based on VE or EC systems – provides real convenience for customers at a low price (e.g., 24 hours remote access). It also gives financial institutions the opportunity to use information residing in new integrated accounts to carry out micromarketing[230] – individually targeted marketing based on the behavioural patterns of individual clients (Johnson, Ott, Stephenson and Weberg, 1995). Moreover, multimedia banking, embedded in an EC system, can be provided at significantly lower costs. Traditional banks and financial services providers suffer from burdensome delivery systems while their mass-market approach provides little flexibility to allow any differentiation along the confines of quality, price and/or innovativeness. Accordingly, savings can be experienced in one of the three areas or combinations thereof. First, reduced staff with a greater focus on customers and marketing of new and existing products and services in bundles that reflect customer requirements. Second, lower operational costs when compared with traditional financial services operations, since one of the two major cost factors – real estate associate with a bank's branch network system – has been reduced considerably. Third, as technology continues to develop, the economic advantage of the multimedia bank can further be expected to grow – widening the gap between virtual and physical operations of the value network. We believe, that the ability to capture, integrate, and disseminate information at low costs will provide the foundation to customise new products and services that better reflect the requirements of a

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[230] Micromarketing refers to marketing and sales promotion activities tailored to the preferences and requirements of individual consumers. For a more detailed discussion about the relationship between tech-

more demanding customer base, which is of paramount importance for the survival of individual financial services providers.

6.6.1.1 The Evolution of Multimedia

The rapid changes in ICTs make it impossible to predict the exact evolutionary process of multimedia and hence the development of VE systems. However, according to our interviews and workshops at SBC and Bank Cial, and secondary data, the transition from traditional forms of banking to VE based financial services, is likely to occur in three phases. Nevertheless, we refrain from providing an exact time frame and would further like to point out that the classification and taxation of the three phases is moderately artificial; although here its serves the point of illustration.

6.6.1.1.1 The 1st Phase of Multimedia Banking

During the first phase of multimedia banking, the strategic focus has rested primarily on providing better access to financial services. Accordingly, the provision of higher levels of convenience has led to an overall higher customer acceptance of remote delivery systems. Technologically, this first phase has been based on ATM networks and telephone banking. It has further seen a proliferation of electronic payment, settlement and clearing systems.

The shift to remote retail banking can be classified along two distinct forms of services and product distribution. The first distribution model refers to banks and financial services providers that establish their own and independent EC and multimedia

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nology and marketing, see for example Bessen (1993); Blattberg and Deighton (1991); Burke (1996);

units. Accordingly, these institutions seek to build a separate brand identity independent of their parent organisations. The second mode of remote delivery and distribution is based on the provision of complementary services that amend the existing portfolio of financial services providers. Hence, these complementary virtual banking services provide many of the direct banking services and product attributes, yet the offerings are promoted under the umbrella brand name or corporate identity of the parent organisations. According to our data, the complementary services are the preferred mode of operation in Switzerland and the UK – although there are some exceptions (e.g., Midland's First Direct).

6.6.1.1.2 The 2nd Phase of Multimedia Banking

The second phase – based on PCs connected to proprietary online services and/or to open network systems such as the WWW – is characterised by a large segment of customers routinely accessing financial information online. In phase two, financial services providers face a potential threat of losing relationships as gateways[231] intervene in the now electronic intermediation process between customers and providers. Accordingly, the contention between content, exchange, and the gateway providers for control over the customer relationship could produce a variety of multimedia or EC banking systems. We conjecture that there will eventually be two polar extremes.

First, gateway domination, where gateway operators backward-integrate into financial services, with customers consolidating their financial services requirements

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McKenna (1995); and Quelch and Klein (1996).

[231] A gateway can be defined as a computer system that transfers data between normally incompatible applications or networks. It reformats the data so that it is acceptable for the new network (or application) before passing it on. For example, a gateway might connect two dissimilar networks, like DECnet and the Internet; or it might allow two incompatible applications to communicate over the same network.

around the gateway to obtain – in an integrated manner – both financial and non-financial information and services. Under this scenario, financial services providers could be forced to operate in the least lucrative back-office mass-production environment. Second, the emergence of large universal multimedia financial institutions or electronic community organisers, as the dominant providers of a wide range of integrated financial services, serving a large segment of consumers who consolidate their financial relationships. We believe that such an institution is well positioned to establish an interest driven virtual community embedded in an existing EC system. Moreover, high uncertainty and the high cost of building such a virtual environment are likely to further cultivate the formation of virtual communities and hence the establishment of collaborative ventures among constituents. A less extreme form of multimedia banking and the preferred scenario for banks and traditional financial services providers is based on existing market structures. Gateways and intelligent search agents retrieve information about comparable financial services and products and present them along easily comparable dimensions. Customers are likely to consider these services as enhancing their existing traditional banking relationships. A significant constraint of phase two, however, is the inability to receive and aggregate **all** required information electronically and hence the necessity to enter data manually from disparate and incompatible sources.

6.6.1.1.3 The 3rd Phase of Multimedia Banking

More generally, a gateway may be referred to a third party or technology that is indispensable in the intermediation and exchange process between customers and providers.

The third phase in the transition from traditional forms of banking to banking based on VE is characterised by the introduction of electronic forms of cash; as a likely replacement for traditional paper money[232].

According to Johnson, Ott, Stephenson and Weberg (1995), in no major economy do paper-based monetary transfers account for less than 20 percent of non-cash transactions. However, this paper in the monetary system perpetuates the need for geographic presence to collect and disperse payments. Electronic cash is likely to evolve along two dimensions (Deakin and Goddard; 1994a, 1994b; Dirienzo and Hansen, 1994; Holland and Lockett, 1996; Kleiner, 1995; Tanaka, 1996; *The Economist*; 1994, November 26). First, as a secure means of payment on digital networks such as the WWW embedded on the Internet. Second, electronic cash embedded in smart cards provides a facility and store of value (e.g., Mondex). The infinite divisibility of electronic cash makes it an ideal means of payment for all virtual forms of exchange, where billing is often foregone due to the high costs associated with concurrent forms of exchange, settlement and clearing of transactions. Hence, it can be expected that the widespread use of electronic cash systems and the development of electronic wallets (Johnson, Ott, Stephenson and Weberg, 1995; Mendonca and McCallum, 1995) or smart cards will further reduce the need for physical presence. The development and widespread use of electronic cash systems will render geographic presence of banking outposts largely obsolete. Customers wanting to make deposits or withdrawals will no longer need to visit a bank branch.

However, further advances in ICT are required until these technologies are likely to enter all domains of financial services and ultimately replace the existing bank branch

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[232] For a detailed discussion about the issues related to the introduction of electronic cash see, for example, Flohr (1996); Kleiner (1995); Tanaka (1996); *The Economist* (1994); and Singh (1996).

network. Moreover, cost-effective implementations of non-proprietary interactive video-links are likely to promote financial advisory services and personal financial services accessible via interactive television- and video systems. Through such two-way interactive exchange channels, consumers can receive face-to-face services traditionally provided exclusively via personal sales channels, while enjoying the 24 hours convenience of remote access and delivery systems. We further believe that the transition from traditional modes of financial services provision to EC based exchange systems is accompanied by a substitution of proprietary means of exchange for open system based exchange platforms. Notwithstanding the eventual shift from physical branch based exchange systems to virtual digital network exchange systems, the provision of financial services in close physical proximity can be a high value added service for a specific customer segment (e.g., private banking), willing to pay for these services.

In the next section, we analyse an important aspect of EC systems, namely the reliability and risks of digital exchange mechanisms. We conjecture that these risks continue to represent a significant hurdle for the setting up of sophisticated EC systems.

6.7 Risks in Interorganisational Exchange

6.7.1 Tampering Risk and Technology[233]

Although banking is not the only industry that has been transformed by forces such as technology, deregulation and increased competition, the **information centric** banking industry as been significantly impacted by these forces and continues to adjust itself to

these changes. Indeed, these forces have significantly shaped the new competitive landscape of most industries (Bettis and Hitt, 1995; Prahalad and Hamel, 1994). Consequently, many other types of organisations have to deal with the same trends. Inevitably, some companies cease to exist as a result of these changes. Usually, they promptly disappear – unless a government decides for some reason or another that a firm is strategic for the economy and comes to rescue it[234]. When it comes to banking in the traditional sense and financial services in general, however, politicians everywhere seem especially reluctant to let a vital entity or part of the economy fail. One reason is that governments fear the political backlash that the failure of a large bank could potentially cause. Most of these financial organisations have a large pool of small depositors, many of whom keep a substantial share of their wealth in bank accounts.

However, there is another, potentially even more serious threat associated with bank failures that causes politicians and central bankers everywhere to take extra precautionary measures. This anxiety is referred to as systemic or contagion risk – the danger that the sudden and unexpected demise of one or several banks could trigger a domino-like collapse throughout the entire banking system – and bear, due to the large scope of banking and finance, significant potential for spill-over across the entire economy and ultimately the collapse thereof. Therefore, it is these side effects or externalities associated with bank failures and/or bank runs that make them such a special case. Conversely, in case of a car manufacturer collapsing, its disappearance is unlikely to cause problems for other car manufacturers – indeed, they should benefit by having a now larger potential customer base. However, when a bank suddenly faces extinction,

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[233] An earlier version of this chapter has been presented as a paper by the author at the *1st Conference on Corporate Reputation, Image and Competitiveness*, January 17 – 18, Stern School of Business, New York University, New York, USA.

its rivals may experience significant problems too. Systemic risk arises, if a failure of a bank causes depositors, who have doubts about the financial solidity of other banks, to run on other financial institutions. This can happen either because they think that their banks have the same problems as the one that just failed, or because the failed bank's fire asset sale has depressed the market price of the assets of other banks. Whatever the initial cause, once a system-wide panic has begun, it is difficult to stop[235].

According to a recent study by *The Economist*[236], banking has become, on balance, more robust than in the past. Banks now have larger capital reserves than they used to in the past. This should help them cope with unexpected situations and external shocks. As part of the Capital Adequacy Agreement[237], which sets minimum standards for international banks' capital levels, banks' are required to hold capital equal to at least eight percent of their risk weighted assets. In addition, banks are required to maintain tier-one capital equal to at least four percent of their risk-weighted assets[238]. Moreover, the majority of banks have started to use risk management systems. These have enabled them to identify more clearly the risks that they are running on both their lending and trading business, and to hedge themselves against those that, on an aggregated level, do not offset one another (Jorion, 1996).

All of these precautionary measures are undoubtedly creating a fitter banking system, while they probably also reduce the potential of a systemic crisis such as a bank run caused by tampering or an external shock. We contemplate that a banking system,

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[234] The issue of regulation and governance, in the context of banking, is further analysed in Dale (1984); Gros and Thygesen (1992); Mazumdar (1996); Melitz and Borders (1991); *The Economist*, February 10, April 27, October 26, (1996); and Vives (1990).

[235] For a more detailed discussion about systemic risks, "runs" and bandwagons see, for example, Abrahamson and Rosenkopf (1993); Aharony and Swary (1996); Arthur (1992, 1994, 1996); Benson and Kaufman (1995); Dale (1984); Chari and Jagannathan (1988); Diamond and Dybvig (1983); Gay, Timme and Summer (1991); Hirschman (1970); Hirschleifer (1995); Jacklin and Bhattacharya (1988); Jayanti, Whyter and Do (1996); and Mazumdar (1996).

[236] *The Economist* (1996) April 27.

[237] See Bank for International Settlement (1992), Basle, Switzerland [www.bis.org].

embedded in a larger social value network, is vulnerable to disruptions along the trajectories of concentration, homogeneity, information and network interconnectivity[239]. The greater the concentration or focus of a bank's portfolio on a single entity, the greater the chance that it will collapse if that specific entity defaults. According to Markowitz (1952), the less diversified a portfolio, the more vulnerable it is to a shock. Thus, if the entity defaults, others are likely to follow only if depositors at these banks think that there is a high level of congruency or homogeneity between the casualty and the rest of the industry. The result may be a bank run, if people believe there is a high level of homogeneity. Although, such a decision might not be error prove, a sound decision can only be reached if there is plenty of valuable information available. The more valuable information there is, the easier it is for depositors to reach a final conclusion about the quality of a specific bank, that is, distinguish between high risk institutions and stable institutions. Word of mouth, for example, may amplify both positive (e.g., a bank is solid) and negative (e.g., a bank is insolvent) feedback loops (Hirschleifer, 1995).

> **Proposition 11**: The number and quality of interorganisational communication and information connections between a faulty organisation and the rest of the value network may determine the potential magnitude of a crisis.

If for example a bank that collapses is an "outsider", the potential for a bank run is considerably lower than if the bank is located at the centre of a value network; in which case regulators and/or government agencies are forced to bail out the faulty organisation. While an insignificant bank might not be worth saving from the government's

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[238] *The Economist* (1996) April 27.
[239] Workshops Bank Cial, SBC, Lehman Brothers and Goldman Sachs.

perspective, government agencies are unlikely to let a large lender in a particular market or an important link in a payment or settlement network default.

6.7.1.1 Interlinked Advanced Financial Networks[240]

Additional sources that bear significant potential for systemic risks are the electronic financial payment systems and other forms of global electronic financial exchange systems. These advanced technology based systems often do not receive the same regulatory attention as financial institutions per se. Yet, banks and other financial institutions put considerable amounts of money and assets at risk in using them albeit for short periods of time. As a consequence, if one of these systems would break down, it would not only put the connected banks in considerable jeopardy, but it is also likely to exert considerable economic pressure on entire economies.

Many of the world's wholesale payment and settlement systems, interlinked networks that allow banks to send and receive large amounts of money to one another and settle foreign-exchange or securities deals, operate on the basis of netting[241]. Because of the rapid growth in financial payment systems, netting now operates on a multilateral basis, involving many different banks simultaneously[242]. At the same time, the monetary amounts that banks owe one another over a specific period has increased sub-

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[240] This section has greatly benefited from various discussions with Bank Cial AG in Basle, Switzerland and Citibank in London.

[241] For example, in the course of a day, two banks, B_1 and B_2, send thousands of payments instructions to each other, but no cash. The bank receiving an instruction simply credits its customers' accounts while the system keeps track of the net position of the two banks. At the end of the netting period, for instance at the end of each day, if B_1 owes B_2 money, it settles by transferring the amount owing from its account at the central bank (if the payment system is a public one) or the clearing house (if it is privately run) to B_2's account. If that payment cannot be made, then it may affect B_2's ability to meet its settlement commitments to other banks, ultimately creating chaos, and possibly, a string of defaults that eventually lead to bank runs.

[242] Interviews with Bank Cial, Basle, 09/14/95, 12/21/95; and SBC Warburg, Corporate Development, London, 09/29/95.

stantially. Accordingly, it is this opacity, coupled with the size of the credit exposures involved, that creates a potential systemic risk embedded in a complex system of inter-dependencies. If under such conditions banks become more conservative and defensive, they may refuse to meet their settlement commitments at the first sign of trouble. As a consequence, a number of central banks have assumed a more active role in payment systems; with the central bank serving as trustee should a bank default.

Privately run systems such as the US Clearing House Interbank Payments System (CHIPS) and Fedwire, and Britain's Clearing House Automated Payments System have imposed limits on their members' overall indebtedness to one another at any given point in time. A number of mainly European countries have opted for another less constraining approach: interorganisational automated quasi real time gross settlement. This system provides the electronic infrastructure for banks to settle their large payments with one another immediately, assuming their accounts with the central bank have enough money in them[243]. Thus, this should dramatically reduce systemic risk because if one bank fails, at any point in time, it will owe little to others. The difficulty with this system is to ensure that enough credit is available to smooth payment flows; albeit without encouraging banks to take unproportional risks. We believe that a substantial systemic risk element, that has traditionally received little attention in the literature, is related to the problems of maintaining interorganisational electronic network system integrity. A number of events linked to tampering in banking and finance have occurred in the recent past, which have exerted considerable problems and risks for digital network constituents[244]. Such an interlinked and interconnected digital system is extremely

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[243] *The Economist* (1996) April 27.

[244] For example, in November 1985, the New York Fed lent US$ 23 billion to the Bank of New York – more than 20 times the bank's capital – after a computer glitch caused it accidentally to run a daylight overdraft of almost US$30 billion (*The Economist*, April 27, 1996). In November 1996, a computer technician at Reuters in Hong Kong had tampered with the dealing room systems of five of the company's

sensitive and error prone to risk sources. For example, events leading eventually to bank runs or externally induced shocks caused by tampering, as has recently been the case in Hong Kong[245], New York[246], and Switzerland[247].

> **Conjecture 11**: Advanced technology driven virtual value networks, such as those in the financial services industry, are not only highly sensitive to external shocks such as tampering, but are also highly error prone to advanced technology or network communication problems per se.

Moreover, the interlinked and interdependent character of these systems bears the potential for a domino like collapse throughout an entire banking system[248].

6.7.2 Risk, Intermediation and Virtual Exchange

Interorganisational information systems are receiving increasing attention as organisations seek new ways to simultaneously compete and co-operate to enhance economic efficiency, and improve their overall services and product quality (e.g., Nalebuff and Brandenburger, 1996). Based on advanced information and communications technology systems spanning organisational boundaries, interorganisational information systems represent the information exchange dimension of networked organisations (Bakos, 1991). The flow of information and data across organisational boundaries and the simultaneous emergence of open system interorganisational digital communication networks have increased substantially over the past decade. Although there has been a

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investment bank clients which brought their operations down for a striking 36 hours (*Financial Times*, 1996, Friday, November 29).

[245] *Financial Times* (1996) Friday, November 29.

[246] *The Economist* (1996) April 27.

[247] *Financial Times* (1996) October 28; *Financial Times* (1995) October 26.

large number of publications on technological and engineering aspects of these interorganisational digital networks, the strategy and management literature shows relative scarcity on issues related to these emerging forms of interorganisational or VE platforms. We conjecture that what is required from a strategy and management perspective, among other things, is a more subtle analysis of the management perspective of interorganisational exchange systems and the risk associated with these digital modes of exchange[249].

There are many different types of interorganisational information exchange systems, ranging from standard EDI to shared interorganisational customer databases. According to Sherer (1995a,b), there are three dimensions of risk that affect interorganisational (data) exchange networks; they are technical, organisational, and environmental risk. Technical risk refers to interconnectivity problems. We believe with the development of more open digital network systems, the primary technical risk will become security[250]. Organisational risk results from changes to internal organisational structures that occur as a result of changing roles among interorganisational exchange network constituents. As recently noted by Goldman, Nagel and Preiss (1995), these risks will be reduced as organisations become more flexible (Bahrami, 1992), and hence depend less on formal, rigid organisational structures. Environmental risk includes dependence risk, where one organisation becomes dependent on another organisation that attempts to change the terms of the contract or fails to perform adequately. The second compo-

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[248] Interviews with UBS, Corporate Communications, Zurich, 09/20/95; Citibank, Corporate Strategy, London, 09/27/95; and Coop Bank AG / GZB, Relationship Banking, Basle, 1995, 1996.

[249] Interviews with Goldman Sachs & Co. Bank, Zurich, 09/19/95; Bank Sarasin & Co., Basle, 09/15/96; SBC, Audit, Basle, 05/13/96, Electronic Retail Banking, Basle, 05/10/96, 12/22/95, 11/03/95.

[250] Issues related to open system network security have been raised during every interview. It can further be expected that security will emerge as one of the most important issues in the advent of VE systems and other forms of open network based information exchange. According to the interviewees, the umbrella of security comprises, access security, authentication (digital identification of a user according to his identification), process security (permission to initiate a certain process) and content security (availability to data content to a specific user).

nent of environmental risk is competitive risk, where one organisation attempts to gain access to competitive information from another or use relationship proprietary information in one's own interest (Sherer, 1995a). However, with more open system networks in rapidly changing environments and the use of advanced information and communications technologies based monitoring capabilities, dependence risk will eventually decrease. Simultaneously, however, competitive risk will become more significant as functionality and accessibility of shared information increases.

We therefore suggest that increased functionality and accessibility of information systems, while reducing the need for traditional market intermediaries, may provided a new role for the business intermediary: the **trust** intermediary, whose major role is to minimise competitive risk[251]. The presence of trust in exchange is a basic postulate of a socialised view of relationships (Granovetter, 1985). Trust, defined in contracting behaviour terms, reflects the extent too which negotiations are fair and commitments upheld (Anderson and Narus, 1990) and one party's belief that its requirements will be fulfilled through future actions undertaken by the other party (Anderson and Weitz, 1989). In situations where two heterogeneous parties can be identified, contracts are the optimal governance mode (Choi, 1994; Williamson, 1975). Trust, is best in a situation where two homogeneous parties can be identified (Choi, 1994). Hostages are an ideal governance mode in situations where two parties can not be identified (Choi, 1994; Scarbrough, 1995; Williamson, 1983, 1993a). A middleman or an intermediary can change the situation (Sarkar, Butler and Steinfeld, 1995; Spulber, 1996). A contract provides a platform for streamlining heterogeneous preferences; therefore, in a contract situation a middleman provides little added value. However, in a trust-based situation,

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[251] Interviews with Bank Cial AG, Basle, 12/21/95 and 05/09/96; SBC, Electronic Retail Banking, Basle, 05/10/96, 12/22/95, 11/03/95. Personal communication with Chong Ju Choi, September 6, 1996.

where the parties are heterogeneous, a middleman is potentially in a position to arrange for a superior outcome than in a contract-based situation[252].

6.7.2.1 Interorganisational Information Sharing

While trading partners have always shared information to some extent, improved interconnectability is likely to increase the accessibility of information not only to additional trading partners, but also to other non-trading institutions, competitors and non-competitors. Increasingly, the types of data being shared between organisations comprise a much wider scope and increasingly go beyond the exchange of traditional market information (e.g., price and volume). This trend is likely to be accompanied with an increasing amount of traditionally "restricted" trade documents being shared across organisational boundaries[253]. Information sharing will be based on open network communication systems such as email, GroupWare, and videoconferencing, as well as fixed format linked- and shared databases – based on numerous standards – that include for example, quality, inventory, personnel and customer information; information that was traditionally kept internal by most organisations.

Adjacent value chain partners in an industry are likely to share some kind of information (Sherer, 1995a). Traditional external market information – comprising a minimum of price and volume – has always been shared in the form of product catalogues, sales quotas, purchase orders, invoices, and other forms of communicating price and volume between the supply- and demand side, respectively. EDI, or similar basic electronic exchange mechanisms, enabled organisations to transmit this information at a

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[252] Personal communication with Chong Ju Choi, September 6, 1996.

much faster rate. However, according to Ferguson and Masson (1993), the information content has been relatively unchanged in most organisations that have adopted open network system based information exchange systems such as EDI; with the most common transactions following the traditional business model of purchase order followed by the corresponding invoice. However, once interorganisational information exchange networks and advanced interactive multimedia systems are installed, organisations are in a position to share a much wider variety of data than was traditionally the case[254]. Moreover, with the advent of the Internet and open network systems, information is increasingly available to many more participants, than has traditionally been the case in proprietary two-party information exchange systems (also referred to as single source distribution). This is particular the case for low transaction costs items that are easy to describe and exhibit low asset specificity – such as financial commodities and standardised derivatives (Malone, Yates, and Benjamin, 1987, 1989). Moreover, as more value network functions are being developed, extended and shared across organisational boundaries, interorganisational digital exchange networks provide many new opportunities to share additional information across a virtual digital exchange network.

6.7.2.2 Risks in Interorganisational Information Systems

Standard EDI systems provide minimal risk to the organisations using this technology since it primarily replaces paper documents in a prespecified way, thus replacing previously available shared information sources with shared access to electronically stored information. Therefore, the risks that currently exist in the domain of EDI are technical

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[253] Interviews with SBC, Electronic Retail Banking, Basle, 05/10/96, 05/13/96, 12/21/95, 11/03/95; Oracle, New York, January 1997; personal correspondence with Microsoft, Online Banking Division, 1995, 1996, 1997; Lehman Brothers, 1997; NatWest, March 1997; Fleming, 09/25/95.

risks arising primarily from connectivity issues. As more open systems develop and the standards are being refined, risks stemming from connectivity are expected to decrease over time (Sherer, 1995a,b). The formation of interorganisational digital exchange networks provides organisations with the possibility to collect and disseminate information content via an increasing amount of platform independent software and channel solutions. On the other hand, third party information providers have been able to benefit from the advent of a platform independent information exchange system to reach a potentially much larger clientele. These structural changes are being reflected in a redistribution of interorganisational exchange network dependent risks, namely with an initial increase in organisational risk. Thus, organisations transform to adapt to new roles centred on cross-organisational forms of information exchange[255]. Thus, interorganisational digital exchange networks may redistribute power and authority as access to information changes. These changes exhibit increasing levels of interorganisational interdependence risk as power and competitive advantage structures are being redistributed with respect to timely access to information[256].

In the remaining part of this chapter, we investigate the role of intermediaries in financial markets. More specifically, we analyse the role of intermediaries in the context of VE systems. We further analyse the transformation intermediaries are expected to undergo should they desire to remain a viable source of added value on VE platforms. ***

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[254] Interview with SBC, Audit, Basle, 05/13/96.

[255] Interviews with Coopers & Lybrand London, 05/03/96 and 06/17/96; personal correspondence with Microsoft, Online Banking Division, 1995 – 1997; and Citibank, Corporate Strategy, London, 09/27/95.

[256] See, for example, Brandenburger and Nalebuff (1995); Clemons and Row (1992); Choi (1994); Dixit and Nalebuff (1991); Gulliver (1979); Hill (1990); Nalebuff and Brandenburger (1996); Nooteboom (1996); Pruitt (1981); Schelling (1978); Williamson (1975, 1985, 1991a, 1991b, 1993a, 1993b, 1996); Young (1991) and Young (1975).

6.7.3 Virtual Exchange and Intermediation

Recent advances in information technology and global digital data networks inspire visions of an "information economy" (Varian, 1995a) in which everyone will have access to the vast information resources without the traditional access barriers of space and time. However, information has always been a notoriously difficult commodity to deal with (Varian, 1995a), and in some ways, information technology and broadband digital networks have amplified the problems of buying, selling, and distributing information elements. Likewise, exchange of products and services based upon those information elements is subject to similar challenges. Under the assumption of the neo-classical framework (rationality and absence of transaction costs), we analyse the impact of increased information availability on end-user choices.

The neo-classical framework states, that individuals are assumed to make rational choices about the available offerings in that they are able to rank offers and subsequently make rational decisions that reflect their preferences. However, we will argue that such decisions will not be consistent over time since many offerings are "bundled" and thus escape the tentative assumptions of the neo-classical school of thought (Eppen, Hanson and Martin, 1991; Simon and Fassnacht, 1993). We therefore propose that in information rich industries rational choices about distinct offerings will often be foregone in favour of bundles of offerings[257] – although on an individual basis they may exhibit a lower utility than a distinct offering. The bundle, however, may exhibit a higher utility than the single offering[258].

The very abundance of digital data exacerbates one of the most fundamental constraints of information and VE systems – the limits of human comprehension (e.g.,

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[257] Interviews with SBC, Electronic Retail Banking, Basle, 05/10/96, 05/13/96, 12/21/95, 11/03/95.
[258] Personal communication with Chong Ju Choi, September 9, 1996.

bounded rationality). In such a noisy environment, data and information[259] themselves (about the product and/or service) consume an increasing amount of the overall attention of potential consumers. The rapidly increasing pool of available data and information sources ultimately results in data overload. This capacity shortage further nurtures the inability of an individual to receive, analyse and react to the available (on-line) information. Moreover, the amount of time available for "paying attention" to information is fixed.

> **Proposition 12**: A wealth of data may create a poverty of attention given to a particular piece of information, and thus the need to allocate attention and time slots efficiently among the overabundance of data and information sources.

Furthermore, information sort mechanisms need to be established that permit "urgent" information to be separated from less important one. Therefore, relative-ranking systems – as opposed to absolute ranking systems – could be useful in categorising the various elements of information (Frank and Cook, 1995). As a result, ICTs for producing and distributing information content, could prove to be useless without some (manual or automatic) mechanism to locate, filter, organise and summarise it. A new form of intermediation, replacing the contemporary form of matching demand and supply side, will have to focus on combining information technology, database management and publishing skills to help discover and make available information in a more readily available form[260].

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[259] Note that attention and time can exclusively be paid to "summary information" (e.g., table of contents) at the expense of the actual information content (e.g., a book).

[260] Interviews with Bank Sarasin & Co., Basle, 09/15/96; SBC, Electronic Retail Banking, Basle, 05/10/96, 05/13/96, 12/21/95, 11/03/95; UBS, Corporate Communications, Zurich, 09/20/95; Citibank, Corporate Strategy, London, 09/27/95; Goldman Sachs & Co. Bank, Zurich, 05/05/96; Oracle, New York, January 1997; personal correspondence with Microsoft, Online Banking Division, 1995, 1996, 1997; and Andersen Consulting, Financial Services and Information Technology, London, 03/27/96.

For example, relative ranking procedures can be used to "index" the abundance of available data. Software agents and other forms of automatic information retrieval and indexing algorithms will provide an important part in the information dissemination and data retrieval process. Software agents, data algorithms and other methods of automatic information retrieval are poised to alter the classical intermediation relationship between the demand and the supply side (Halfhill, 1996; Reinhardt, 1994; Varian, 1995b). A potential life insurance client, for example, could program a software agent to scan a specific VE platform for a suitable package according to his prespecified criteria. The power to close a potential deal thus eventually rests with the demand side, which has access to a large pool of possible information and hence products and services that adhere to a predefined set of criteria. However, the supply side being aware of the existence of these algorithms, can deliberately put an misleading offer on a VE system embedded on the WWW or block a Web server from letting the software agent scan its offerings altogether (Halfhill, 1996). Therefore, we conjecture that this transition will eventually introduce a shift of power from the supply side to the demand side. This development accommodates with the ability to retrieve the information requested and thus influence – and to a certain extend manipulate and steer – the information dissemination process of the supply side.

6.7.3.1 Forms of Intermediation in Financial Services

With the advent of VE platforms embedded on the Internet, and more specifically on the WWW, the market structure in the financial services industry is likely to undergo sig-

nificant changes[261]. We believe that the recent advances of advanced ICTs will prompt a large-scale redistribution of distinct competitive advantages within the financial services industry – that is the resources and capabilities required to maintain and eventually sustain competitive advantages.

The advent of VE platforms and electronic communities, we believe, is one of the single most influential sources to change the existing forms of intermediation[262]. With the costs of communication rapidly decreasing, firms and private individuals alike have started to use communication services for additional functions and/or alter and extend the content of the communication itself[263]. Consequently, information dissemination barriers have been lowered significantly – making information and telecommunication based organisational capabilities financially more lucrative to small and medium sized companies for further exploitation and exploration. Traditionally an economic agent has been able to track a limited number of data and information sources. Conversely, the era of mass information dissemination provides a plethora of data and information sources that not only exceed the traceability limit of an individual economic agent, but also raise new questions as to the quality and trustworthiness of the information sources per se. Moreover, the ratio of information content about an actual service and/or product relative to the actual service and/or product is increasing rapidly.

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[261] This statement has been confirmed by almost 95 percent of surveyed financial services institutions. However, it needs to be pointed out that the organisational **opinions**, as far as the direction, timing and scope of the changes are concerned, have **varied significantly**.

[262] Interviews with SBC, Electronic Retail Banking, Basle, 05/10/96, 05/13/96, 12/21/95, 11/03/95; UBS, Corporate Communications, Zurich, 09/20/95; Citibank, Corporate Strategy, London, 09/27/95; Goldman Sachs & Co. Bank, Zurich, 05/05/96; Oracle, New York, Jan. '97; personal correspondence with Microsoft, Online Banking Division, 1995, 1996, 1997; and Andersen Consulting, Financial Services and IT, London, 03/27/96; Goldman Sachs & Co. Bank, Zurich, 09/19/95; Bank Sarasin & Co., Basle, 09/15/96; Bank Cial, Basle, 09/14/95, 12/21/95; SBC Warburg, Corporate Development, London, 09/29/95.

[263] Interviews with SBC Warburg, Corporate Development, London, 09/29/95; SBC, Electronic Retail Banking, Basle, 05/10/96, 05/13/96, 12/21/95, 11/03/95; UBS, Corporate Communications, Zurich, 09/20/95; Citibank, Corporate Strategy, London, 09/27/95.

Proposition 12: In a data and information rich environment, information about products and services becomes increasingly as important as the actual product and/or service.

Conjecture 13: Increasing levels of data availability require increasing levels of information about the content and the quality of available data – and the products and services based on these data.

That is the information about the actual product and/or service is increasingly becoming as important as the actual service and/or product. Moreover, professional services and intangibles exhibit credence good characteristics (Nelson, 1970), that is the quality of the offerings is rarely know even after purchase.

Therefore, the a priori outcome or value of a contract can only be specified in terms of probabilities that event **a** or **b**, respectively, will occur[264]. This high level of a priori uncertainty is, however, a considerable shortcoming for many business transactions. Nevertheless, in the case of the financial services industry, the ability of services providers to bundle individual offerings (e.g., equity, bonds and derivatives) into customisable products (e.g., growth or income mutual funds) provides a way to reduce the a priori risks of individual products in that the individual risks are being hedged; or neutralised as a result of diversification (Markowitz, 1952).

Therefore, in the light of these developments, forms of intermediation (in virtual environments) are likely *not* to disappear all together, but rather to take new forms. Agents, intermediaries and other forms of information brokers will provide new intermediation services that contain among other things, information about the quality and the performance of products and services. Moreover, the increasing amount of information is such that many people no longer talk about a large set of services and prod-

[264] Although the characteristics and the eventual payoff structures of a derivative are known a priori, the final value, if any, is only measurable on the derivative's actual expiration date.

ucts, but rather opt to talk about a limited set of indexed – or "superstar" character – services and products (Frank and Cook, 1995; Rosen, 1981). Recent developments on the WWW indicate that these information brokers will select appropriate services and tie them together to create new bundled offerings instead of a discrete or standalone offer. The skilful reduction of data into manageable pieces of valuable information can already be observed on a number of VE platforms[265]. For example, several VE services providers have started to cross-advertise bundles of products and services on well know web sites to promote their own products and services in a symbiotic relationship with the services provider. Likewise, a number of web sites have sprung up to provide an overview of the products and services available on the Web[266]. We believe that eventually more sophisticated virtual intermediation services – tailored specifically for VE platforms – will emerge as the availability of data continuous to expand. Thus, in Appendix 6, we introduce a hypothetical VE system for banking based on interview- and case study data. This model is further augmented with financial services that exist in various forms and shapes on the WWW.

6.8 Summary and Conjectures – Risks in VE

Risk in interorganisational exchange situations can be distinguished along two dimensions. First, opportunistic renegotiations where one party attempts to renegotiate the terms of the contract, especially after the second party (the dependent party in most cases) has contributed substantial resources (e.g., high asset specific sunk costs, or lesser control over its own resources) to the project. Second, risks related to non-

[265] In the case of financial- and financial news services, they include E*Trade [etrade.com]; Bloomberg [bloomberg.com]; and Quote.com [quote.com].

compliance – a situation where one of the contract partners does not act in accordance with the contract or other prespecified terms. However, as more open systems are developed, non-biased (e.g., equity dominated) and non-proprietary EC systems eventually replace electronic hierarchies (Malone, Yates, and Benjamin, 1987, 1989). Accordingly, the risks of opportunistic renegotiations are sequentially reduced. Furthermore, with the advent of advanced interactive information and communications technologies, instant access to remote information sources can be utilised to monitor the behaviour of alliance partners to identify forms of non-compliance and spot potential threats (stemming from both opportunism and non-compliance).

In electronic markets, environmental risk is high if the system is biased, that is an interorganisational network exchange system is designed with one organisation being at a competitive advantage and/or the other organisations being dependent on the former[267]. However, Malone, Yates and Benjamin (1987) have suggested that electronic markets will – driven by competitive and legal forces – converge towards unbiased markets. If this should to occur, organisational rather than environmental risk may be an essential factor if organisations are not flexible enough to transform their internal business processes to effectively use these new forms of interactive communication and electronic trade. Therefore, it can be expected that traditional forms of intermediation will eventually be forced to undergo significant change[268]. As information systems increasingly provide accessibility to exchange partners, the traditional role of intermediaries (matching supply and demand) is decreasing, especially in commodities markets

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[266] See, for example, yahoo.com; altavista.com; hotbot.com and numerous other "search engines".

[267] Interviews with SBC, Electronic Retail Banking, Basle, 05/10/96, 05/13/96, 12/21/95, 11/03/95; Oracle, New York, Jan. '97; personal correspondence Microsoft, Online Banking Division, 1995, 1996, 1997.

[268] Interviews with Oracle, New York, January 1997; personal correspondence with Microsoft, Online Banking Division, 1995, 1996, 1997; SBC, Electronic Retail Banking, Basle, 05/10/96, 05/13/96, 12/21/95, 11/03/95; UBS, Corporate Communications, Zurich, 09/20/95; Citibank, Corporate Strategy,

(where offerings are well defined). Simultaneously, however, there is a growing need for a new form of intermediation related to the growing amount of information available and the associated lack of accreditation and quality ratings of the vast pool of available services and products that exhibit credence good characteristics (Nelson, 1970).

Sharing new, non-market information with new partners provides, of course, one of the greatest potential risks to organisations (Bernstein, 1996; Nalebuff and Brandenburger, 1996; Sherer, 1995a,b; *The Economist*, February 10, 1996). The degree and type of risk is dependent upon the nature of the relationship and the genuine history (e.g., path dependency, establishment of mutual trust) of the relationship (Arthur, 1994; Liebowitz and Margolis, 1996b). Interorganisational digital network exchange systems can either be used to support information exchange or they can equally well be used to maintaining the structure of the relationship. In cases of non-competitive alliances and network systems, functional support warrants the most attention since it can be expected that all companies involved in a specific value network gain by co-ordinating functional activities that enhanced the overall aggregated value. However, eventual opportunistic renegotiations cannot be exclude a priori. In cases of competitive alliances and network systems, competitive risk or poaching – the risk that one party goes after the other's customers or uses proprietary information for its own advantage (Clemons and Row, 1992) – of information must be considered as a potential source of risk. Under these newly emerging exchange conditions, characterised mainly by higher levels of uncertainty, intermediation might eventually transform itself to provide a new function associated with establishing and maintaining interorganisational trust.

London, 09/27/95; Goldman Sachs & Co. Bank, Zurich, 05/05/96; and Andersen Consulting, Financial

Services and Information Technology, London, 03/27/96.

7 A Synthesis of Virtual Exchange

7.1 Abstract

This chapter is structured into three parts. The first part discusses EC systems – the commercial application of VE systems. A taxonomy of EC is provided in the following section. We then provide some empirical evidence of commercial VE systems and applications. In the next section, we evaluate a possible path of evolution for VE systems. In the second part of this chapter, we discuss the impact of advanced technology on organisational design. We analyse an emerging commercial interorganisational exchange system called Extranet and discuss the building blocks required to set up an Extranet. We then discuss the relationship between value networks and organisational design. We provide an analysis of three organisational exchange arrangements located in the virtual domain of organisational value networks, namely, the Extranet, the virtual organisation and electronic communities. We examine the value creation process in virtual environments and investigate the role of electronic communities as an institutional arrangement. The final part of this final chapter provides a synthesis between marketplace and marketspace.

7.2 Electronic Commerce Systems

VE refers to the conduct of economic exchange in a virtual environment, where the actual transaction is carried out on digital networks linking disparate network entities[269]. EC may be considered from two complementary perspectives. The technological perspective centres on the ICTs required to transmit information and data embedded in digitally encoded messages that travel beyond organisational boundaries. Alternatively, EC may be viewed as an enhanced business practice to carry out economic exchange, with interest focused on the harmonisation of routines and rules among digitally interlinked network constituents. We believe, however, that these two views are not mutu-

[269] The term VE and EC will be used interchangeably through this text to indicate that an exchange or transaction is carried out on a VE platform rather than via the traditional and tangible channels of exchange (e.g., a bank branch).

ally exclusive. Instead, we conjecture that these paradigms need to be seen as complements – forming the entirety of a VE platform.

Pfeiffer (1993) has noted that the early texts on EC tended to take a technological perspective. These technologies incorporate interorganisational modes of exchange, which may simply replicate existing rules and norms or alternatively allow an evolution of novel forms of trade. McFarlan (1984), in an early study of single source EC[270], focused on its use to gain and maintain competitive advantages in the marketplace (Galliers, Swatman and Swatman, 1995). The development of these electronic systems led to two potential sources of competitive advantage. First, these systems provided a genuine source of services differentiation. Thus, the system provider often evolved as the preferred supplier. Second, the customers benefited from faster services and simplification of the actual transactions. However, a single-source sales channel provides significant incentives, coupled with economic power, for suppliers to lock in customers[271].

The single source EC model (e.g., the EDI of GE) has been challenged as EC systems emerged based on co-operation among apparently competing organisations (Graham, Spinardi and Williams, 1996; Tapscott, 1996). The establishment of potential sources of competitive advantages, however, needs to be balanced against an eventual loss of operational efficiency. Therefore, firms must ultimately decide whether to co-operate with competitors to develop standardised VE systems, develop proprietary systems or wait and see how the ICTs continue to evolve. Technological co-operation implies an eventual convergence of rules, regulations and governance practices among participants, and thus partially restricts the future use of (proprietary) VE systems to

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[270] A single source EC system, such as electronic data interchange (Ferguson and Masson, 1993; Galliers, Swatman and Swatman, 1995; Jimenez and Polo, 1996; Stecklair, 1995; Swatman and Swatman, 1991), provides the means to trade electronically between two parties to the exchange; namely the supply- and demand side.

[271] Sources disguised upon request.

gain a competitive advantage. Note, however, that the boundaries and scope of such a decision may be blurred as a group of firms may collectively develop a VE platform and eventually evolve into an electronic community. For example, the Swiss Electronic Exchange (SEE) is in the first phase of becoming an electronic community as more functionality and exchange features are incorporated into the VE system. Moreover, collective and co-ordinated organisational actions, aimed at maximising operational savings within the community, need also be seen as a mode to differentiate the community from firms outside the virtual community[272]. Thus, a purely co-operative nature of such initiatives implies a shift from EC as a means to gain competitive advantage to its use as a source to reduce costs by improving operational efficiency.

An additional perspective on EC is anchored in the vast literature on business process reengineering (BPR); where electronic communities can be perceived as an extension of BPR in interorganisational collaborative arrangements (Hammer, 1990; Hammer and Champy, 1993)[273]. In the BPR framework, ICTs are viewed as potent enablers of radical change in how organisation perform their operations. Malone, Yates and Benjamin (1987) have pronounced that faster, cost-effective interorganisational communication will eventually extend the impacts of EC systems beyond the automation and redesign of existing interorganisational electronic linkages and facilitate the restructuring of value chains. Swatman and Swatman (1991) have further noted that these efforts may lead to the restructuring of intraorganisational exchange processes. Likewise the concept of BPR has been extended beyond the boundary of the single or-

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[272] Interviews with SBC, Electronic Retail Banking, Basle, 05/10/96, 05/13/96, 12/21/95, 11/03/95; Oracle, New York, Jan. '97; and personal correspondence with Microsoft, On-line Banking Division, '95 – '97.

[273] For a more detailed discussion about BPR, see for example: Currie (1995); Davenport (1993); Earl and Bushra (1994); Grover, Fiedler and Teng (1994); Hall, Rosenthal and Wade (1993); Henderson and Venkatraman (1994); Stebbins, Sena and Shani (1995); Venkatraman (1991, 1994); and Venkatraman, Henderson and Oldach (1993).

ganisation in business network redesign (Venkatraman, 1991), where EC has been promulgated as a lever to trigger radical change across networks of organisations.

7.3 A Taxonomy of Electronic Commerce

EC as outlined above can be seen from a number of perspectives, with distinctions between strategic advantage and operational efficiency, competition and co-opetition, and as a driver for industrial restructuring[274]. Following in part Graham, Spinardi and Williamson (1996), we describe and develop a taxonomy of EC – ultimately leading to the concept of an organisational multisource value network. Likewise we attempt to discover the stimuli that lend themselves to shape the emerging configurations of VE systems and how they can blend with existing commerce system in the **organisational multisource value network model**.

Malone, Yates and Benjamin (1987, 1989) divided EC platforms into two categories. First, electronic hierarchies that integrated organisational tasks, functions and processes across a predefined set of organisational boundaries. Second, electronic markets, where a number of buyers and sellers conduct economic exchange through an electronic intermediary. Benjamin, de Long and Scott Morton (1990) have taken this definition a step further by making a distinction between transaction processing (routine transaction processing), and task support (non-routine task support for managerial analytical and design functions).

The market versus hierarchy dichotomy was largely derived from neo-institutional economics, notably of Coase (1937) and Williamson (1975, 1985, 1991a,

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[274] Co-opetition can be defined as a revolutionary mindset that simultaneously combines competition and co-operation in the marketplace (Moore, 1993; Nalebuff and Brandenburger, 1996).

1991b, 1993a,b, 1994a,b, 1996). Economics have two basic mechanisms for co-ordinating the flow of products and services through adjacent steps in the value network – markets and hierarchies. Williamson (1975, 1985) categorises economic exchange or transactions into those that support co-ordination between multiple buyers and sellers (e.g., market transactions) and those that support co-ordination within the confines of an organisation (e.g., hierarchy transactions). Williamson (1975, 1985, 1996) has further noted that the choice of transaction depends on a number of factors, including asset specificity, the frequency of reoccurrence, and the prevailing level of uncertainty.

Therefore, markets and hierarchies are alternatives for conducting transactions. Thus, transactions are brought within the hierarchical structures of organisations when the market mode is no longer efficient. A market is the most efficacious mode of conducting transactions when all necessary information is conveyed between parties by a price, and this single item of information is sufficient. Transactions are better brought within a hierarchy when much more must be known, much less is certain, and there may be elements of moral hazard or asymmetric information. Consequently, the hierarchy brings the inadequately informed parties to a transaction together under some degree of control. Therefore, a hierarchy more closely approaches information parity, and in particular provides for moral, ethical and reciprocal obligations over and above strictly economic ones. What stops hierarchical arrangements taking over more and more transactions indefinitely? The limits begin to appear as firms grow larger and as vertical integration between firms extends. Transaction costs then rise to a level at which the marginal costs of administering the incremental transaction begin to exceed those of completing transactions through the market[275].

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[275] Interview with Oracle, New York, January 1997; and personal correspondence with Microsoft, Online Banking Division, 1995, 1996, 1997; and workshops Bank Cial, Goldman Sachs, Oracle and SBC.

Although Benjamin, de Long and Scott Morton (1991) and Malone, Yates and Benjamin (1987, 1989) rely heavily on the works of Williamson (1975, 1985), their use of the term hierarchy, to include long term relationships not governed by short term price negotiations, is ambiguous (Graham, Spinardi and Williams, 1996). These interorganisational arrangements are neither simply market based nor they pure hierarchies where one party to the relationship is able to partially direct the operations of the other. Benjamin, de Long and Scott Morton (1991) refer to hierarchies as long term exchange relationships characterised by high levels of trust. These interorganisational arrangements are neither pure market relationships, as it is not short-term competition which determines prices, nor are they hierarchies. Williamson (1986) has termed such interorganisational arrangements "obligational contracting". However, such interorganisational arrangements may also be seen through the lens of "networks" of interlinked network nodes (Castells, 1996; Thorelli, 1986; Powell, 1987, 1990).

7.3.1 Virtual Exchange – Empirical Evidence

Close task and process integration across networks of organisations has been viewed as an example of the emergence of network industrial structures and the network organisation[276], where interorganisational relationships are neither hierarchical nor market based.

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[276] Although issues related to the structures of industrial networks are beyond the scope of this research project, a sound discussion can be found in Baker (1992); Bartness and Cerny (1993); Benson (1975); Blankenburg-Holm, Eriksson and Johanson (1996); Bolton and Dewatripont (1994); Borch and Arthur (1995); Burt (1992), Charan (1991); Cravens, Piercy and Shipp (1996); Duysters and Hagedoorn (1995); Ghosal and Bartlett (1990); Gomes-Casseres (1994); Grandori and Soda (1995); Jarrillo (1988); Johanson and Mattsson (1987); Kreiner and Schultz (1993); Lea, O'Shea and Fung (1995); Madhaven, Koba and Prescott (1996); Miles and Snow (1986, 1992, 1994); Nohria (1992); Nohria and Eccles (1992a,b); Oliver and Ebers (1996); Park (1996); Patterson (1995); Pennings and Harianto (1992); Perry (1993); Ring Smith (1996a, 1996b); Robertson, Swan and Newell (1996); Rogers and Kincaid (1981); Steinfeld, Kraut and Plummer (1995); and Thorelli (1986).

In the case of the virtual corporation[277], such an integration eventually leads to financially independent organisational entities (Davidow and Malone, 1992) behaving increasingly like a single firm (e.g., the Eurofighter project: a joint project between the BAe in England, Alenia in Italy, DASA in Germany and CASA in Spain).

Under this scenario, EC provides the instrumentality for informational and VE integration. Using the network paradigm, a further distinction can be drawn between electronic markets and electronic hierarchies. Electronic markets bring together disjoint buyers and sellers, eventually replacing existing intermediary institutions[278]. Conversely, electronic hierarchies automate the exchange between organisations in stable interorganisational arrangements.

The implementation of such VE system can either follow a radical approach as suggested by Schumpeter (1934), or alternatively follow a more evolutionary or incremental path[279]. The third possibility – the transposition of existing information previously exchanged by other means, in which existing practices provide a template from which EC can be derived – is not an innovative use of VE per se. Radical implementation corresponds largely with the BPR concept (Short and Venkatraman, 1992)[280], where EC is primarily used to radically restructure relations across organisational boundaries; yet within the confines of the community. Although we use the terms evolutionary and incremental interchangeably, we would like to point out that organisations have largely adopted well planned incremental implementation procedures. However, evolutionary

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[277] The virtual corporation of formally analysed in Alexander (1997); Davidow and Malone (1992); Handy (1995b); Nohria and Berkley (1994); and Upton and McAfee (1994).

[278] Interviews with UBS, Corporate Communication, Zurich, 09/20/95; Oracle, New York, January 1997; and Coopers & Lybrand, London, 05/03/96, 06/17/96; workshops with Oracle, SBC and Bank Cial.

[279] For a discussion about the "evolution of organisations" see, for example, Axelrod (1984); Baum and Singh (1994); Mezias and Glynn (1993); Nelson (1994); Nelson and Winter (1982); Simon (1993a); and Williamson and Winter (1991).

[280] A more detailed discussion about Business Process Reengineering (BPR) is provided in, Earl and Bushra (1994); Davenport (1993); Grover, Fiedler and Teng (1994); Hall, Rosenthal and Wade (1993); Hammer (1990); Hammer and Champy (1993); and Martinez (1995).

processes have been observed at numerous case study sites where plans got out of hand and evolutionary process gained control over structured procedures[281]. Incremental implementation thus refers to the extension of electronic exchange among economic agents to include the exchange of information and data not previously exchanged.

VE platforms that have been analysed in this work have generally been identified as undergoing incremental change[282]. The SEE, the SOFFEX and a number of financial services providers have implemented electronic exchange systems through a large number of step changes. Initially, the predominant focus has rested on reproducing existing (paper) transactions[283]. Yet, once the initial procedures have been installed successfully, financial institutions and SEE registered organisations have started to include novel or adjacent transactions and enhance the nature of the procedures and transactions per se.

7.3.2 Virtual Exchange – A Possible Path of Evolution

Although it is difficult to predict the exact nature of change in an environment where change is the only constant, we believe that two major trends can nevertheless been spotted. First, based on the works of Moore (1993) and Nalebuff and Brandenburger (1996), we conjecture that EC will eventually introduce a change in emphasis from competition to co-opetition. Likewise, we believe that interorganisational collaboration will promote efforts aimed at improving community or network population wide effi-

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[281] Sources disguised upon request.

[282] Interviews with SBC, Electronic Retail Banking, Basle, 11/03/95, 12/21/95, 05/10/96; UBS, Corporate Communication, Zurich, 09/20/95; CS Holding, CS Economic Research, London, 07/31/96; Coopers & Lybrand, London, 05/03/96, 06/17/96; Lehman Brothers, London, 1996; Goldman Sachs & Co. Bank, Corporate Communication and Information Technology, Zurich, 09/19/95; and Oracle, Financial Services Division, New York, January 1997.

[283] Interviews with Bank Cial, Basle, 05/09/96; Coop Bank AG / GZB, Relationship Banking, Basle, 1995, 1996; and Bank Sarasin & Co., Basle, 09/15/96.

ciency and effectiveness. Second, we conjecture that the potential opportunities from exploring and exploiting VE platforms will eventually lead to the formation of further electronic markets following incremental processes rather than radical developments within communities.

The emergence of VE, driven by cost-effective advances in ICTs, has provided the tools for increased operational efficiency[284]. This transition is driven by the following contingencies. A successful first mover is likely to be challenged by competitors seeking to emulate the first mover's system. Trading partners prefer having access to a large number of exchange systems. Moreover, in the majority of industries no single organisation has the economic power to gain sufficient dominance to impose a specific proprietary electronic exchange platform. A number of authors have recently pointed out that benefits of open co-operation, to gain operational efficiency, may exceed the competitive benefits of proprietary implementations[285]. Thus, exchange systems specifically designed to exploit "value" from locked in customers may exhibit a strong tendency to open up to competitors as a result of government regulations and the eventually high value added for customers manifested in a greater choice and an overall higher trading volume. The seminal works of North (1981), and Castells (1996) lend to the belief that virtual or electronic exchange will be initiated within the confines of virtual or electronic communities. This minimises the uncertainty faced by community constituents and the complexity of governance (Spar and Bussgang, 1996). Systems then develop incrementally, either towards markets or towards reconfigured hierarchical interorganisational co-operative arrangements. Thus, we conjecture that incrementally

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[284] Interviews with Goldman Sachs & Co Bank, Zurich, 05/05/96, 07/05/96; Bank Sarasin & Co., Basle, 09/15/96; and workshops with SBC, Oracle, and Goldman Sachs & Co Bank.

[285] See, for example, Arthur (1989; 1990, 1994, 1996); David (1985); Katz and Shapiro (1985, 1994); and Liebowitz and Margolis (1990, 1994, 1996a, 1996b).

growing virtual communities may overlap in terms of content and scope, hence creating a digital quilt rather than a homogeneous coherent electronic trading community[286].

Lower search costs and greater competition are the two major economic benefits of electronic communities (Bakos, 1991a,b). However, the formation of such communities is inhibited by the need to amass a large enough number of buyers and sellers to achieve a critical mass of exchange partners and hence create a viable marketspace. Unlike electronic hierarchies, these formations cannot be easily initiated by a small core of firms. These contingencies may further prompt existing market intermediaries to switch their existing links among exchange partners to EC platforms. The expertise of incumbents and their fear of other electronic services usurping their market position make the development of electronic markets attractive. Thus, incumbents may eventually develop these systems into an electronic marketspace. The incremental developmental process of interorganisational electronic exchange arrangements may further lend itself to the creation of new forms of electronic intermediation.

The contemporary state of VE systems, according to our data from the financial services industry, reveals that the common developmental pattern for corporations follows a rather conservative approach[287]. At present, the majority of organisations use advanced ICTs largely to replicate existing links. However, a number of organisations have started to develop these systems further and design genuine VE application that have did not exist previously. For example, Microsoft's MSN – a VE network, where the intermediary is paid a commission for each transaction carried out on MSN. Thus, the general trend for financial services providers seems to be based on replicating ex-

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[286] Personal communication with Microsoft, Online Banking Division, '95–'97; workshops with Oracle.

[287] For example, interviews with SBC, Audit, Basle, 05/13/96, Electronic Retail Banking, Basle, 05/10/96, 12/22/95, 11/03/95; UBS, Corporate Communications, Zurich, 09/20/95; CS Holding, CS Economic Research, London, 07/31/96; Citibank, Corporate Strategy, London, 09/27/95; and Coop Bank AG / GZB, Relationship Banking, Basle, 1995, 1996.

isting procedures in the virtual environment and eventually design a widening range of genuine virtual information and services exchange mechanisms. Our research, however, did not find significant evidence that in the short term large scale industrial restructuring will occur[288]. However, we hypothesise – subject to future empirical testing – that through the development of more sophisticated VE systems and the rise of structured virtual communities, digital forms of exchange will have more impact on existing structural arrangements and the modes of economic exchange.

7.3.3 Structure, Technology and Value Networks

The study of how forms emerge, evolve, and eventually dissolve over time is central to the study of organisational design (Bahrami, 1992; Daft, 1986)[289]. Organisational design and structure becomes even more important within the dynamic context of advanced ICTs, which can aggrandise the development of new forms. Related to the development of genuine new organisational forms is the study of how variations of existing forms evolve – either independently or within the confines of other organisational forms (Ring Smith and Van de Ven, 1994).

Advances in ICTs have long been recognised for their impact on organisational design (Daft and Lengel, 1984, 1986; Daft, Lengel and Trevino, 1987; Fulk and DeSanctis, 1995; Huber, 1990; Scott Morton, 1995). The initial contributions of ICTs

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[288] Graham, Spinardi and Williams (1996) recently pointed out that barriers to radical industry restructuring are linked to the difficulty of co-ordinating radical change across a network of voluntarily interlinked organisations. Radical change raises the complexity of the new exchange processes and hence the risk and uncertainty encountered by network constituents. Therefore, electronic communities – in their contemporary state – implicitly tend to accept existing industrial structures rather than instigating the development of genuine VE platforms. Thus, the initial reliance on existing industry structures is likely to prompt industrial change to occur incrementally.

[289] For a more detailed discussion about the evolution of organisational structures and the study of organisation design, see also Brocklesby and Cummings (1996); Galbraith (1973, 1997); Huber (1990); Scott Morton (1995); Suarez and Utterback (1995); Tushman and Nadler (1978).

were brought about by basic forms of information exchange that contributed to the development of bureaucracies; enabling co-ordination and control among organisational entities (Yates, 1989; Yates and Orlikowski, 1992). Organisational forms were later designed to match communication and information exchange requirements. Galbraith (1973, 1977) noted, for example, that boundary spanning organisational units were created to link intraorganisational uncertainty reduction activities to activities within the environment. Beniger (1986, 1990) argued that ICTs and organisations are truly homologous forms. ICTs create new options for organisational design; and new organisational forms, in turn, create the opportunity to devise new forms of ICTs. Therefore, the articulation of technology and organisational design recognises that neither one is fixed but that both are changing in relation to each other.

7.4 Advanced Technology and Organisation Design

Although there have been considerable discussions about the interdependencies linking organisational design and technology, Henderson and Venkatraman (1994) have recently noted that the specific mechanisms by which new technologies affect and are affected by organisational design have not been described in a systemic matter. Fulk and DeSanctis (1995) discuss five features of advanced ICTs that offer important advancements for organisations. The first feature is linked to the increase in the speed of communication and the emerging possibilities for enhanced forms of data and information exchange. The second advancement is the simultaneous reduction in the costs of communication due to technological advances and the exploitation of economies of scale. The third feature is linked to the sharp rise in the availability of bandwidth, which has facilitated the explosion in multimedia communications and applications. The fourth

feature of the interdependence between technology and organisation design is the increase in the size of the digital network of interconnected entities and economic agents. The fifth feature is linked to the ongoing integration, convergence and blurring of ICT based exchange systems with computing and consumer electronics technologies, which has moved information exchange technologies beyond a purely connective function.

There has been a recent evolution in organisational design whereby hierarchical and divisional structures are increasingly replaced by decentralised, technology intensive and more flexible approaches to arranging and co-ordinating organisational activities, procedures and processes[290]. Unlike their more rigid bureaucratic predecessors, the new organisational forms are viewed as highly responsive to environmental pressures. Moreover, these technology-enabled organisational forms are more than reactionary (Fulk and DeSanctis, 1995). Many organisations are actively engaged in the design and implementation of unique virtual and electronic interorganisational exchange platforms, virtual communities and a number of other EC based exchange mechanisms. Fulk and DeSanctis (1995) further point out that the essential forces affecting the interdependence between technology and organisation include, greater environmental complexity, increasing levels of competition and globalisation, a desire within the firm to enhance innovation and become more entrepreneurial, while maintaining and forging new interorganisational relationships. These elements of change contribute to the growing organisational interest in the design of organisational forms driven largely by advanced ICTs. New organisational designs, forms and structures, centred largely around ad-

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[290] A formal analysis of the relationship between organisational design, technology and the distribution of power to co-ordinate organisational activities is beyond the scope of this work. However, a sound analysis can be found in the following works of Bahrami (1992); Brocklesby and Cummings (1996); Castells (1996); Chesbrough and Teece (1996); Daft and Lengel (1984); Davidow and Malone (1992); Gerwin (1981); Ghoshal and Bartlett (1990); Handy (1995b); Harrison (1994); Hitt, Keats and DeMarie (1995); Huber (1990); Ilinitch, D'Aveni and Lewin (1996); Scott Morton (1991, 1995); Stebbins, Sena and Shani (1995); Tushman and Nadler (1978); Volberda (1995); Von Simson, (1990).

vanced ICTs, have been variously referred to as adhocracy (Malone and Rockart, 1991), the internal market (Malone, Yates and Benjamin, 1987, 1989), the knowledge-linked organisation (Badaracco, 1991), the virtual organisation (Alexander, 1997; Davidow and Malone, 1992; Handy, 1995b), the network organisation[291], and EC systems[292].

7.5 Value Networks and Organisational Design

As recently noted by DeSanctis and Poole (1994), and Fulk and DeSanctis (1995), there is a rising interest in innovative forms of collaborative interorganisational arrangements, whether or not they share the same value chain. Many interorganisational forms are possible, including, strategic alliances, partnerships, coalitions, joint ventures, franchises, research consortia, and network organisation (Ring Smith and Van de Ven, 1994). In addition, new forms of coupling may be developed through ICTs, in what has been termed "electronic integration effect" (Malone, Yates and Benjamin, 1987; Venkatraman and Zaheer, 1994). We consider two forms of interorganisational collabo-

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[291] Although the concept of interorganisational collaborative arrangements is only of minor relevance for this work, we would like to point out that a detailed discussion can be found in the works of Bleeke and Ernst (1991, 1993, 1995); Broys and Jemison (1989); Bronder and Pritzl (1992); Brouthers, Brouthers and Wilkinson (1995); Dunning (1995); Fedor and Werther (1995); Garcia-Canal (1996); Garnsey and Wilkinson (1994); Gerlach (1987); Glaister and Buckley (1996); Gomes-Casseres (1993a, 1993b, 1994); Gulati (1993, 1995a, 1995b); Gulati, Khanna and Nohria (1994); Hamel, Doz and Prahalad (1989); Kanter (1988); Lei and Slocum (1992); Lorange (1996); Mclean (1994); Ohmae (1989); Osborn and Baughn (1990); Pekar and Allio (1994); Urban and Vendemini (1992); and Yoshino and Rangan (1995). More specifically, a detailed discussion about the "network organisation" can be found in the works of Aldrich and Whetten (1981); Baker (1992); Benson (1975); Borch and Arthur (1995); Burt (1992); Charan (1991); Cravens, Piercy and Shipp (1996); Economides (1996); Ghoshal and Bartlett (1990); Grandori and Soda (1995); Hinterhuber and Levin (1994); Jarillo (1988); Johanson and Mattsson (1987); Kreiner and Schultz (1993); Lea, O'Shea and Fung (1995); Miles and Snow (1992, 1995); Nohria (1992); Nohria and Eccles (1992a,b); Nouwens and Bouwman (1995); Park (1996); Patterson (1995); Ring Smith (1996a); Robertson, Swan and Newell (1996); Rogers and Kincaid (1981); Steinfeld, Kraut and Plummer (1995); and Thorelli (1986).

[292] Electronic commerce systems have been analysed in the works of Crede (1995); Graham, Spinardi and Williams (1996); Hoffman, Novak and Chatterjee (1995); Kalakota and Whinston (1996); Nouwens and Bouwman (1995); Picot, Brotenlaenger and Roehrl (1995); Sarkar, Butler and Steinfeld (1995); Steinfeld (1995); Steinfeld, Kraut and Plummer (1995); Tapscott (1996); Wigand and Benjamin (1995); and Young (1995).

ration and value creation that thrive on the use of advanced ICTs. Their common organisational structures all exhibit characteristics of networks and deploy advanced ICTs to varying degrees. While the network organisation delivers value along the traditional dimension of the physical value network, the electronic or virtual community is a proponent of the virtual value network. The interim form – the virtual organisation – exhibits criteria of both the virtual as well as the physical value network. Thus, an organisation's overall added value, as depicted in Figure 7, is a function of both organisational procedures and capabilities of both **the physical as well as the virtual domain of its value network**. This taxonomy thus includes aspect of commerce from both an organisation's physical and virtual domains, respectively. The overarching umbrella of this model is the creation of value, which is not confined to either physical or virtual contingencies, but rather incorporates both aspects of organisational value creation.

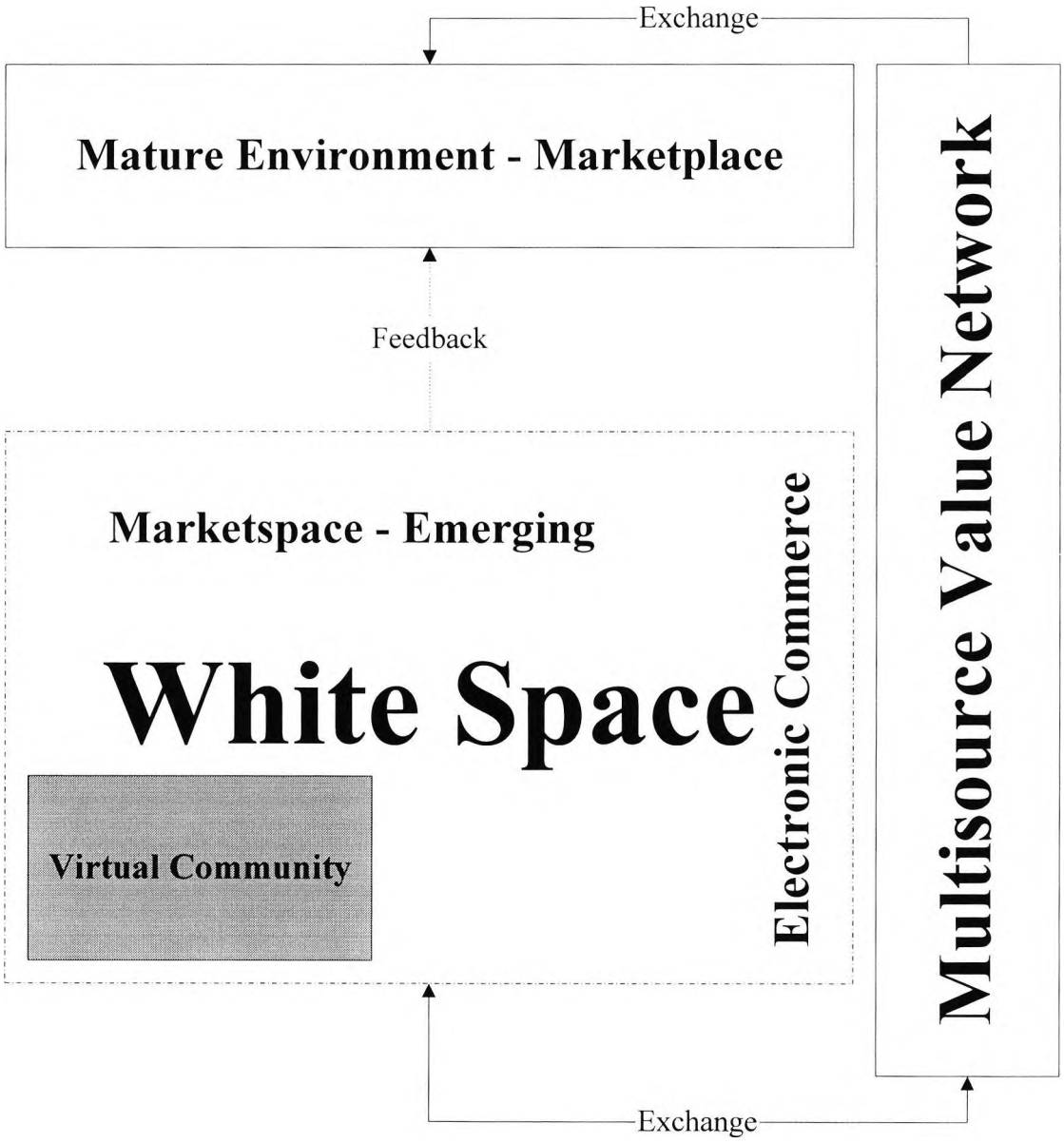

Figure 7 The Organisational Multisource Value Network

The physical domain of an organisation's value network can broadly be defined as comprising those organisational activities that span the traditional confines and scope of organisational resources and capabilities. Using the transaction cost framework, these

capabilities correspond to those organisational resources that are under the direct hierarchical control and co-ordination of an organisation (Coase, 1937; Williamson, 1975, 1985). The branch network of a financial services provider, for example, represents an organisation's potential to create value in the physical realm of its operations. Alternatively, the virtual value network component corresponds to organisational capabilities and resources that are eventually beyond the direct control and co-ordination of an individual organisation. Under this scenario, the co-ordination and control of organisational value creation activities is significantly impacted by advanced ICTs. The use of technology then permits disparate organisations to align their economic activities across traditional constraints of time and space[293].

Thus, below we discuss three interorganisational exchange arrangements positioned in the virtual domain of the organisational value network. We examine these constituents and outline their idiosyncrasies with special reference to financial services. The production and distribution of financial services in the virtual realm of the organisational value network requires a perspective of analysis that pays apt attention to the deployment of advanced technology within virtual interorganisational exchange environments. According to our interview and case study data, the exploration and deployment of advanced technologies in the financial services industry seems most promising in the following virtual exchange arrangements: the Extranet, the virtual organisation as a subset of virtual communities (Jones, 1995), and the virtual community per se.

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[293] Workshops with Lehman Brothers, Oracle, and SBC.

7.5.1 Extranet – the Third Wave of Virtual Exchange

As a powerful enabler of world-wide EC, the "Extranet Technology" is well positioned to trigger a revolution in the structure and operations of interorganisational commercial arrangements. The Extranet[294], or extended Internet, is a private business network of several co-operating organisations located outside the corporate firewall[295]. Alternatively, an Extranet can be regarded as the virtual part of a value network, where exchange is carried out on digital exchange networks. An Extranet service uses the existing Internet interactive infrastructure, including standard Web servers, e-mail clients and WWW browsers. This makes the Extranet far more economical than the creation and maintenance of a proprietary digital exchange network (e.g., EDI). It enables trading partners, suppliers and customers with common interests to form a tight business relationship and a strong communication bond. Technical and cost advantages are, of course, very important[296]. However, the real significance of the **Extranet** is that it is the first **non-proprietary** technical tool than can support the rapid evolution of EC. On a perhaps more fundamental level, the Extranet is also likely to redefine the business evolution of a conventional corporation into an information and knowledge based organisation[297]. The term third wave refers to the maturity process in the development of WWW technology – with the Internet marking the first wave and the Intranet the second wave, respectively. The Extranet is conceptualised as an essential advanced technology

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[294] An Extranet is a secure web site that facilitates digital communication and exchange between organisations. An Extranet allows authorised agents to access certain areas of a web site to collect and post information and or initiate digital economic transactions.

[295] A firewall is a barrier placed between an organisational data network and the outside digital world to prevent unwanted and potentially damaging intrusion of the organisational data network. Just as no physical firewall is a perfect protection against a fire, no digital firewall can provide 100 percent security against outside intrusion and attempts of tampering for an organisational data network.

[296] Interviews with Bank Sarasin & Co., Basle, 09/15/96; Bank Cial, Basle, 09/14/95, 12/21/95; SBC Warburg, Corporate Development, London, 09/29/95. Workshops with SBC, Goldman Sachs, Oracle.

enabler for the development of large-scale EC sites – a prerequisite for VE environments. Moreover, this new concept is also at the core of the reengineering effort required to advance a traditional corporation into an open system information and knowledge based organisation. In such an environment information, data and knowledge are the life-blood embedded in organisational capabilities, resources and procedures that need to circulate freely among the value network constituents.

The concept of an open system information and knowledge-sharing organisation is critical for the evolution of the Extranet. To survive and prosper in the information economy, an organisation must position itself within a system of loosely, yet interconnected economic agents – much like an evolving hub at the centre of a web of VE systems. For such a firm, the design of interorganisational liquid information and knowledge management systems has to be one of its core competencies – a principal strength that keeps it in an economically favourable position within its environment. The design of interorganisational exchange systems is here understood as the business of

1. gathering relevant data from other economic agents that interact with the organisations or the community of which it is part;
2. adding value by creating data, that is new information and knowledge, often in collaboration with other community members; and
3. disseminating the added value services and/or products to economic agents

in a fashion that does not interfere with the free flow of information across boundaries, while providing apt security to protect the community from fraudulent attacks and tampering. As a mission critical corporate tool, the Extranet has to support every one of these core functions in an effective and economical way.

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[297] For example, interviews with Oracle, Financial Services Consulting Group, New York, January 1997; American Stock Exchange, Advanced Technology, New York, January 1997; and Lehman Brothers, Institutional Investors, London, January 1997.

In the traditional organisation, the information and communication infrastructure normally includes three well-defined and distinct entities, namely input, processing and output. The information economy, characterised among other contingencies by high contract uncertainty, short development cycles, as well as the high risk associated with misjudging clients' needs and partners' abilities to deliver the requested goods[298]. Hence, an Extranet based EC system is well advised to include not only suppliers and partners, but also a number of viable economic agents representing the demand side of the overall customer population[299]. Moreover, the system must support efficient feed-back mechanisms to maintain services and product quality and automatically track basic changes in the community environment; measured for example by changes in consumer preferences and priorities.

In an abstract world of economic exchange, where there is no contract uncertainty, there can be zero transaction- and measurement costs and the identity of economic agents involved is not important. In reality, contract uncertainty exists in most types of economic exchange, especially when exchange occurs across organisational and cultural boundaries that transcend beyond the traditional limitations of time and space constraints (Choi, 1994; Nelson, 1970). With high levels of uncertainty in a dynamic interlinked and fast changing world, it is unlikely that one optimal organisational framework prevails over a long period[300]. Hence, a knowledge and information driven organisation has to aspire to uniquely position its offerings in the marketplace and marketspace (Rayport and Sviokla, 1994, 1995), thus continuously satisfying individual cli-

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[298] Interviews with SBC, Electronic Retail Banking, Basle, 05/10/96; Oracle, New York, January 1997; and personal correspondence with Microsoft, Online Banking Division, 1996, 1997.

[299] Interviews with SBC, Internal IT Audit, Basle, 05/13/96, Electronic Retail Banking, Basle, 05/10/96; Oracle, New York, January 1997; personal correspondence with Microsoft, Online Banking Division, 1995, 1996, 1997; workshops with SBC, Cial and Oracle.

[300] See, for example, Aharoni (1996); Ashkenas, Ulrich, Jick and Kerr (1995); Bahrami (1992); Dess, Rasheed, McLaughlin and Priem (1995); and Scott Morton (1995).

ent requirements, characterised by short cycles of changing products and services. The system's feedback mechanisms provide vital sources of information to adapt to future contingencies and evolving trends. Simultaneously, an information-accumulating organisation has to vigorously protect the essence of its existence: information and knowledge that provide a potential source of competitive advantage. Therefore, every information and knowledge driven organisation eventually has to resolve contradictions of

1. constantly sharing data with its interlinked base of economic agents on new products and/or services, thus uncovering and addressing their evolving requirements;
2. gathering information on their preferences, abilities, and future requirements; while
3. protecting vital data, information and knowledge, the life-blood of an information and knowledge centred organisation, from its competitors and other no-authorised economic third parties.

7.5.1.1 Extranet Building Blocks

An Extranet is divided into open and secure segments. Access security is at the foundation of the Extranet concept. Secure connections among network constituents create a virtual private network[301], using inexpensive and ubiquitous public infrastructure.

In many cases, standard password protection provided by WWW browsers is adequate to preserve the integrity of data stored on corporate site. Sites that require a higher level of protection could use more complex encryption tunnelling technology. An "Internet Tunnel" can securely transport data between its input and output points by encapsulating the packets of one protocol into another. Tunnel technology can also be used to individualise an Extranet site by providing features that are only accessible to

[301] A Virtual Private Network is an Internet based secure network constructed by a number of organisations, often competitors, to increase efficiency and create cleaner lines of communications. Using en-

entitled users. Furthermore, Extranet members could closely collaborate on exploring and prototyping a new product and/or service or could jointly conduct transactional delivery of electronic services. The Extranet would include some technical means to track the usage of various elements within the services. Ongoing statistical evaluation and monitoring help to identify effective and popular modules, components and features and to drop the unsuccessful prototypes. In a fully functional Extranet, transactional data could be stored in a powerful database management system that provides the foundation for further customer analysis. Special transactional procedures provide the secure means to Extranet members to directly initiate transactions, store or retrieve data. Extranet transactions can take place without an intermediary. Consequently, the processing speed can be maximised and the accuracy of data considerably improved.

An Extranet would also offer a private discussion area, which permits the members to exchange ideas and share non-transactional information[302]. The discussion area facilitates collaboration in solving joint problems and in an attempt to continuously improve the overall level of services. A discussion area is but one example of members' interactivity designed into the Extranet platform. Network constituents' and members' feedback through various digital information dissemination channels as well as statistical analysis of usage patterns help to constantly improve and upgrade the Extranet components and services. Furthermore, these feedback system provide the foundation for members to capitalise on serendipitous opportunities when they arise.

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cryption and other security mechanisms, the network is as secure as a traditional closed system although it uses public infrastructure.

[302] Interviews with SBC, Electronic Retail Banking, Basle, 05/10/96; Oracle, New York, January 1997; workshops with SBC; Oracle and Lehman Brothers.

7.5.2 Virtual Organisation

The design of organisations has gained much attention over the last decade (Dess, Rasheed, McLaughlin and Priem, 1995; Scott Morton, 1995). One of the basic questions that has kept the topic afloat, essentially remained the same through much of the last decade; namely: what is the optimal degree of structuring corporate activities within the confines of organisational boundaries? In the context of outsourcing, what is the optimal balance between corporate activities performed in-house and those purchased on the market?[303] To what extent should corporate activities be co-ordinated by a centralised as opposed decentralised organisational structure? Likewise, the convergence and blurring of industries has raised the level of uncertainty for a large number of organisations that have already been embedded in highly dynamic environments. This environmental threat has instigated management to devise organisational forms that maintain maximum flexibility in the face of unforeseen environmental changes.

7.5.2.1 Virtual Organisations – Location versus Ownership

In addition to the contingencies as outline above, virtual organisations can further be distinguished along the confines of [1] time and space and [2] the actual ownership of assets (Alexander, 1997). Accordingly, organisations can be ascribed to as virtual if they operate without either physical proximity between their peers or if they exhibit un-

[303] In the context of this research, we refrain largely from questions related to outsourcing. For a discussion about outsourcing see, for example, Alexander and Young (1996); Bettis, Bradley and Hamel (1992); Cross (1995); Drtina (1994); Elfring and Baven (1994); Hendry (1995); Huber (1993); Jennings (1996); Quinn and Hilmer (1994); and Raynor (1992). For a discussion about outsourcing in the context of information technology see for example: Cheon, Grover and Teng (1995); Choi and Willcocks (1995); Clark, Zmund and McCray (1995); Conk and Sharp (1995); De Looff (1995); Duncan (1995); Earl (1996); Hurst and Hannessian (1995); Jurison (1995); Klepper (1995); Lacity and Hirschheim (1993, 1995); Lacity, Hirschheim and Feeny (1995, 1996); McFarland and Nolan (1995); McLellan and Beamish (1995); Willcocks and Fitzgerald (1994); and Willcocks, Fitzgerald and Feeny (1995).

usually low levels of direct ownership. Under circumstances of high environmental uncertainty and in an attempt to maintain high levels of flexibility, organisations that aspire to these ideals are ascribed to as virtual. They mimic the activities of their peers without requiring physical proximity that are normally regarded as necessary (Alexander, 1997; Davidow and Malone, 1992). Removing the constraints of physical proximity and time is attractive because it can provide the foundation for assembling economic benefits and form the potential for the exploitation of economies of scale and scope. However, these potential benefits need to be weighted against the costs associated with the changes in the interactions and relationships between the parties involved. Accordingly, the boundaries between them cannot be managed in quite the same manner. The extent of these changes, we believe, depends largely on the nature and scope of advanced technologies deployed to substitute for physical proximity. These boundaries will have to be managed differently as long as advanced technologies provide anything short of total replication of physical presence. Moreover, the continued importance of physical proximity as an important tool in managing boundaries between peers is highlighted by the continued success of Silicon Valley and the City of London. Therefore, the objective is to manage these boundaries in such a way that, at a minimum, the advantages achieved by removing the requirement for physical proximity are not outweighed by corresponding disadvantages from impaired interactions or relationships (Alexander, 1997).

The first prototype of a virtual organisation, as described above, rests on changing boundary management, that is the liberation of physical proximity to carry out economic activities. Conversely, the second prototype of a virtual organisation is linked to the amount of direct ownership of an organisation in the production of added value. Instead of owning assets directly, the virtual organisation relies largely on other organisa-

tions and their entities to carry out economic activities within the value network – often under the auspices of co-ordination and control of the virtual organisation (Alexander, 1997; Davidow and Malone, 1992; Normann and Ramirez, 1993; Porter and Millar, 1985; Rayport and Sviokla, 1994, 1995). This type of virtual organisation gains competitive advantage from removing constraints from ownership; with the primary benefits being focus, access and flexibility. The concentration of direct ownership on a relatively small group of corporate activities, permit virtual organisations to simplify their management task, overcome resource constraints and increase the chances of building or maintaining competitive advantages in those strategic areas of focus.

Likewise, flexibility is a major advantage in a dynamic environment characterised by high levels of uncertainty (e.g., Aaker and Mascarenhas, 1984; Bahrami, 1992; Harrison, 1994; Hitt, Keats and DeMarie, 1995; Volberda, 1995). If organisation relevant contingencies are changing rapidly, such as technology or customer preferences, it is dangerous to become too dependent, through direct ownership, on past success factors. On the other hand, if demand for the organisation's output is growing rapidly, internal growth may not be sufficient. Thus, reliance on other established, yet flexible, organisations may increase the speed of response to unanticipated market fluctuations.

Therefore, virtual organisations consist of entities contributing to the organisational value creation process out of physically dispersed locations and workspaces with assets beyond the direct control of the core organisation. Thus, the life-blood of the organisation and a major source of integration are the information and communication links among the organisational entities. The alternation of the organisational value network and/or value chain provides alternative means to reduce the size of the core organisation and extend the reach of the virtual organisation. The 1980s are commonly described as an era of vertical integration and conglomeration of organisations, with the

1990s showing the reverse trend (Fulk and DeSanctis, 1995; Chesbrough, and Teece, 1996; Handy, 1995b; Scott Morton, 1995). The current trend is away from vertical integration in favour of working with value network constituents to improve their performance through investments in ICTs (Applegate, Cash and Mills, 1988; Cash, McFarlan, McKenny and Applegate, 1992). These interdependencies are maintained and supported by interorganisational information and communication systems and obviate the need for one firm to fully subsume the other. This strategy can improve not only the performance of interlinked network constituents but also their bondage.

The unique culture of a virtual organisation can be expressed as a function of the lack of permanence, fluid authority relations, and the deficiency of a consistent workspace (Davidow and Malone, 1993; Fulk and DeSanctis, 1995; Handy, 1995b). Castells (1996), Gibson (1984, 1993), Nohria and Berkely (1994), Handy (1995b), and Rheingold (1992, 1994) argue that significant changes in the "social space" are driven and enabled by advanced ICTs and in particular the Internet. Jones (1995) goes a step further by arguing that virtual space occurs outside the physical realm and thus provides the foundation for the formation of virtual communities – an offspring between advanced interactive forms of information exchange and the Internet. Accordingly, a virtual organisation can be seen as a subset of a virtual community or a possible ancestor in the evolution of virtual communities that has managed to coexist along side virtual communities. In addition, Rheingold (1992, 1994) proposes that ICTs need to be seen as facilitators in a transition of virtual communities from an association of physical neighbourhoods to an interest-oriented collective. Note that such a shift brings the concept of a virtual community closer to the notion of a virtual organisation.

7.5.3 Organisational Design – Virtual Communities

The Concise Oxford Dictionary defines a community as "a group of people living together as a smaller social unit within a larger one, and having interests, work, etc., in common." Similarly, a virtual or electronic community focuses on a group of people with common interests; only their interests are mediated through an information and communication computer network rather than through physical proximity. Electronic communities, known also as "virtual communities," have existed for some time on the Internet (and earlier versions thereof). Starting around the early 1980s, many electronic communities were organized through on-line bulletin boards, or so called Usenet news groups. These electronic communities consisted of self-organizing interest groups in academic, research and government circles. Using electronic mail and bulletin boards, hundreds of interest groups sprang up. Electronic communities catering to business and consumer interests did not generally emerge until the late 1980s, after the rise of on-line services such as CompuServe, Prodigy and America On-line. Since the introduction of the WWW, as a graphical extension of the data representation on the Internet in 1991, the Internet has increasingly become the electronic site of choice for a large number of consumer-oriented electronic communities. These communities have become dynamic places for consumers to pursue their interests. As Howard Rheingold wrote in his 1994 book *The Virtual Community*:

> " *... people in virtual communities use words on screens to exchange pleasantries and argue, engage in intellectual discourse, conduct commerce, exchange knowledge, share emotional support, make plans, brainstorm, gossip, feud, fall in love, find friends and lose them, play games, flirt, create a little high art and a lot of idle talk. People in virtual communities do just about everything people do in real life, but we leave our bodies behind ...* "

Yet, even since the publication of Rheingold's (1994) book, the activities in electronic communities have been changing dramatically with almost every major technological innovation. The type of human interactions Rheingold (1994) described occurred mainly through electronic mail and bulletin boards. These technologies essentially enhance the ability of people to network with each other. Through advances that improve people's sensory experience, aggregate products and services, and customize offerings to their unique tastes, today's electronic communities offer a far more powerful way for a group to achieve its interests. That is, they help address far more of a group's consumption process. With future advances that will give people nearly full-sensory experiences on-line, we can envision entire consumer processes; such as finding a job or buying a car; being performed through a number of interlinked electronic media. Who organizes these communities is also changing. In contrast to the self-organizing electronic communities of 25 years ago, entities with commercial interests have discovered the economic potential of tapping into an electronic community. Thus, these so-called electronic community developers have expanded the boundaries of communities to include themselves, as well as providers of products and services. Therefore, the business opportunities associated with electronic communities' lie in identifying and servicing consumer processes; that is, being the commercial catalyst that enables a well-defined segment of consumers to better accomplish its commercial and non-commercial interests (workshops with Oracle and Lehman Brothers).

Electronic or virtual communities are set to transform the structure of many industries, and the role and scope of the economic exchange or transactions function within them (Armstrong and Hagel, 1995, 1996). An economic transaction in a virtual environment can create value in ways similar to traditional forms of exchange embedded in a physical environment. However, a transaction carried out in a virtual environ-

ment may be more cost effective compared to the same transaction carried out in a non-virtual environment (Narus and Anderson, 1996). For example, transaction capabilities can exhibit both revenue generation and cost reduction potential (Quelch and Klein, 1996), depending on whether a company is attracting new customers and sales or transferring existing sales to a more profitable or cost effective medium (Narus and Anderson, 1996). Similarly, the provision of information can increase revenues by facilitating incremental sales or increased margins. In like manner, the costs of disseminating corporate information can further be reduced by replacing internal or external communication through more cost efficient distribution and dissemination channels on public network systems such as the Internet (Capozzi and Sutherland, 1996; Narus and Anderson, 1996). Electronic or virtual communities have actually existed for a number of years (Hess and Kemerer, 1994; Malone, Yates and Benjamin, 1987). However, the majority of these online services have been non-commercial. Financial transactions are rare and often resisted. These traditional forms of electronic exchange have undergone drastic changes over the last few years. First electronic communities have effectively integrated communication, information, entertainment and basic economic transactions. Second, electronic communities are emerging along economic and non-economic interests.

> **Proposition 13**: Organisations that blend communications with additional exchange functionalities and content in a commercial environment will eventually emerge as organisers of sophisticated and high value added electronic communities.

Likewise, commercial success in the on-line arena will be based on those businesses that organise electronic communities to meet multiple social and commercial requirements (Armstrong and Hagel, 1996). Moreover, the resource intensive process of es-

tablishing a critical mass of community members will further benefit early advocates of electronic communities (Armstrong and Hagel, 1995). Transaction and advertising revenues will further help community organisers to improve content and reduce eventual user fees, while capturing essential behavioural data from the users of online community services.

7.5.3.1 Electronic Communities and Consumer Requirements

Determining how an electronic community – embedded on the Internet – is likely to transform markets, begins with an understanding of how consumers accomplish their commercial interests, that is manage the consumption process. Although such a consumption process can vary according to the product or service requested, a number of fundamental requirements can be addressed and enhanced by online technologies. The active or passive gathering and acquisition of information and/or knowledge is likely to earmark the first step in the consumption process. This initial search process includes the discovery of viable alternatives, prices and other conditions under which the requested products and services are being offered, and the quality, if possible, of those products and services. Online communities can supply this information and provide consumers, upon request, with additional information concerning the quality of the potential product and/or services.

Armstrong and Hagel (1995, 1996) have recently noted that electronic communities should meet or adhere to a number of basic consumer requirements. These can broadly be distinguished in terms of economic mandates and social aspects of electronic communities. The economic transactions and the collection of information thereof comprise the economic aspects of EC embedded in virtual communities. Conversely,

the social dimensions of virtual communities provide the opportunity to forge relationships based on interest, economic rationale, or the engagement in virtual and anonymous worlds. These requirements can be related to the amount of interaction users want to have (with others), the depth of interaction required for participating in a specific exchange situation, and the extent of "virtual reality" present in an interactive exchange.

Thus, given these contingencies, we can distinguish between four types of online or virtual communities. First, electronic communities of transaction facilitate primarily the exchange of products and services and deliver information related to these transactions. These are not communities in the traditional social sense; rather their sole purpose is economic exchange. The organiser of a "transaction community" does not need to be a vendor. Electronic community organisers may simple bring together or intermediate a critical mass of buyers and sellers to facilitate certain types of economic exchange. Alternatively, the provision of an economic exchange platform may further provide a certain degree of accreditation and certification. For example, economic agents intending to trade within the confines of a specific community may transact in a specific marketspace[304] only upon passing the minimum requirements as set forth by the community organiser. Second, electronic communities of interest bring together people that share and interact extensively with one another on specific topics. These communities initially involve a higher degree of interpersonal interactive communication than

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[304] The transition from marketplace (atom) to marketspace (byte) refers to a shift from physically defined markets to markets based **digital** information. As markets move from place to space, costs are not only reduced – as a function of advanced ICTs – but there are also greater opportunities to isolate pieces of the value chain and capitalise on them individually. The value chain can be divided into three basic pieces. First, content – the actual product or service, second, the context or the way the product or service is being offered, and third the infrastructure or the underlying systems that support the process. In the marketplace, these pieces tend to be aggregated. For example, in publishing where subscribers not only pay for the information printed in the publication (the content) but for the publication's style and layout (the context), the printing process and the delivery system (the infrastructure). In the marketspace, the picture changes. An online services provider deals only in context, providing a lens through which to view content from a number of sources. The context is often the result of ad hoc interaction among constituents, while the infrastructure is beyond the direct control of a specific online provider.

pure communities of transaction (Capozzi and Sutherland, 1996; Thompson, 1996). These communities are defined by subject matter and are often limited in scope. Communities of interest might be based on geography, subject, social or experimental interest or transactional interest. Communities of interest are often a prerequisite for communities of transaction, in that they provide the necessary information – organised along user interest – to facilitate economic exchange. Third, communities of relationships are likely to arise around continuous forms of communication, exchange and other forms of interaction. These can spawn existing communities or alternatively arise with emerging customer requirements. In contrast to communities of interest and transaction, communities of relationship are centred on the identity of individuals that have interacted over a relatively long period. Accordingly, trust is strongest in relationship based communities. Finally, online interaction can be based on disguised forms of communication, where people create new environments, personalities in which they interact with one another. Armstrong and Hagel (1995, 1996) refer to these virtual environments as communities of fantasy. Although members of these communities might interact on a regular basis, they may not be aware of others' identities.

These four types of virtual communities are, however, not mutually exclusive. Interest and the purchase of one product or service may stimulate interest in complementary and/or unrelated offerings. Thus, the boundaries between these four community types are not fixed at any one point of time. Communities of interest often provide information before the actual transaction is carried out. Likewise, an online relationship may provide the additional or necessary information associated with a potential economic transaction and thus essentially blends the needs met by communities of relationship, interest and transaction (personal correspondence with Microsoft, workshop with Oracle). Although there is a growing number of electronic communities that provides

facilities to all four customer requirements, the majority of online settings accommodates only community access and/or facilities for a single dedicated customer requirement. Armstrong and Hagel (1996) correctly pointed out that such a focus deprives online community organisers from fully exploiting the possibilities of VE environments. Organisers of electronic exchange platforms offer participants the greatest value if they address all four requirements within the same community. Moreover, electronic or virtual communities are subject to continuous change; as such, they may evolve from one form to another. For example, communities of interest may evolve into communities of relationships or transaction. Community organisers should be sensitive to such shifts; accordingly meeting community of interest and relationship requirements will build ties between users and keep them loyal to the community organiser (Armstrong and Hagel, 1995). Thus, by fostering relationships and loyalty across a network of interests, organisers can make their communities highly competitive and build a critical mass that has the potential to make it difficult for new entrants to lure away customers (Arthur, 1989, 1990, 1996; Katz and Shapiro, 1985, 1994; Liebowitz and Margolis, 1996b). Although customers might get locked-in, they also receive value in that the virtual community can provide cost effective and efficient access to information and other scarce resources (Capozzi and Sutherland, 1996; Thompson, 1996) and the distribution thereof (Narus and Anderson, 1996).

7.5.3.2 Value Creation in Virtual Environments[305]

Although the number of companies that maintain Internet presence is growing rapidly, the payoffs from these endeavours are all but certain (93 percent of respondents agree:

T5 – T7, value creation). Conversely, one might argue that this high level of uncertainty – or the eventual high return – has prompted many companies to establish an online presence (as a precautionary measure should profits occur). Notwithstanding, the uncertainty facing virtual communities and accordingly the payoff structure associated with such endeavours, organisations providing transactional as well as relational facilities are likely to benefit from greater customer loyalty and may gain additional insights into customer behaviour.

Virtual communities are likely to create value in a number of distinct ways or any combination thereof. At present, the predominant mode for value creation rests on access control. An access-based model creates value via time-based usage fees. In an initial stage, time based fees may make sense, given the relative absence of other income sources. In the long run, however, time based value or income creation may be less sensible as communities will need to maximise the number of interactive members and their interactions. Usage fees, however, do not encourage interactions and prevent people from spending much time online. Alternatively, a content based model of value creation depends on fees for accessing specific content. Some Internet Services Providers (ISP) have recently started to adopt this model in favour over a usage fee oriented model. Although the Internet is subject to continuous change, the concurrent prototype of an EC system is based on a growing number of online community members and ISPs, which have adopted a value creation model that draws primarily on advertising and transaction revenues. Furthermore, highly visible online services providers are well positioned to charge other companies to advertise on their website. Likewise, online services providers or community organisers can take a small commission for every

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[305] This discussion has greatly benefited from the various interviews with Oracle in New York, January 1997, and the workshops with SBC, Bank Cial, and Lehman Brothers.

transaction carried on the virtual premises of their electronic community. In addition, corporate online presence must offer valuable, changing content that will not only attract new customers with diverse demographic backgrounds, but also encourage them to return. Thus, online providers and community organisers face a number of challenges that need to be resolved. For example, individuals exhibit distinct preferences with respect to information about products and services; they demonstrate varying levels of brand familiarity and possess different bandwidth capacities. Thus, fulfilling such diverse requirements on a single website will continue to be a challenging endeavour[306].

Finally, a number of communities have developed symbiotic relationships – with either customers or other community members in an attempt to exploit potential synergies. For example, the information about the status of a requested service and/or the distribution of digital products and services such as software and well-defined financial services could be subject to online verification and reception, respectively. For companies this may mean reduced customer services costs, while customers can benefit from higher levels of convenience and the ability to incorporate the requested information into other online activities – such as forwarding an email. Firms that follow this model can benefit by moving activities from the physical to the virtual world or value chain, respectively (Benjamin and Wigand, 1995; Normann and Ramirez, 1993; Rayport and Sviokla, 1994, 1995).

Value creation from electronic communities, however, is subject to the successful mastery of a few online idiosyncrasies. According to Armstrong and Hagel (1996), two strategic questions must be answered before any engagement in electronic communities or EC activities is actively pursued. First, how large is the potential of the virtual

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[306] Note that a number of ISPs have realised this problem by establishing localised versions of their online sites. Examples include search engines that tailor their content to locale criteria, online city guides and localised versions of the Yellow Pages.

community and second how intense is the competition likely to be? The elements that make an online community economically attractive include the size of the potential market or the number of participants, the likelihood of frequent and intensive interactions among community members, the possibilities for advertising revenues, and the potential for frequent and valuable economic transactions[307]. Thus, services providers – seeking to position themselves to capture value from electronic operations – will have to think about controlling hard to replicate content, proprietary distribution channels and the development of a loyal customer base. An assessment of the potential competitive forces within the confines of an online community is subject to the existence of natural content owners in some communities (Armstrong and Hagel, 1996). Natural owners of a community, or content therein, are those businesses that have a substantial economic incentive to exploit synergies between an on-line community and existing business capabilities in the physical domain (e.g., publishing). Moreover, owners of unique and/or difficult to replicate content are likely to be in a strong position to command a significant share of the added value created by the virtual community. The ability of the community member to attract new users or stimulate interaction among existing community members further determines the share of value creation by an individual community member.

Second, value creation further depends on the structure or the customer segmentation of an electronic community. The finer the customer segmentation, the easier it should be to achieve high levels of congruency between the content provided and the customer requirements. Thus, the smaller the size of a community, the more precise and narrow the content definition and hence the ability to customise content to personal

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[307] Interviews with SBC, Electronic Retail Banking, Basle, 05/10/96; UBS, Corporate Communication, 1996; workshops with SBC, Lehman Brothers, and Oracle; and personal correspondence with Microsoft, Online Banking Division, 1996, 1997.

interests[308]. Nevertheless, allocating costs and assigning revenues to specific subcommunities is likely to be a difficult procedure. Accordingly, such allocation mechanisms are of little guidance in the decision to expand, split or close an existing virtual community. Thus, as communities grow, small peripheral segments will push to split off and form new communities on their own. However, the infrastructure required to run and manage a new community means that a balance will have to be established between keeping the community segments small enough to foster a sense of belonging while letting them grow enough to achieve an economically viable size[309].

The plethora of questions and challenges that need to be address in the process of establishing an online presence embedded in a virtual community prompt organisations to contemplate whether to build communities by themselves or form interorganisational collaborative arrangements. Given the skill requirements, partnerships may often make sense, but attractive partners must be identified, and financial structures developed to attract and retain viable collaborators. In addition, organisers must devise [1] how to share usage, advertising, and transaction revenue streams with partners and community content providers, [2] how to structure ownership of user generated content and information (e.g., consumer behaviour). Furthermore, potential community members or content providers often face a number of existing communities. Thus, the allocation of content across a number of communities and the presentation thereof requires careful evaluation. Therefore, content providers must not only decide whether to organise their own communities but also whether to provide content exclusively to one com-

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[308] Interviews with SBC, Electronic Retail Banking, Basle, 05/10/96; UBS, Corporate Communication, 1996; The Sema Group, 1996 and NatWest, 1996.

[309] Interviews with SBC, Electronic Retail Banking, Basle, 05/10/96; UBS, Corporate Communication, 1996; workshops with SBC, Lehman Brothers, and Oracle; and personal correspondence with Microsoft, Online Banking Division, 1996, 1997.

munity or alternatively diversify their risk and provide their content to a number of communities.

In summary, the value of electronic communities will significantly depend on the ability of these platforms to establish and retain a loyal customer base. Providers of online services and products must also assess potential threats to the value of their existing properties. Many services risk disintermediation, particularly those that can be delivered electronically such as banking and investment management. These threats beg the organisational question of whether to incorporate online community activities tightly with traditional businesses – or alternatively keep them separate.

7.5.3.3 The Institution of Electronic Communities

Although the Internet is likely to introduce a commercial revolution, information intensive operations have thus far shown relatively little enthusiasm for this new digital exchange medium (Hess and Kemerer, 1994). As recently noted by Spar and Bussgang (1996), these shortcomings are largely attributable to the lack of consistent and coherent exchange and governance rules on VE platforms. Accordingly, companies need to think carefully about non-technological parameters before establishing an online presence.

We conjecture that lack of enforceable exchange rules combined with the perceived low level of digital network security[310] have prevented many online providers

[310] Security and enforcement thereof pose some of the most obvious problems of Internet based EC. The parties to an exchange must have confidence that their transactions are secure. That is, they must know that the buyers and sellers are really who the claim to be, that the information being exchanged cannot be stolen or altered en route, and that the payment being offered is real. The need to guarantee information integrity presents a second security problem. Once information is online, there are few mechanisms to ensure that the content is unlikely to be altered or tampered with electronically. Moreover, just as the nature of the Internet makes it difficult to spot the theft of information; its current structure poses a similar impediment to trace online tampering.

from establishing fully commercial services on VE platforms such as the Internet. Conversely, companies may want to establish semi-closed or closed VE systems in which they can control and enforce exchange. Virtual communities provide an institutional structure to support and enforce commercial laws (Castells, 1996; North, 1981; Spar and Bussgang, 1996). As has been pointed out above, these virtual communities will not be open to all; rather entrance and the availability and depth of services will be subject to the status of an individual. Guest status, full membership or limited membership may determine the extent and scope of services available to an individual. Likewise, the flow of information beyond the virtual boundaries of a community may be subject to membership status. Therefore, it is plausible to expect that EC will eventually be embedded in electronic communities – simply because companies require a minimum of governance to carry out economic transactions (Spar and Bussgang, 1996; North, 1981). However, this transition is subject to the ability of electronic communities as means to provide more versatile and secure VE platforms.

In their attempt to provide VE, organisations often face multiple communities from which they must choose the one, best suitable for their corporate activities. The reputation (Fombrun, 1996, Golder, Choi and Kim, 1997) of a virtual community and/or its age (Choi, Lee and Oh, 1995) may serve as close surrogates for difficult to assess capabilities. Reputation may be expressed in terms of an online provider's ability to enforce EC laws and to provide high levels of exchange network security. However, the infancy of the industry and the dynamic environment limit the application of reputation and firm age as surrogates for the actual quality of an online provider.

7.6 "Place" and "Space" – Summary and Synthesis

The reconfiguration and adaptation of organisational structures have their genesis in the decision regarding the ownership and control of organisational resources to carry out organisational activities. The transaction costs theory of the firm describes a hierarchy as the outcome of an organisational decision making process to own resources in order to achieve control of the costs of co-ordinating processes through internal management rather than the use of external markets (Coase, 1937; and Williamson, 1975, 1985, 1991a, 1991b, 1996). Malone, Yates and Benjamin (1987, 1989) have pointed out that advances in ICTs provide alternatives and new options for the organisation of economic activities and the exchange thereof[311].

Traditionally, the multinational corporation has been viewed as an organisational structure that exhibits a central core that connects directly to its satellite organisations (Birkinshaw and Morrison, 1995; Campbell and Verbeke, 1994; Ghoshal and Bartlett, 1990; Ghoshal and Nohria, 1993; Madhok, 1995; Shapiro, 1996). When viewed alternatively as networks, these organisations can be seen to contain both networks and hierarchies in their internal structures as well as external networks whose interconnected organisational entities transcend beyond national, regional and cultural boundaries. Accordingly, this spider web like organisation should rather be understood as a global network organisation embedded in a dense set of (digitally) interconnected

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[311] Malone, Yates and Benjamin (1987, 1989) divided EC systems into two categories. First, electronic hierarchies that integrate tasks and functions across a predetermined set of organisational boundaries. Electronic hierarchies automate the interchange between organisation in stable relationships. The commitment of both parties to these relationships overcomes legal uncertainties and minimises unwillingness to invest in proprietary electronic exchange systems. Second, electronic markets where multiple buyers and sellers conduct business through an electronic intermediary. Electronic markets may be subdivided into electronic marketplaces, which present the purchasers with an array of priced products and services, and electronic auctions, which simulate the real-time auctioning of lots, and thus require a systems running interactively (Malone, Yates and Benjamin, 1987). Graham, Spinardi and Williams (1996), correctly point out that Malone, Yates and Benjamin (1987, 1989) use the term electronic hierarchy to actu-

and globe spanning organisations (e.g., Powell, 1990). Monge and Fulk (1995) have pointed out that a global scope and reach of such enterprises poses a number of challenges as far as the use of advanced ICTs is concerned. Advanced ICTs can deal with both extensive geographic distances and the associated asynchrony across time zones due to their ability to handle large volumes at considerable speed advantages. However, advances in technology fall short of successfully bridging cultural idiosyncrasies. Moreover, the allocation of corporate activities across alternative exchange platforms and organisational design needs to be evaluated in the context of a heterogeneous organisational population, particularly since transactions are inherently interorganisational.

For example, digitally interlinked organisations that co-exist in a co-opetition framework that comprises industries as diverse as banking, insurance, travel and telecommunications are forging complex webs of strategic alliances (Nalebuff and Brandenburger, 1996). In such an environment, one organisation can serve and act simultaneously as customer, competitor, complementor, and supplier. The result is a circular value chain, or alternatively a value network, and new forms of organisational interdependence. Norman and Ramirez (1993) argue that complexity has transform the value chains into value constellations[312]. Similarly, complex interconnected value network activities comprising a number of disparate organisations illustrate the boundaryless feature of new organisational forms and designs (Ashkenas, Ulrich, Jick and Kerr, 1995). Moreover, the development of new organisational structures and the associated

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ally describe a complex networked relationship. Thus, there may be some **ambiguity** with reference to the term electronic hierarchy- and market as used by Malone, Yates and Benjamin (1987, 1989).

[312] Norman and Ramirez (1993) argue that value is created in complex constellations of organisations rather than in sequential manner that links isolated firms along the value chain. Thus, according to this concept, companies do not really compete with one another anymore. Rather, "offerings" compete for the time, attention and money of the consumers. Likewise, the most attractive offerings involve, often simultaneously, customers, suppliers and other organisations in new combinations.

interdependencies highlight the importance of relational trust to manage such complex networks of organisational interdependencies[313].

By employing the concept of archetype, we come to conclude that new organisational forms and structures, aimed at facilitating economic exchange and the creation of added value, can represent ideal states often aspired by many organisation, approximated by other organisations and out of reach for yet other organisations. For organisations that have initiated an organisational redesign programme, the result is often expressed in terms of either total success or total failure. However, we believe that for a number of reasons, a full organisational transformation may not be viable. How then does a transformation carried out in the virtual space as opposed to the physical domain of the value network affect the competitive advantages and disadvantages of organisation? What is the optimal balance between organisational activities allocated to the virtual and physical domain of the value network, respectively? Are emerging VE platforms virtual extensions of existing organisations, operating in the physical realm, or new genuine organisational forms? There is a vast array of research questions that needs to be address to broaden our understanding about the interdependencies between advanced technologies and emerging (virtual) organisational forms and the conduct of economic exchange based on these platforms.

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[313] For a more detailed discussion about the role of trust in interorganisational relationships see, for example, Gill and Butler (1996); Golder, Choi and Kim (1997); Gualti (1995b); Handy (1995b); Inkpen and Currall (1996); Kramer and Tyler (1996); Madhok (1995); Mayer and Davis (1995); Mayer, Davis and Schoorman (1995); McAllister (1995); Mohr and Spekman (1994); Moorman, Deshpande and Zaltman (1993); Nooteboom (1996); Sabel (1993); Williamson (1993a); and Zaheer and Venkatraman (1995).

8 Discussion and Conclusion

8.1 Abstract and Objective of this Work

An assessment of advanced technology in an information and information technology intensive industry, such as the financial services industry, represents an important stream of research in today's complex global environment. However, this research does not always receive the recognition it deserves. This is mainly attributable to the lack of an agreement on the definition and measurement of advanced ICT and the scarcity of compelling evidence on the precise role of advanced technology within organisations. In addition, these effects drive and are subject to constant change that makes an assessment of advanced technology a difficult undertaking. Hence, this research set out [1] to provide a descriptive and exploratory framework for advanced technologies and the exploitation and exploration thereof in an ICT intensive industry, namely the financial services industry and [2] to propose organisational adaptation and adjustment strategies. This chapter summaries the findings from our empirical research and our contributions to the field.

8.2 The Investigation – Summary and Overview

The objective of this investigation was to examine the relationship between exploitation and exploration of advanced technology as means of organisational adaptation in financial institutions. Using case study methodology, we have analysed thirteen financial institutions in Switzerland, England, America, Singapore and Hong Kong by conducting 87 interviews over the period 1995 – 1997 and collecting secondary data and material as discussed in the chapter Research Methodology.

Although a number of scholars have investigated the role of technology in organisations, these works have not addressed the role of exploitation and exploration of advanced technologies in the context of financial institutions. Our results have indicated that the creation of value, facilitated by the use of advanced technology, can be observed along the physical and virtual domain of an organisational value network. Thus, using this framework, we are able to incorporate physical and virtual modes of

exchange under the single umbrella of organisational value creation and ultimately profit maximisation. This largely exploratory research has identified advanced technologies that are more suitable for exploitation and exploration, respectively. The organisational value network, incorporating both virtual and physical domains of value creation, provides a framework for a sound examination of the balance between organisational exploitation and exploration and the competition between them for scarce resources. Within this framework, we have investigated the forms and structures of advanced technology in financial institutions and discussed the value contribution of various technological infrastructure elements to the overall organisational value network.

We distinguished between three levels of technology within a financial firm. First, $\mathbf{T_1}$ the basic or generic technology level (e.g., hardware and software), which is not organisation specific. Second, $\mathbf{T_2}$ the advanced technology level is the set of processing activities and corporate resources that represents the actual corporate workflow embedded in an organisation's products and services. Third, $\mathbf{T_3}$ represents the actual business requirements. This distinction allows us to better understand the technological areas that are more prone to exploitation and exploration, respectively.

The use of advanced technology further affects the distribution of services and products across time and space. Therefore, advanced technology can also be deployed to produce different services for different market segments. Hence, we investigated the impact of advanced technology on the distribution of financial services and products and the role of technology in the market segmenting process. Furthermore, we analysed the role of technology in the areas of distribution, with special emphasis on globalisation, and the impact of technology on financial services and product innovation. We then investigated the exploitation of advanced technology in the organisational value

network with reference to capital markets, infrastructure, retail banking and knowledge, through the lens of globalisation.

Special emphasis was devoted to explore the nature of EC and VE. We put forward a framework of propositions (and conjectures) that specified the use of VE systems as surrogates for traditional marketplace oriented exchange environments. Although well known brands attached to a financial institution may carry a premium in the initial phase of a VE system, we conjectured that in cases of tampering it is likely that these impairments may exhibit detrimental repercussions for the entire organisation – including marketplace and marketspace activities. Taking into account these contingencies, we proposed a multimedia banking system based largely on interview data with Bank Cial, SBC and Bank Sarasin. The existence of digital interorganisational networks, as part of a VE system, raised questions related to the risks associated with interorganisational digital exchange. Accordingly, we analysed the risks of VE systems and discussed the role of intermediation to alleviate or reduce risks associated with this form of economic exchange. We constructed a hypothetical secure banking system based on a VE system. Finally, we reviewed some of the existing VE systems and the technology involved. We then provided a taxonomy of VE system, drawing on the existing literature (Armstrong and Hagel, 1995, 1996; Castells, 1996; Fulk and DeSanctis, 1995; Graham, Spinardi and Williams, 1996; Malone, Yates and Benjamin, 1987, 1989; Spar and Bussang, 1996; Tapscott, 1996), and discussed several aspects of VE systems in the context of the organisational value network framework.

8.3 Research Findings

8.3.1 Results and Conjectures Exploitation

A viable virtual banking model has begun to emerge. Virtual banking is hereby referred to as the use of multifaceted digital delivery channels financial institutions deploy to distribute their services and products. Many financial organisations have taken first steps toward building value networks, and in the process, discovered the massive potential of virtual banking – the domain of the institutional value network that is predominantly concerned with VE mechanisms. Thus, with virtual banking, potential data and information input sites include every **connected** network constituent across time and space. Value networks are being formed when financial services providers and other economic agents, banks and non-banks alike, collaborate to offer their customers comprehensive packages, made up of distinct services and/or products. These are being delivered via various outlets, including the marketplace and the marketspace and other means of digital information dissemination. Advanced ICTs provide the means to build a value network across multiple organisations, although it does not guarantee that these connections will be valuable. We conjecture that information and communication may determine whether these autonomous economic agents are able to co-ordinate and transact. Communication can be defined as a process in which participants create and share information with one another in an attempt to reach mutual understanding; thus communication implies relationship (Rogers and Kincaid, 1981). Therefore, in a network of digitally interlinked organisations, the conditions of access to the communication network can be as important as the conditions of network infrastructure ownership. Thus, information and telecommunication technologies can eventually help firms to overcome problems of co-ordination and control and thus assist to restructure interfirm relationships, especially over the traditional constraints of time and space. Nevertheless, value

will only be created if value network participants have a clear understanding of their customers' requirements and how they desire to interact with the financial institutions. Managing this knowledge is just as important as managing financial capital and the ICT infrastructure.

The value network is about choices. Financial organisations must decide where they will focus their energies, by clearly specifying what business segments will be covered and how these services will be provided. Hence, by specifying these two criteria, a customer definition has indirectly been undertaken. With these questions answered, management can focus on core competencies and the selection of suitable strategic partners to provide the predefined services and products. Banks enjoy a temporary advantage over non-banking institutions, largely as a result of the formers' ability to establish significant market presence and subsequently acquire customer knowledge and achieve a certain lock-in effect with existing clients. Nevertheless, non-banks have initiated a number of projects and are in the process of developing their own value networks. Without the legacy of the branch network, these non-banking institutions have been eager to explore VE systems as potential commercial exchange platforms. Thus, banks must take advantage of their expertise and establish themselves firmly during the development of financial services value networks, if they are not to be faced with decreasing market shares.

In addition to a financial institution's reputational capital and the associated extent of relational trust in that institution, potential customers consider ease of use and convenience as two primary elements of value when selecting a financial services provider. Transactions through traditional branches are expected to further decline – yet the amount of transactions that has been conducted via branches is expected to be more than offset by alternative distribution channels, such as ATMs, telephone banking, the

continuing growth in PC-based home banking and transactions carried out on VE systems. Notwithstanding the fact that the traditional branch office is likely to vanish over the next decade, the functions and procedures of a traditional branch office are currently being revised. Likewise, new organisational forms are being designed to accommodate the new emerging VE paradigm and incorporate additional customer requirements. The newly emerging branch office will be designed to serve more as a meeting place that provides face to face facilities to seek advice on a number of financial and non-financial issues, rather than a location dedicated purely to financial transactions. In the future, the redesigned branch office will be just one element in the portfolio of distribution channels that blends well against other organisational functionalities and the digital distribution systems. These digital distribution channels, embedded in VE systems, and other enhanced digital delivery channels can further be used to accommodate to rapidly changing customer demand patterns for comprehensive retail banking services.

Capital market activities are further being expanded to meet the growing needs of financial institutions and customers around the globe. All interviewed financial organisations have indicated that higher technology expenditures need to be incurred to enhance corporate **risk management** capabilities in an attempt to improve capital markets activities. However, the expected level of expenditure incurred varies significantly among organisations! Trading floor software systems and hence trading floor operations are increasingly dependent on the strengths of third-party software solutions providers. In the majority of the interviewed financial institutions, the development of expensive in-house trading floor software systems is increasingly foregone in favour of pre-packaged and hybrid software systems. We believe that this development is in part due to the increasing complexity of designing an integrated trading desk software system. On the other hand, single proprietary software installations are costly and often

lack the ability to explore economies of scale associated with potential licensing and eventual outsourcing contracts.

Maintenance and development of value networks require dynamic, well co-ordinated infrastructures, human resources, knowledge, processes and technology. There is a growing consensus among financial organisations that delivering valuable financial services to specific customers hinges on more than raw computing power. Distributed database management (e.g., data warehouse) and client server technologies support a more fluid, interactive exchange of information and allow a financial organisation to readily link with customers and other value network constituents. The implementation of distributed database management systems, including Intranet and data warehouse systems, is recognised by management as a high priority in successfully mastering advanced technology strategies.

Although few companies have yet fully addressed the year 2000 and EMU challenges, numerous financial institutions have started to devote considerable resources to the issues. Conversely, private banks have long relied on the programming skills of third party software developers. Accordingly, they have put considerable pressure on them to come up with valuable solutions for the year 2000 and EMU problem in due time to allow for testing and their integration in the existing software and hardware environment. The small number of private banks, which have developed in-house software solutions, have so far shunned the investment associated with the year 2000 problem. In addition, many private banks run tight technology operations and hence often lack the capacity required to tackle such exceptional issues. However, regardless of the problem solving approach, all interviewees reckon that the costs associated with the conversion to update customer application systems for the new century will be costly and complex while yielding no added value. Nevertheless, successful handling of this

issue is critical for basic infrastructure operations, although it contributes little to the competitive differentiation in the market.

The goal of global banking is to provide customers with seamless, comprehensive and secure financial services independent of time and space constraints. In an increasingly cosmopolitan and commercially integrated world, financial organisations are in a process of providing services that better cater to the requirements of international customers. Thus, banks concurrently thrive to establish global networks that provide multinational corporations with the same level of service around the world. Financial services and non-financial services providers, alike, aspire to be at the centre of a web of an interlinked electronic community that will eventually serve as a global financial VE platform. The establishment of globally available services has promoted a global consolidation of banks around the world in an attempt to extend the scope and reach of products and services. Advanced technology driven value networks then need to be seen as both cause and effect of globalisation. Retail and commercial customers drive banks to aggregate their competencies, as they demand seamless financial services and capital markets capabilities abroad.

Conversely, value networks provide the necessary data collection facilities that appease financial institutions' thrive to collect more valuable customer information. We believe that knowledge – when properly managed and leveraged by an organisational value and exchange network – will be one of the distinct competitive advantages in the dawning era of interorganisational value networks. Early, yet promising contestants of these VE platforms are the Internet, proprietary exchange systems such as financial exchanges (e.g., SEE) and emerging hybrid systems that comprise elements of a number of distinct technologies and paradigms (e.g., Extranet and Intranet). Faced with in-

creasing competition from a variety of non-traditional financial services organisations, banks are responding by creating multiple value network elements across multiple value networks. These are partially embedded in the virtual as well as physical domain of an organisational value network in an attempt to enhance and broaden the scope and quality of financial offerings. As current and anticipated levels of technological expenditure increase, bank management must understand and continually assess the need to enhance their value networks by aligning their services with customer needs. Unless a financial institution chooses to operate in a local niche market, the future is likely to belong to diversified financial services organisations and not to an institution that adheres to the traditional paradigm of a (local) bank[314]. Therefore, financial institutions ultimately face the inevitable questions of market positioning – that is the strategic position they would like to achieve and that best allows them to maximise their profits. Thus, financial organisations are ultimately faced with the decision of whether they want to establish a position at, or close to, the centre of an emerging value network or function at the periphery of an emerging value network. We believe that these decisions will significantly define financial institutions' role in the future.

8.3.2 Results and Conjectures Exploration

Undisputedly, technological change is a major element of long-term economic growth – albeit often beset by a high degree of uncertainty[315]. Thus, understanding uncertainty is linked to the fundamental issue of how new technologies are devised, how rapidly and

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[314] Source disguised upon request.

[315] See, for example, Bettis and Hitt (1995); Hamel and Prahalad (1996); Hitt, Keats and DeMarie (1995); Orlikowski (1992); Orlikowski, Yates, Okamura and Fujimoto (1995); Prahalad and Hamel (1994); Quinn (1992a,b); Schendel (1991, 1995a,b); Schumpeter (1934, 1942); Scott Morton (1991,

far they spread, and ultimately how they affect organisational performance. Likewise, high levels of uncertainty associated with technological innovation and the exploration thereof make it hardly surprising that organisations in technology intensive environments are exhibiting potentially high failure rates (Rosenberg, 1995). Moreover, as the continuous lack of direction and focus of EC systems shows (*The Economist*, 1997), a more intriguing field of inquiry may be the apparently widespread inability to anticipate the future impact of successful innovations – even after their technical feasibility has been established and applied in basic applications. As recently noted by Rosenberg (1995), it is often assumed that the initial uncertainties vanish after the first commercial introduction of a new technology. Although, some initial uncertainties may have faded following the commercial launch of a new technology a new set of questions, often associated with new technological requirements and their effect on the balance between exploitation and exploration of organisational capabilities, arises during the organisational adaptation process. We conjecture that much of the difficulty associated with the anticipation of future uses of new and advanced technologies may be related to two interlinked contingencies. First, in retro perspective new technologies often enter the world in a rather primitive form. Thus, their future use may significantly depend on an extended process of continuous improvements that vastly expands their commercial application. Second, the commercial success of new technologies hinges much on the willingness to adapt to an emerging set of technological capabilities – making existing systems often obsolete.

1995); Tushman and Anderson (1986), Tushman and Nelson (1990); and Tyre and Orlikowski (1993, 1994).

8.3.2.1 Advanced Technology and Organisational Adaptation

Organisational adaptation may therefore ultimately be linked to the ability to foresee the trajectory of market adaptation, future improvements and the economic consequences of those improvements. The ability to see pools of interlinked technologies rather than individual technologies in isolation is crucial in the process of organisational technology adaptation and ultimately the exploitation and exploration of advanced technology capabilities. Hence, we believe that the impact of a new technology depends not only on the innovation itself but also on complementary inventions[316]. In addition, the organisational adaptation process of new advanced technologies may often take many years to replace an established technology. The intertwined nature and evolution of technological systems often requires the development of numerous additional components of a larger organisational system. Thus, major technological innovations often entail profound organisational change[317]. Furthermore, technological innovations often constitute entirely new complementary technology systems. Therefore, it may be extremely difficult to conceptualise an unknown system. Accordingly, our thinking about new technologies is likely to be handicapped by the tendency to conceive them in terms of existing technologies, which they may eventually replace. Likewise, we surmise that improvements in performance in one part of the system may only have limited impact without simultaneous improvements in other complementary parts of the overall system.

Consequently, within technological systems, significant improvements in performance and productivity are seldom produced by a single innovation. It is rather the

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[316] For example, the use of the WWW as an interorganisational exchange hinges on high bandwidth data communication connections, which in turn depend on improvements in data communication protocols, data compression algorithms and the development of high capacity modems.

[317] Organisational change driven by information technology is more formally analysed in Henderson and Venkatraman (1994); Scott Morton (1991, 1995); Short and Venkatraman (1992); and Venkatraman (1991, 1994).

cumulative and self-reinforcing mechanism of multiple improvements and innovations within a technological system that may ultimately yield high returns on investment.

The popular press, researchers and organisational scholars alike have often express disappointment with the fact that advances in ICTs have not brought about the remarkable improvements in organisations, or alternatively these are slow to realise. Our research has indicated that technological impacts are often subtle and occur in unstable and disruptive rather than the ubiquitously assumed linear fashion. Moreover, the way in which advanced technology evolves is strikingly similar to the Cambrian explosion[318]. At the onset of the development, diverse forms of life and design branch out rapidly only to be followed by a declining rate of branching, which in turns eventually leads to extinction – ultimately leaving only a few major species at the end (Kauffman, 1995). These developments in evolution and biology have many similarities with the way advanced technologies evolve – namely; advanced technologies bound to the manipulation of digital forms of information.

A number of advanced ICTs have followed similar patterns, where the early diversity of forms and designs is more radical, eventually through periods of blurring and convergence, leading to a few major dominant lineages. Any basic innovation is ultimately the result of a culmination from a number of a wide range of early experiments and radically different designs. After the "emergence" of an innovation, organisations experiment with a range of different modifications and variations thereof to evaluate, exploit and explore routes to improve the existing technology. Over time, as it becomes

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[318] In the Cambrian period of the Palaeozoic era – some 500 million years ago – a burst of biological creativity took place (Kauffman, 1995). This tranquillity followed by an extreme eruption and explosion finds an echo in many contemporary technological developments, where after a long gestation, a new technology spreads over a relatively short period of time (Arthur, 1989, 1990, 1994, 1996; Casti, 1992a,b; David, 1985).

more difficult to devise more efficient designs and technologies, variations become more modest. Thus, adaptation can be seen as an attempt to optimise systems bounded by conflicting constraints (Casti, 1992a,b). Accordingly, one must find some sort of compromise – taking into account environmental contingencies and organisational constraints. However, some of these technologies provide little added value after an initial phase of exploration and exploitation; they rather evolve into the "ubiquitous ticket to play" – a necessary requirement to remain competitive in the business.

8.4 Our Contributions to the Field – A Summary

The main contribution of this thesis has been an analysis of the use of advanced technology, in terms of exploitation and exploration as means of organisational adaptation in organisations in an information concentric environment such as financial institutions. Thus, this research seeks to contribute in two ways.

8.4.1 Our Contributions – Exploitation versus Exploration

The first part of the thesis on exploitation amended the scarce literature on advanced technology in information rich and technology intensive environments such as financial institutions. Furthermore, part one set out to provide a detailed account of how advanced technology is used in financial organisations. Likewise, we unravelled a number of areas that are based on advanced technology capabilities (e.g., segmentation and distribution channel management, risk management).

Exploitation and exploration are linked in an enduring symbiosis as part of the overall organisational adaptation process. Each requires the other in order to effectively

contribute to an organisation's long term survival and prosperity. Simultaneously, however, each interferes and competes with the other by trying to tie a critical amount of scarce organisational resources to its undertakings. Exploitation discourages the experimentation and variation that are essential to long-term survival. It results in sticking to one currently effective core capability to such an extent that there is little room for exploration of others, or in failing to stick to one potential effective capability long enough to determine its true value. Likewise, exploration often comes at the expense of exploitation. Efforts to promote experimentation, or the development of new organisational capabilities that form the core of a sustainable competitive advantage, encourage impatience with new ideas, strategies, concepts and technologies. As a result of these counteracting forces, we have argued, organisations are likely to fall short of maintaining an effective long-term balance between the two symbiotic forces.

Moreover, the balance between exploitation and exploration hinges upon the extent of positive local feedback loops, which produce strong path dependence and inertia and hence bear the possibility to result in suboptimal equilibria[319]. Consequently, it is possible for an inferior organisational competence to generate enough feedback and hence attract a substantial amount of organisational resources to exclude potentially superior organisational activities or exploration with which the organisation, at present, has little experience and economic success (Herriott, Levinthal and March, 1985). Therefore, the development of long-term corporate knowledge depends on sustaining a reasonable level of organisational exploration. Conversely however, the tendencies to increase exploitation and reduce exploration are likely to render organisational adaptive processes potentially self-destructive (March, 1991). However, the development of a

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[319] The influence of feedback loops and path dependence on the equilibrium or final balance between two variables (e.g., exploitation and exploration) is more formally analysed in Arthur (1994); David (1985); and Liebowitz, and Margolis (1990).

genuine optimal balance between exploitation and exploration requires further long-term analysis of organisational adaptation processes. Nevertheless, our data suggest that exploration is likely to receive increased attention as the exploration of advanced technology is considered a viable form of organisational adaptation in rapidly emerging information intensive areas such VE.

A large adaptation problem, in the context of balancing organisational exploration and exploitation, is focusing attention on the refinement of existing capabilities taking into account the potentially negative long-term consequences of such a focus or strategy (March, 1991). Although efforts spent on the exploration of new possibilities detract from maximising short-run efficiency and specialisation, organisations sometimes try, usually unsuccessfully and with adverse consequences for their short-run efficiency (March, 1995), to escape the specialisation/exploitation rigidities. Thus, without a steady stream of exploratory efforts, adaptation is likely to fail. In addition, it fails particularly when the environment is changing rapidly (e.g., financial markets). Consequently, exploration becomes useful only if it can be sustained long enough to expose its true value. Note however, the relative certainty of rewards from exploitation and their nearness in time and space give them an advantage over the rewards from exploration. Thus, firms eventually end up with increasingly specialised competencies and an emphasis on the refinement of existing organisational procedures.

Thus, the essence of exploitation is the refinement and extension of existing competencies, technologies, and paradigms. Its expected returns are positive, proximate, and predictable. The essence of exploration is experimentation with new alternatives. Its expected returns are uncertain, distant, and frequently negative. Consequently, the distance in time and space between the starting point of a project and the locus for the realisation of a positive return is generally greater in the case of corporate

exploration than in the case of corporate exploitation. Accordingly, we conjecture that in the context of organisational adaptation, there is a tendency to substitute exploitation of relatively low risk alternatives for the exploration of uncertain and hence high-risk alternatives. Nevertheless, the current efforts by a large number of financial institutions to explore new possibilities in the domain of VE and to develop adequate organisational capabilities are in an early stage and hence the value of these efforts as a part of the overall organisational adaptation process cannot yet be fully assessed.

8.4.2 Our Contributions – Electronic Commerce

The exploratory second part of the thesis amends the literature on VE and EC; the objective being, to develop pertinent propositions and conjectures for further inquiry. One emerging paradigm then forms the main substance for part two; namely, the exploration of advanced technology to devise and develop VE platforms. We developed a framework – the organisational multisource value network – that takes into account both sources of physical and virtual value creation by balancing explorative and exploitative efforts of an organisation. The organisational multisource value network comprises [1] the mature environment, largely driven by the exploitation of advanced technology in the traditional marketplace, and [2] the emerging environment, largely driven by the exploration of advanced technology in the marketspace.

We have argued that financial services and products are increasingly bits and bytes of data and information combined in a number of ways and disseminated via the plethora of digital distribution channels. Advanced ICTs, aimed at the conduct of economic exchange, provide opportunities to lessen or alleviate market imperfections. We argued

that the development of advanced technology based economic exchange systems, such as EC, hinges on the provision of social structures surrounding the VE platform. Thus, a practical implication for the development of VE system is related to the development of a supportive environment within which VE can emerge. Based on the seminal work of North (1981), we argued that these support systems may take the form of virtual communities, modelled on existing forms of communities, which reflect a familiar and secure environment. However, economic agents in their attempt to access and perform economic transactions often face multiple communities from which they must select the one that best matches their set of required characteristics and capabilities to carry out their economic activities. The reputation of a community and/or its age may serve as close surrogates for difficult to assess capabilities such as the quality of a VE platform.

In a data and information rich environment, information about products and services becomes increasingly as important as the actual product and/or service. Consequently, increasing levels of data availability require increasing levels of information about the content and the quality of available data and the products and services based on these data. Therefore, brand, image, reputation or alternative expressions of customer trust in a financial institution are critical factors in stimulating initial interactive forms of exchange on virtual platforms. With the global and instantaneous reach of VE platforms, embedded on open network systems, the management of global or corporate brands is of paramount importance since these brands provide corporate name or logo identification and carry the reputation of an organisation. Alternatively, a virtual community may perform some of these "certification" requirements and provide an environment where certain forms of conduct can be guaranteed.

Services, and financial services in particular, often operate under an umbrella brand name, making it difficult to separate individual products and services and sell

them under their own brand. Moreover, it is often the umbrella brand name that permits cross-selling activities in the first place. In addition, new online users tend to explore and visit sites of familiar brands first. However, a number of financial organisations have expressed their concern with the use of umbrella-branding techniques to avoid eventual tampering and the contamination of all corporate activities in events of default. For example, the UBS sells financial products and services covering commercial and investment banking; in addition the universal bank has started to offer telecom and information technology services to third parties. While some of the services are sold under the corporate banner, other services are provided under the corporate brand of an independent, yet wholly owned subsidiary. Financial institutions, however, correctly point out that failure to deliver secure and efficient online services may exhibit repercussions that could spill over to all existing operations; and therefore decreasing the overall value (e.g., brand) of all corporate activities.

Thus, product and services differentiation is an important part of virtual economic exchange platforms. The use of advanced ICTs contributes significantly to high levels of product and services differentiation in the financial services industry. Another important implication of these differentiation efforts is that additional customisation and segmentation of information products and services (digital data) are unlikely to face considerable barriers – except from the cost of and complexity advanced technology itself. Moreover, customer segmentation and aspired levels of profitability may significantly help financial institutions to determine the optimal balance of explorative and exploitative delivery channels.

Advanced ICTs provide means to perform and execute *partially* different production technologies in centralised locales. Consequently, the differentiation of production technologies, and thus the provision of a heterogeneous portfolio of products

and services, can be partially automated by deploying advanced technologies and open system exchange networks from a centralised location. Thus, we argued that higher levels of informational capability, supported by an organisational multisource value network, may provide the foundation for a financial institution to supply higher value added for its customers.

Therefore, a significant number of financial institutions no longer considers a large pool of diverse distribution channels as experimental, but rather as a necessity to build and maintain market share. Thus, financial institutions and especially retail banks have started to differentiate themselves, for the first time, through their distribution strategies. Accordingly, the multisource value network is characterised by organisations trying to achieve a balance between distributions channels related to the exploitation of advanced technologies (e.g., restructured branch networks that exploit the existing infrastructure) and the exploration thereof (e.g., VE platforms). Although it is early days yet, we believe that an increasing amount of organisational resources will be devoted to explore new forms of exchange at the expense of exploiting existing organisational capabilities.

The organisational adaptation process in financial institutions further reveals that, even in the face of radical innovations in advanced technology, it rarely displaces all the skills, organisational capabilities and other resources related to existing technologies and organisational capabilities. We propose that the effects of advanced technology on organisational adaptation may be better understood when effects on their routines, social structures and culture are taken into account and when the difficulty of exploring new capabilities is distinguished from the interference effects of exploiting existing organisational capabilities.

9 Limitations of this Research

9.1 Abstract

This final chapter discusses the limitation of our studies. Furthermore, it concludes by identifying areas where further research is required to advance our understanding of the impact and implications of exploitation and exploration of advanced technologies in the context of organisational change and adaptation in financial institutions.

More specifically, we analyse the role of assumptions in the context of advanced technology and indicate how further research may be conducted by relaxing some of these constraints. Furthermore, we describe limitations associated with the nature of the research project and those associated with the actual field work. Finally, we extend the discussion beyond the scope of this present research work to provide a framework and a foundation to instigate further research.

9.2 Introduction

Although our study shows clearly what kind of advanced technologies are better suited for exploitation and exploration in the financial services industry, and what this implies for organisational adaptation and strategy formulation, our findings should be viewed in the light of various limitations that we have encountered. Given that the aim of this exploratory study was primarily theory development – via a set of related propositions and conjectures that specify relationships among a number of variables (Blalock, 1969; Kerlinger, 1986) – the emerging theory and propositions should be regarded as tentative at this stage. A main limitation of the present study, conducted in a highly dynamic and flexible environment, is the small and selective number of cases that could be examined and the limited time available for each company[320]. Likewise, the stringent require-

[320] The adherence to- and maintenance of stringent levels of confidentiality as requested by the majority of financial institutions – 11 out of 13 financial institutions objected to having a case study about their organisation published in this work while the remaining two have requested that all confidential information be disguised and names and other firm specific information be disguised – has promoted us to outlined the support for individual propositions and conjectures in Appendix 7. This provides an overview

ments by case study objects have made it impossible to publish the case studies as initially planned. Out of the 13 case studies only two financial institutions have not objected to the publication of their case study in this research. Nevertheless, these two firms have requested that all names and other confidential information be disguised to maintain the highest possible level of confidentiality and anonymity. Ideally, given more time and resources, additional cases, in financial and non-financial institutions, could have been examined. A complementary study that analyses the role of non-financial organisations providing financial service should shed light on future structure of the financial industry. We believe that not all financial institutions exhibit the same problem or characteristics and accordingly operate and maintain different adaptation strategies. For example, the ratio between exploitation and exploration across analysed organisations has varied considerably. A large-scale study, for example, may reveal whether there exists an optimal dynamic balance between exploitation and exploration of organisational capabilities that facilitates the organisational adaptation process.

Having completed this research, we can now provide a more precise definition and operationalisation of organisational adaptation expressed in terms of exploitation and exploration of organisational capabilities. Nevertheless, the theory can still be improved and the generalisability of the propositions, constituting the theory, is in need of further empirical testing. Furthermore, in an ideal world, each organisation would have been studied over a longer period, particularly with reference to social and cultural changes, which may evolve more slowly. Likewise, the rapid change of technology often requires observations to be made over a longer period, as many efforts aimed at exploration may not come to fruition for several years. Simultaneously, though, there may

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of the support for individual propositions and indicates the aggregated level of support for the propositions and conjectures.

be additional developments in advanced technology, which may further influence the outcomes of organisational exploration and exploitation efforts. Organisations that have thus far successfully managed their operations may encounter more challenges as they move into unknown areas or shift the balance of organisational adaptation from a focus on exploitation to exploration or vice versa.

9.2.1 Breaking the Technology Assumptions

Assume that we accept that advanced technology is qualitatively different from all previous forms of technology; that its power and persuasiveness place upon us unprecedented global, social and biospheric responsibilities (Davies, 1995). Suppose also that technology is not neutral or value free (as assumed in chapter three Research Methodology) and that all developed technologies are deeply imbued with certain worldviews and values, leading eventually to a certain skewed distributions of benefits and costs. Simultaneously, advanced technology penetrates all aspects of life and interpersonal affairs – for instance, the very impact advanced technology has on communication. Thus, further research is required to assess the relations among advanced technology, interpersonal communication and social processes. Likewise, we surmise that a number of ethical issue arise out of the use of advanced technology as a means of VE – the very meaning, definition, expectations of virtual interchange. The implications of advanced technology need to be assessed beyond the digital walls and confines of financial institutions. Even a cursory examination of the political, social and cultural issues involved here exposes how far our institutional frameworks lag behind our technical advances and their technological ramifications.

We believe that a genuine agreement has been reached that advanced technology has changed micro patterns of human behaviour; yet this is unaccompanied by a sound understanding at the macro level. Correspondingly, we call for a better understanding of the relations between advanced technology and control. What evidence do we really have that we are able to control advanced technology (e.g., the enormous efforts required to ride us from the year 2000 problem)? A rather pragmatic approach to developing the skill and discipline of exerting control over technology may be the ability to conclusively demonstrate that we are able to exercise with equal ease and legitimacy both a "yes" and "no" to various technologies. If we never exercise a "no" vote – we may have accepted the accusation that we hold a deterministic position by default and ultimately recognise that we can do little but adapt to whatever advanced technology confronts us with.

9.2.2 Empirical and Field Work Limitations

The environment of financial institutions has always been special in the sense that information about corporate affairs and the dissemination of sensitive information has been a major concern in the information politics of a large number of financial institutions. For example, the financial institutions in Switzerland have recently received an abundance of negative press and public attention, related to the country's role during the Second World War and the management of assets from the Democratic Republic of Congo. This "information" may prove detrimental for the image and the reputation of Switzerland as an effective and trustworthy financial market. Accordingly, corporate policy has been strict during the review process of our findings. However, anonymity

has not been confined to the case study sites in Switzerland. Thus, company names were often replaced with acronyms and all interviewee names had been disguised.

We believe that in a dynamically changing environment a study that directly or indirectly takes into account the long term social and cultural effects of advanced technologies is naturally constrained by the ability to "observe" the evolution and eventual social implications of a new advanced technology. Moreover, as recently noted by Choi, Golder and Lee (1996) and Choi and Kelemen (1995), cultural and/or ideological difference across the Triad economies may call for significantly different approaches to understand advanced technology and the deployment thereof.

9.3 Implications and Further Research Requirements

It should be emphasised that the cases described are not examples of good or bad practice. The purpose of this research is rather explanatory than prescriptive. There are a number of areas that could benefit from further research initiatives. This thesis has, among others, the following implications for further research. Although financial institutions have already undergone significant change and organisational adaptation in the newly emerging competitive environment, our research has indicated that financial institutions are likely to face continued environmental uncertainty as a result of dynamic changes in numerous advanced technology related areas. Thus, we surmise that these changes should be analysed in the broader context of institutional, socio-political and cultural contingencies, which may have implications for the exploration of VE systems. This study focused primarily on exploring the future organisational possibilities and adaptation processes related to the use of advanced technology in financial institutions at the onset of a new digital era. In particular, research is required to assess the implica-

tions stemming from a lack of an adequate institutional conception that provides a legal and regulatory framework and enforcement mechanisms in a VE system. There may well be changes in the long-term that may not manifest themselves in the short term. Adaptation aimed at exploring new technological capabilities exhibit long-term characteristics and the full impact is yet to be seen.

If we employ the concept of archetype, we can identify new organisational forms that represent contemporary ideal states, which are approached by few organisations, approximated by others and out of reach for yet other firms. For organisations that have embarked on a radical organisational adaptation process there may be no returning back (e.g., from the physical to the virtual domain of the value network). However, we believe, for a number of reasons a full transformation may not always be possible. What organisational form do these firms take and/or what is the design structure of the organisational value network? Are such forms stable over the long term? How prevalent will such forms be and what are the competitive advantages / disadvantages of such midrange forms? What are the environmental conditions that foster the development of a certain type of design over another? A related concern is the failure to transform altogether. Much has been written about innovative organisations and their transformation towards new forms and structures, but much less has been written about those that fail altogether. However, we believe as much can be learnt about the process of organisational adaptation from the unsuccessful cases as from those that do succeed.

There are also several interesting questions related to the idiosyncrasies of a particular industry. The financial services industry is an industry that is subject to special scrutiny from governmental agencies and a number of other international bodies that govern and regulate the provision of financial services. Accordingly, further research is required to assess whether the findings of this particular industry also hold in

less regulated industries and/or industries where the core of the products and/or services comprise lower informational content. An additional area that requires particular attention, especially in an industry that is subject to convergence and blurring of multiple contingencies, is examining the effect of advanced technology on organisational culture and developing a revised concept of an industry mindset. To what extend, for example, can organisational culture vary from industry culture? Similarly, what are the cultural and social consequences of the emergence of an industry spanning VE system? What are the differences of various industries that all converge in the virtual marketspace?

Finally, specific suggestions were made with respect to many of the propositions and conjectures. In addition to these specific suggestions, a number of somewhat more general recommendations are in order. Although advanced ICTs comprise a host of distinct technologies and concepts, these distinct systems have been used under the umbrella of advanced technology and accordingly they have largely been treated as a homogeneous concept. Therefore, more research is required to assess the value and status of individual advanced technology elements and their role within the overall framework of advanced technologies.

As an alternative to studying the same cases, the generalisability of the propositions and conjectures forming the concurrent theory could be tested with other cases in the financial industry and/or in additional, information concentric, industries. What is the role of exploitation at the expense of exploration in a firm's thrive for profit maximisation? What are the implications of industry idiosyncrasies, such as strong regulations and governance, for the development of organisational capabilities and what are their implications on the decision making process of pursuing strategies of exploitation or explo-

ration? Finally, this study only examined the effects of advanced technology induced changes and hence organisational attempts to adapt to environmental contingencies in a technology and information intensive environment. How applicable are the propositions and the conceptual framework to low information and technology concentric environments? Below we present in more detail two specific areas where additional research may provide additional insight that may aid financial institutions in their thrive to maximise profits in the emerging virtual marketspace.

9.3.1 Organisational Value Networks and Boundary Design

We have largely looked at the value network from an organisational point of view. This assumes that the boundary between the inside and the outside of an organisation is easily identified. Yet, because of communications and information exchange, the organisational boundaries are blurred and punctured. Organisations are connected to each other. Within this dynamic environment, some organisations have decided to outsource part or all of their information system functions in order to reduce costs and/or increase strategic flexibility.

If we accept the fact that financial institutions largely deal with information and the management thereof, we believe that two basic dimensions are helpful in classifying and analysing the information concentric institutions. These are the forms of information, and the functions relating to information. Moreover, one needs to accept the fact that technology not only transforms information, but also creates new forms of information. Moreover, given the importance of the information system as a support mechanism for co-ordination, exchange and communication throughout the organisation and in making strategic decisions, outsourcing the **strategic elements** of information system

may turn out to be a serious mistake. Moreover, our research has indicated that such undertakings may be extremely risky and may eventually lead to higher costs and less strategic flexibility[321]. Undoubtedly, outside vendors may find it difficult to design an organisational information system that meets the idiosyncrasies of a specific institution. Clearly more research is required to understand the relevance of interlinked **strategic** information and exchange systems that span not clearly defined organisational boundaries. The rise of VE systems and EC is likely to increase the demand for expensive advanced ICTs. Should companies then engage in interorganisational collaborative arrangements aimed at third party procurement of advanced ICTs? If the answer is affirmative, the firm may face a number of questions. What kind of arrangements should be made, what is the optimal governance structure, how should corporate activities be monitored, and how can the provision of service be guaranteed on an ongoing basis?

9.3.2 Future Research – Electronic Commerce

Analysis of the numerous cases and interview data uncovers three broad trends in the evolution of EC. First, changes in emphasis from competition towards collaboration and (virtual) community wide improvements in efficiency and effectiveness. Second, the formation of virtual communities on VE platforms. Third, a process of continuous, yet often episodic, rather than radical development within these virtual communities. With reference to VE platforms, we surmise that benefits may predominantly stem from three areas. First, benefits may arise from the use of the digital platforms as a cost effective distribution channel. This is most likely for firms with digitised versions of their products and services such as information concentric businesses. Second, EC systems

[321] Sources disguised upon request.

transfer a significant part of the selling function to the customer through online purchase facilities as discussed above. However, this transfer of power offers an organisation the ability to collect intelligence and monitor consumer requirements and revealed preferences in the exchange process. Taken a step further, these mechanisms can be used to tailor communication and economic exchange processes precisely to individual customers – allowing customers to order the information they require. Simultaneously, this interactive exchange of information allows marketers to effectively customise advertising content at an individual level. Finally, VE systems provide the opportunity to compete on dimensions other than price such as convenience and personalised services – in other words the focus comes to rest on value rather than prices.

Although the core business functions of financial institutions, the management of information, are relatively industry independent further research is required to assess and confirm the implications, findings and validity of this study in the context of other technology intensive firms and industries such as insurance, pharmaceuticals and airlines. We further believe that a new or revised institutional framework and adequate policies should be developed that can cope with emerging VE systems and provide the necessary governance structure for virtual- and EC systems. While an awareness of the policy options for advanced ICT depends upon conceptual and theoretical progress (in strategy, business, law and politics), there are a number of problems associated with their realisation. One of the most evident problems is that organisational and technological change and hence organisational adaptation, expressed in terms of exploitation and exploration, is a social process embedded in a specific socio-cultural environment. In many organisations and more generally in many countries, the introduction of new technologies has often been accompanied by an organisational conservatism in realising their full potential. This is not surprising, given the fact that most organisational mem-

bers have an incentive to maintain or preserve the status quo of familiar structures and arrangements. Our research has further revealed that in continental Europe, with its weight of tradition, organisational conservatism is particular entrenched. Although the phenomenon of organisational conservatism lies beyond the scope of this research, its persistence is clearly germane to the rate at which the developments discussed here will proceed.

9.4 Conclusion

Advanced ICTs can support and enhance the organisation of economic exchange – both in the virtual and physical domain of the organisational value network. In particular, ICTs may facilitate the process of externalisation, which has been encouraged by interorganisational collaborative arrangements and more recently by the proliferation of VE and EC systems. Consequently, advanced ICT systems have effectively become an integral element of the organisational structure. These digital information exchange systems have the capacity to handle codified information and to diffuse it across barriers of time and space. Likewise, the ability to reprogram software systems offers considerable flexibility during the organisational adaptation process which itself is exposed to rapidly changing environmental conditions. These characteristics lessen the technological requirements and constraints on the choice of exchange arrangements for organisational transactions. Accordingly, they diminish the need to place integrated operational systems under one organisational roof. Thus, they further extend the precept of Peters and Waterman's (1982) "simultaneously loose-tight coupling" to the organisation of contractual exchange relations within the wide confines of the virtual and physical realm of the organisational value network. Simultaneously, these advanced technologi-

cal systems provide the theoretical foundations to secure the benefits of externalisation with considerably less risk of loosing operational control. However, this mutuality of advanced ICT and organisations, in the context of virtual and physical organisational value networks, remains in a formative stage and we have not yet proceeded very far along the learning curve in this area (Child, 1987). Likewise, extensive organisational use of advanced ICTs, as means to exploit and explore organisational capabilities, is too new, and systematic investigation of their use too limited for a theory of their effects to have evolved and received general acceptance[322]. There is however, no doubt that the dynamic rise of advanced ICTs calls for a partial reorientation of organisational analysis. We believe that one essential conceptual requirement is to partially redefine organisation – embracing both physical and virtual platforms of exchange at the centre of a new definition. This new "model organisation" may comprise a wide portfolio of organisational procedures, processes and distribution channels embedded in a virtual community to organise economic exchange. The nexus between exchange and production of products and services would be provided by means for integrating and controlling an organisational production and distribution system with the flexible arrangement of an organisational value network embedded in an institutional framework, for example in the form of a virtual community.

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[322] A theory may be defined as set of related propositions (and conjectures) that specify relationships and interdependencies among variables (Blalock, 1969; Kerlinger, 1986). The set of proposition set forth in this research related to one another (at the very least) through their possessing a common independent variable, advanced information and communication technology, passes this definitional test of a theory.

Appendices

The appendices are organised chronologically that is, they appear in the order set forth in the actual text of this work. Appendix 1 provides additional insight into the discussion of technology and organisational adaptation elucidated by the case of Bank ABC. Appendix 2 documents the interview and case study sites that have served as the primary data sources during the fieldwork of this research. Note, however, that occasionally, footnotes indicate additional data sources mainly for clarification and verification of data. In addition, Appendix 3 provides a short overview of the additional data sources that have been used throughout this research. Appendix 4 outlines the general themes that have been addressed during the regular course of an interview. These themes have been used as general guidelines throughout all semistructured interviews. In Appendix 5, we analyse the back office operations of Bank XYZ to further illustrate, how new technology, process redesign, and restructuring can interact to decrease the time to market of new products and services. In Appendix 6 we discuss, based on our interview and secondary data, secure Internet banking platforms for the conduct of EC and more specifically the exchange of financial services in the marketspace.

The individual case studies have been subject to stringent confidentiality requirements by firms and organisations that have been the object of our case study research. The field work results, presented in the form of case studies, have thus been relatively limited. Accordingly, Appendix 7 – Conjectures and Propositions Summary – presents the aggregated level of support of individual case studies for the research propositions and conjectures as a supplement to the interview quotations and aggregated frequency throughout the actual text.

Appendix 1

Technology and Adaptation – Practical Evidence[323]

This section describes a paradox related to organisational adaptation of new technologies[324]. While continuous adaptation of new technologies is vital for long-term operational success, its implementation requires time and experience[325]. Moreover, the more experience users gain with a specific technology, the more they tend to rely on estab-

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[323] The results and data of this section are largely based on the case study Bank ABC (name disguised upon request). Additional data has been collected from Swiss Bank Corporation and Bank Cial.

[324] Personal correspondence with Swiss Bank Corporation, Quantitative Investment Research, Global Asset Management, 1995 – 1996.

[325] Interviews with Swiss Bank Corporation, Auditing, Basle, 10/17/95, 05/13/96, 05/12/96; Bank Cial, Accounting, 12/21/95, 05/09/96.

lished procedures and routines. Likewise, the technology eventually becomes embedded in the existing organisational structure (DeSanctis and Poole, 1994; Levinthal and March, 1981; Miles, 1989; Muzyka, De Koning and Churchill, 1995; Narus and Anderson, 1996; Tyre and Orlikowski, 1993, 1994). What then is the ratio between the adaptation of new technologies and procedures versus the maintenance of well-embedded technologies and procedures? Correspondingly, is it possible to define an optimal balance between maintaining existing procedures and adapting new ones? If the answer is affirmative, it needs to be evaluated to what extend it is possible to maintain a balance between the status quo, exploitation of existing corporate capabilities, and the pursuit of continuous organisational improvements or the exploration of new possibilities.

To illustrate the options and issues of exploitation and exploration, as outlined above, we discuss a case study based on interview data from Bank ABC that illustrates such organisational adaptation processes in the area of accounting, risk management, trading and information technology. The processes described below, allow organisations to rely on continuous exploitation of existing and embedded (Granovetter, 1985) organisational capabilities. Simultaneously, however, they provide a "window of opportunity" (Tyre and Orlikowski, 1993, 1994) to re-examine and change existing stable organisational and technological routines and procedures and eventually explore new opportunities. The exploitation and exploration of organisational capabilities occurs in discontinuous and episodic corporate development patterns – the opening and closure of windows of opportunity (Tyre and Orlikowski, 1994). Our data, largely in line with the results from a study conducted by Tyre and Orlikowski (1993) suggest that it is possible to balance exploitation and exploration of organisational capabilities. Nevertheless, such an objective requires careful management of organisational adaptation strategies.

Case Study – Technological Adaptation Bank ABC

In the case of Bank ABC, the existing accounting system, running on the bank's mainframe system, needed to be upgraded as a consequence of the introduction of the SEE and the Swiss Options and Financial Futures Exchange Ltd. (SOFFEX) trading systems. This upgrade has been mandated by the enhanced data exchange standards of the SEE and SOFFEX that automatically provide trading information to Bank ABC's securities and derivatives trading division. In addition, these data will automatically be stored in relational database systems upon the execution and clearing of a successful trade. Therefore, the "life-feed" of trading and financial information provides a window of opportunity to enhance the organisation's corporate risk management system as crucial data are available in real time and thus provide the basis for a continuous assessment of corporate risk.

The functional areas most affected from these institutional changes were the settlement and clearing procedures for securities and the automatic data communication between the two exchange trading systems and the bank. One-year prior to the official launch of these new trading systems, Bank ABC created two small independent experimental systems that served as test environments. These experimental installations were aimed at exploring and exploiting new organisational capabilities while leaving the existing system unaffected by potential problems. After six months, the bank had gain sufficient experience with the new systems to develop sophisticated automated data exchange interfaces. Accordingly, ABC was in a position to simulate automatic settlement and clearing processes among the two connected experimental systems and a copy of its own mainframe based database. Consequently, successful testing and implementation of the new systems on the mainframe system of the bank were completed on

schedule. With the official introduction of the new trading systems, the bank was thus able to productively deploy its new software systems.

The implementation of these new data transmission protocols has further opened a window of opportunity in conjunction with the bank's attempt to institutionalise its corporate risk management; thereby extending the use of the new trading system and the underlying database. The existing risk management software modules had been developed on powerful workstations with off-line data feeds from a number of departments in the late 1980s. The introduction of the new trading systems decreased the external data sources for trading and exchange information from approximately five to two systems[326]. Conversely, the internal data collection process for corporate risk management was structured around the various trading and exchange areas such as securities trading, foreign exchange, derivatives, and interest related businesses. Traditionally, the data from these internal sources have been delivered in fixed time intervals to the centralised office in charge of corporate risk management. Thus, the new real-time data feed from the external data sources did not match the sporadic internal mode of risk assessment. This time difference between the provision of real time data and the sporadic assessments of the firm's risk exposure has been considered as unsatisfactory by senior management. Consequently, the bank launched an initiative to provide real-time data communication procedures via TCP/IP networks between the external data sources and the risk management system. This adaptation had twofold implications. First, the risk management software had to be updated to incorporate a new data communication protocol, which in turn made the system more flexible and accurate. Second, the transition to TCP/IP networks in the area has been extended to include all departments of ABC.

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[326] The institutional environment under the old trading and exchange system comprised the three regional exchanges in Zurich, Basle and Geneva now integrated in the SEE, and a number of scattered derivative exchanges now united under the SOFFEX system.

With the selection of a TCP/IP based internal network, the bank has chosen an Internet compatible data communication and exchange solution. Thus, Bank ABC is in a position to effortlessly provide services to the Internet or a specific EC platform.

The recent partnership with Bank QWE[327], further opened a new window of opportunity for the provision of secure interorganisational data exchange platforms. Moreover, the collaboration among Bank ABC and Bank QWE and the agreement that Bank ABC would manage all database and information technology procedures for Bank QWE mandated the development of sophisticated interorganisational secure data aggregation algorithms. Consequently, the current hardware and software solution of Bank ABC was modified considerably to handle this data exchange and integrate the data from Bank QWE with that of Bank ABC. The existing hardware and software solution of Bank ABC has been primarily designed for internal or mono-organisational use. The successful development of sophisticated aggregated software and data management tools for the existing information and data communication platform has drawn considerable attention from the original software solutions providers of Bank ABC. Accordingly, the initial software solution provider has shown considerable interest to have access to Bank ABC's expertise and knowledge gained from these recent software and hardware adjustments. Thus, Bank ABC has been able to develop new organisational capabilities and explore new methods for an enhanced corporate risk management system. Simultaneously, Bank ABC has been able to leverage its expertise in data handling and obtain a number of future concessions from its main solutions provider in exchange for knowledge and its expertise in the area of interorganisational data aggregation and risk management. Moreover, these adjustments are vital should ABC decide to establish and EC system or join and existing financial services virtual community.

Discussion and Conclusion – Bank ABC

Our data is basically in line with the recent study on technological adaptation conducted by Tyre and Orlikowski (1993, 1994) in three manufacturing and services organisations in the US and Europe. The discontinuous adaptation process described by Tyre and Orlikowski (1993, 1994) is based on three distinct phases. First, aggressive adaptation of new technology, that is the maximum number of possible modifications is carried out at the earliest possible stage. Second, by imposing routine on the use of the new technology, senior management attempts to achieve the highest possible level of exploitation from the implementation of new procedures. Third, new and additional windows of opportunity for adaptation are created on an irregular or random basis. Although, our data and especially the case of Bank ABC as illustrated above basically correspond with these findings, our data exhibit small discrepancies from the results and framework describe by Tyre and Orlikowski (1993, 1994).

First, the risks associated with discontinuous forms of adaptation have been perceived as high and often counterproductive in the overall organisational adaptation process. Thus, a large number of surveyed financial institutions have founded research and development divisions that assess the potential value of new technologies along the confines of exploitation, exploration, and organisational fit or ease of implementation of the new technology. The use of R&D divisions is expected to smooth the transition or organisational adaptation process between the concurrent infrastructure and the desired state. Accordingly, a new technology is only embraced and adopted if it contributes substantially along all three dimensions to an organisation's value network.

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[327] Names and interview sources disguised upon request.

Second, in the case of Tyre and Orlikowski (1993), a new technology is aggressively promoted at early stages of the organisational adaptation process. Conversely, the surveyed financial institutions initially introduced the new technology only in a few strategically chosen areas to assess the true business value in limited field experiments[328]. This period of experimental use provides data on how the new technology is working, on whether previous changes (in the same or other relevant technologies) are yielding positive returns, and on what new challenges or opportunities need to be addressed. Successful results in one area provide the impetus to transplant and implement the new technology in other relevant areas. Third, our findings do not support the same magnitude of discontinuous change as reported in Tyre and Orlikowski (1993). On the contrary, our data suggest that the evaluation of new technology often evolves along certain criteria over a certain time period. Likewise, the selection of the actual projects and a rough timetable of for their implementation and adaptation are based on a sound strategic decision making process, initiated by senior management.

Appendix 2

Case Studies and Interview Sites

As illustrated in Table 7 below, thirteen financial institutions have been interviewed over the course of August 1995 – March 1997. Note that footnotes occasionally indicate additional references and data sources that have been used mainly for clarification and verification of existing data. We have further conducted triangulation interviews with five financial and non-financial institutions that have significant insight into the organisation and working of advanced technology in financial institutions. The trian-

[328] Sources disguised upon request.

gulation process has further been amended with five workshops as illustrated in Table 8. These five workshops have been carried out to collect additional evidence and to further validate our findings. The workshops have also been the source for additional feedback and further served as an interim and final test environment or laboratory for the formulation of the proposition and to receive comments on interim and final results and conjectures. Moreover, the workshop data could be juxtaposed to the interview and secondary data to check for potential systemic biases. In total 87 interviews have been conducted. Out of these 87 interviews, 17 have been conducted as triangulation interviews. The interviews, one average 1½ hours, lasted from 1 hour to a maximum of 5 hours. However, additional interactions took place via personal correspondence, personal observation during the course of an interview, and emails to obtain additional information as projects moved on and to clarify eventual differences and discrepancies.

Institution and Interviews	Date	Locations	Comment[329]
Andersen Consulting *Financial Services*	03 / 27 / 96 3 hours	London	1 person
Bank Cial AG, Switzerland *Accounting and MIS*	09 / 14 / 95 4 hours	Basle	2 people, SVP, VP
Bank Cial AG, Switzerland *Accounting and Finance*	12 / 21 / 95 3 hours	Basle	2 people, SVP, VP
Bank Cial AG, Switzerland *Finance and Accounting*	05 / 09 / 96 3 hours	Basle	2 people, SVP, VP Senior VP
Bank Sarasin & Co. *Technology and Finance*	09 / 15 / 95 2 hours	Basle	4 people, VPs & AVPs
Bank Sarasin & Co. *Corporate Development*	09 / 17 / 95 3 hours	Basle	1 person, VP
Bank von Ernst, Zurich	08 / 1996	Miami	1 person, COM
Citibank *Corporate Strategy, Technology*	09 / 27 / 95 1 hour	London	1 person, VP
Coop Bank AG / GZB *Relationship Banking*	11/95-03/96 13 hours	Basle	1 person, 7 interviews, and fax

[329] Legend and remarks for column "Comment": VP – Vice President; SVP – Senior Vice President; AVE – Assistant Vice President; COM – Communication. Furthermore, 2 people, in the column Comment indicates that two individuals have been interviewed (Senior Vice President and Vice President); the total time for all interviews in that case were four hours (e.g., with the Accounting and MIS division, respectively, of Bank Cial AG, Basle, Switzerland, 09/14/95).

Institution and Interviews	Date	Locations	Comment[329]
Coopers & Lybrand	05 / 03 / 96 3 hours	London	1 person, informal
Coopers & Lybrand	06 / 17 / 96 2 hours	Zurich	1 person, informal, 4 interviews
CS Holding / Credit Suisse *CS Economic Research*	07 / 31 / 96 6 hours	London	1 person
Derivative Audit Group	March 1997	London	1 SVP; COM
Deutsche Morgan Grenfell *Global Markets*	March 1997 3 hours	London	1 person, SVP
Goldman Sachs & Co. *Institutional Investors*	NA	London	1 person, email, VP, 3 interviews
Goldman Sachs & Co. *Corporate Sales*	03 / 04 / 96 3 hours	London	1 person, informal
Goldman Sachs & Co. Bank *Accounting and Audit, Technology*	09 / 19 / 95 1 hour	Zurich	1 person, VP
Goldman Sachs & Co. Bank *Operations*	09 / 19 / 95 2 hours	Zurich	1 person, VP
Goldman Sachs & Co. Bank *Corporate Information*	09 / 19 / 95 2 hours	Zurich	1 person, VP
Goldman Sachs & Co. Bank *Accounting and Audit*	12 / 17 / 95 1 hour	Zurich	1 person, informal, telephone
Goldman Sachs & Co. Bank *Information Technology*	05/ 05/ 96 1 hour	Zurich	1 person, informal, telephone
Goldman Sachs & Co. Bank *Audit*	07 / 05 / 96 1 hour	Zurich	1 person, phone Consultant
Goldman Sachs & Co. Bank *Audit*	05 / 12 / 96 1 hour	Zurich	1 person, phone Consultant
Lehman Brothers *Trading (foreign exchange)*	06/96-01/97 15 hours	London	5 person, 7 informal interviews
Microsoft *Online Banking*	1995-1997 NA	Redmond, New York	3 people, via email, 7 interviews
NatWest *Retail Banking*	March 1997 3 hours	London	1 person; VP COM
Oracle *Financial Services Division*	06/94-12/96 NA	New York	1 person, discussion via email
Robert Fleming *Strategy and Operations*	09 / 25 / 95 2 hours	London	1 person, VP
SBC Warburg *Corporate Development*	09 / 29 / 95 2 hours	London	1 person, VP
Schroder *Corporate Finance*	09 / 26 / 95 2 hours	London	1 person, AVP
Schroder *Information Technology*	09 / 27 / 95 2 hours	London	1 person, AVP
Sema Group *Financial Services Practice*	05 / 06 / 96 2 hours	London	1 person, informal
Swiss Bank Corporation (SBC) *Corporate Information*	NA	Singapore	2 people, email, VPs
Swiss Bank Corporation (SBC)	11 / 03 / 95	Basle	1 person, VP

Institution and Interviews	Date	Locations	Comment[329]
Electronic Retail Banking	3 hours		
Swiss Bank Corporation (SBC) *Audit*	09 / 17 / 95 2 hours	Basle	1 person, AVP
Swiss Bank Corporation (SBC) *Audit*	10 / 17 / 95 5 hours	Basle	5 people, VPs, Workshop
Swiss Bank Corporation (SBC) *Strategic Planning*	08/95-12/95 13 hours	Basle, London	1 person, VP, 7 interviews, & phone
Swiss Bank Corporation (SBC) *Electronic Retail Banking*	12 / 22 / 95 3 hours	Basle	1 person, VP
Swiss Bank Corporation (SBC) *Audit*	05 / 13 / 96 3 hours	Basle	2 people, VPs
Swiss Bank Corporation (SBC) *Electronic Retail Banking*	09/95-06/96 NA	Basle	1 person, email, VP
Swiss Bank Corporation (SBC) *Electronic Retail Banking*	09/95-09/96 NA	Basle	1 person, email
Swiss Bank Corporation (SBC) *Electronic Retail Banking*	05 / 10 / 96 2 hours	Basle	2 people, VPs
Swiss Bank Corporation (SBC) *Audit and Information*	01/95-12/96 NA	Basle	1 person, email
Swiss Bank Corporation (SBC) *Audit*	December 1996	Hong Kong	1 person, email, VP
Swiss Bank Corporation (SBC) *Internal Technology Audit*	05 / 12 / 96 2 hours	Basle	1 person
Union Bank of Switzerland (UBS) *Information Technology*	December 1996	Singapore	1 person, email, VP
Union Bank of Switzerland (UBS) *Telecom, Communications*	09 / 20 / 95 5 hours	Zurich	2 people, VPs
Union Bank of Switzerland (UBS) *Telecom, Communications*	1996	Zurich	1 person; personal correspondence
Union Bank of Switzerland (UBS) *Corporate Communication*	09 / 20 / 95 2 hours	Zurich	1 person, AVP; COM

Table 7 Interviews and Case Studies Data

The 87 interviews have been longitudinal. Many organisations have been visited repeatedly where many managers have been interviewed repeatedly, yielding close to 150 pages of written interview notes. As illustrated in Table 7, the sample of respondents and interviewees comprised mangers that had been involved or affected by issues of advanced technology in the context of organisational adaptation. These managers represent a wide variety of functional, hierarchical, and business backgrounds. In addition, 17 interviews (out of the 87) have been carried out with third parties such as manage-

ment consultancies and software firms. These "triangulation institutions" provide advanced technology services for financial institutions. Similarly, we have conducted five workshops with financial and non-financial institutions, which have significant insight into issues of advanced technology in financial institutions. These workshops have been performed to get a more holistic picture of the current trends and issues in financial organisations and to discuss some of the preliminary findings to achieve the highest possible level of validity. In cases where differences and discrepancies occurred, managers that have previously been interviewed were contacted again to clarify the unresolved issues and contradictory findings. In addition, throughout the research period, informal discussions with employees and other "industry insiders" were conducted to corroborate data obtained from the formal interviews.

Organisation	Departments	Comment
Bank Cial AG Switzerland *Basle, Switzerland*	Accounting, Trading, MIS, Internal Audit	5 people, VPs, SVPs, 1 day workshop, 05/13/96
Goldman Sachs & Co. Bank *Zurich, Switzerland*	Corporate Information, Operations, Internal Audit	3 people, SVP, VPs, ½ day workshop, 07/05/97
Lehman Brothers *London*	Fixed Income, Foreign Exchange, Corporate Finance	3 people, VPs, ½ day workshop, 01/27/97
Oracle *New York*	Financial Services Division	3 people, SVPs, ½ day workshop, 21/01/97
SBC *Basle, Switzerland*	Audit, Corporate Strategy, Electronic Commerce, MIS	7 people, VPs, 1 day workshop, 05/11/96

Table 8 Triangulation and Verification Workshops

The primary data collection methods and procedures rested on semi-structured exploratory interviews, which is largely attributable to the exploratory nature of our research (see chapter three). In addition, we have made use from all the sources of evidence (e.g., archival data, observation, correspondence), as illustrated in chapter three except for physical artifacts. In order to maintain the highest level of **confidentiality**, as re-

quested by interviewees, no tape recorder was used. However, the interviewer made extensive notes of the interviews (as outlined in chapter three).

Appendix 3

Secondary Resources and General Data Sources

In addition to the interviews conducted, we have collected additional information, as discussed in chapter three, about the organisations being analysed, the industry and other contingencies that have emerged during the course of the investigation. Furthermore, we have carried out five workshops to assess and discuss our findings and obtain additional feedback and insight into the phenomena being studied.

Archival data, such as documents, memos and various proposals from third party solution providers (e.g., outsourcing, software and hardware offers) describing an organisation's history, annual reports and additional archival data, if necessary, were obtained from the firms under investigation. Archival data were further obtained from a number of research institutions and the popular press. We have further analysed written materials such as industry publications and financial analysts' reports and business press articles about the companies in question and the financial industry and advanced technologies, respectively. This archival data together with the interview data made it possible to construct a qualitative picture of the exploitation and exploration of advanced technology in the financial institutions involved in this research project. The archival data could further be juxtaposed to the interview data to check for systemic biases in retroperspective accounts of past strategy (Golden, 1992). Discrepancies between interview data and secondary materials such as archival data discovered during the course of the research raised a number of questions that guided further data collection and analy-

sis. Data collection (both primary- and secondary data) was concluded when a level of saturation was reached (Glaser and Strauss, 1967).

Appendix 4

Interview Questions Guide

The interviews have been semi-structured and open-ended. In the following section, we provide a list of themes that has been prepared priory to start of the data collection procedures. These topics were derived from the literature and the pilot case study in an attempt to conceptualise and understand the phenomena of exploitation and exploration of advanced technology in financial institutions. They were added and amended from time to time during the course of the interviews to reflect new insights. Therefore, the objective of the **Interview Question Guide** is to outline general topics and themes that have been discussed during the course of a normal or representative interview. Furthermore, some of the questions have been designed to incorporate "cross checks" – to ensure high levels of validity and ensure that the data provided from respondents is correct and not contradictory. In cases of obvious and immediate contradictions, further inquiries were initiated during the interview. Alternatively, if contradictions arose during the data analysis, further investigations have been carried out at a later stage during the research process. Throughout the text aggregated frequencies for *certain* statements are provided followed by a brief indication of the interview theme involved. For example, (90 percent of respondents agree: T7, network consolidation) refers to the fact that 90 percent of interviewees have expressed the opinion that the distribution network of financial institutions may consolidate in the future (a topic under interview theme 7). Thus, the Theme **T** indicates the areas of investigation, while the topic indicates what

areas within a specific theme have been addressed. Finally, a theme indicator alone refers to data that has been aggregated across the entire theme and thus cannot be linked to a single contingency.

Interview Guide Objective: First, to investigate the role of advanced technology as a means of exploitation and exploration of organisational capabilities in the organisational adaptation process of financial institutions. Second, to examine the relative standing of exploitation- versus exploration of advanced technology in financial institutions as a means of organisational adaptation. Third, to explore the use of advanced technology in financial institution and economic exchange among them (e.g., EC).

Theme 1 – Exploitation and Exploration

What are exploitative areas of advanced technology in financial organisations
What are exploratory areas of advanced technology in financial organisations
Balancing exploitation versus exploration: how, why and when?
Reputation, trust and credence characteristics – links to exploitation and exploration

Theme 2 – Advanced Technology

Definition of advanced technology
Why is advanced technology of paramount importance in financial institutions?
How is advanced technology being deployed in financial institutions?
The contemporary role of advanced technology in organisations / financial institutions
Elements of advanced technology – disaggregation of technology in organisations
Technology and brands: pricing and technology

Theme 3 – Organisational Arrangements

The transition of financial institutions as a consequence of advanced technology
Convergence and blurring – the rise of the organisational value network
Technology as a source for establishing new inter- and intraorganisational arrangements
Technology as a source for resolving inter- and intraorganisational tensions: how
Interorganisational exchange of intangibles – digital data

Theme 4 – Exploitation

Existing organisational capabilities: room for exploitation – why and how?
Capital Markets
- Competition and technology – globalisation / complexity of operations
  - Centralisation versus decentralisation of operations: when, why, how?
- Risk management: why, how and when?
- Information system – third party versus proprietary – competitive advantage
- Growth – organic or mergers and acquisitions

Infrastructure
- Flexibility versus performance
- Boundaries of organisational infrastructure: Virtual Value Network (VVN)
- Standards: when, how, why, what?
- Infrastructure and customer services – optimal balance: when and how?

Retail Banking
- Branch and distribution strategies
- Interorganisational arrangements and sharing of infrastructure – networks
- Interorganisational value networks: when, what, why and how?
- Electronic retail banking: when, how and why?

Knowledge
- Customer database: when, why and how?
- Cross selling – data collection
- Data management: how?
- Knowledge cycle in financial institutions – the customer-firm interface
- Knowledge dissemination – issues of (virtual) value network boundaries

Theme 5 – Exploration

Assessment of potential areas for organisational exploration: how and why, direction?
The rise of alternative system – the organisational value network: how, when, why?
Multimedia banking: when, how, and why?
- See also Theme 6 and 7

Theme 6 – Electronic Exchange

Advanced technology and banking – the perception of technology as a danger: why?
Advanced technology and intermediation
Virtual exchange: when, why and how?
Virtual exchange in a trust based relationship and the identification of economic agents
Virtual exchange: possible evolutions of virtual exchange systems in finance
- Extranet: when, why, how?

Organisational design, technology and virtual exchange: how?
- Virtual organisations: location versus ownership: how and why?

Technology, exchange and structural-, institutional arrangements
- Virtual communities

Theme 7 – Advanced Technology

The value of technology in financial institutions
The value of technology for the provision of financial services
Advanced technology: expansion across time and space – distribution of services
    Existing forms of digital exchange (electronic commerce)
Advanced technology: market segmentation – exploitation and exploration
The nature of financial services and products – tangibility versus intangibility
    Credence character
Distribution of financial services and products
Distribution network consolidation: when, why and how?
Distributions – emerging forms: when, why and how?
Globalisation of finance and banking: when, why and how?
    Globalisation and advanced technology – cause and effect
    Organic growth versus mergers and acquisitions
    Interorganisational standards – exchange on virtual platforms
    Allfinanz (Universal Banking) versus specialisation – globalisation strategies
Innovation and advanced technology: how, why?
Risks of interorganisational digital exchange
    Risk and intermediation in digital exchange – the context of finance
    Information sharing – defining the organisational boundary
    Data overload – risk and consumer decisions – renewed roles for intermediation
Secure virtual exchange systems: why, when and how?
Advanced technology in finance – value creation: how?

Appendix 5

Case Study – Back Office Operations of Bank XYZ

Bank XYZ is one of the leading Swiss Private Banks, with additional full services subsidiaries and offices in London, New York and Singapore. It provides not only financial asset management and advisory services, but also a wide palette of basic financial products. These financial products include derivatives, equities, fixed income securities, and research, while its major line of service ranges from portfolio management, and advisory services to international cash management. Trading, clearing and settlement of transactions take place almost 24 hours a day through all the major financial centres in the world. Bank XYZ trades for both customers and its proprietary accounts in all major financial instruments. The dynamic market environment of these financial instru-

ments makes innovation and development of and new products and services indispensable for the long-term success of the organisation. The trading environment of Bank XYZ is largely shaped by the following three factors: first, rapid development of new financial instruments by using flexible software solutions; second, an increasing volume of executed trades on all major exchanges; and third the global nature of financial markets and its implications for corporate activities (e.g., risk management across time and space; portfolio and asset management; portfolio insurance and hedging).

In an attempt to maintain maximum flexibility in a dynamically changing business environment, Bank XYZ initiated a review of its back-office operations in 1994. Traditionally, new product development depended upon interactive operations input – T_{2P} – as no new product or service could be introduced until software programmes and communication protocols (typical back-office operations) were developed that could handle the trading and settlement procedures of these new financial instruments. The functional structure of the bank's operations and information technology department, however, was not flexible enough to accommodate and incorporate a rapidly changing pool of financial products and services. Likewise, the existing clearing and settlement procedures did not support rapid development of new products and services. At the time of the review, back-office operations were often manual and supported by mainframe batch processing systems originally developed in the late 1970s. Accordingly, radical changes have become a necessity to realign business capabilities with environmental contingencies. The reconfiguration of the back-office, aimed at facilitating product and services development and their alignment with back-office procedures, has been achieved by implementing and performing the following organisational measures. An initial work flow analysis has been carried out to identify the potential for streamlining and redesigning operational procedures and processes. The next step in the or-

ganisational adaptation process involved the establishment of cross-functional work teams; as a means to reduce the traditional role and reliance of a functionally driven work environment. The establishment of cross-functional teams was aimed at incorporating expertise and knowledge from a number of disparate functional areas into one entity. The financial institution anticipated that an incorporation and flexible combination of dispersed knowledge in one readily accessible organisational centre or hub will eventually help to reduce the development time for new products and services. At the same time, senior management has initiated organisational structural adjustments to flatten the organisation to stimulate the development of a more entrepreneurial corporate culture and hence more innovative products and services. On the technological side, open system distributed client-server systems have been substituted for the existing mainframe systems. The newly implemented distributed client server-architecture permits settlement and clearing processes to be managed simultaneously from a number of locations in a single centralised database. The use of an open system architecture based technology infrastructure has further open the possibility for Bank XYZ to access remote resources and organisations based on standard interorganisational corporate communication protocols (e.g., TCP/IP). Although the changes have not been without significant cost and disruption, Bank XYZ is now in a position to develop clearing and settlement procedures for new hybrid financial products in approximately one seventh of the original time. The consolidation and unification of the old systems into one coherent new one has saved the bank approximately US$30 million annually over the last two years. Bank XYZ is further in the process of upgrading internal computer and communication systems to provide a common Intranet based data and information management infrastructure across all its operations via a standard browser interface on an open network system. The open network design will further provide the means to easily

access additional remote information and communication systems in the future; should there be a need to do so.

In summary, the findings of this case study suggest that in addition to monetary rewards substantial benefits of swift product and services innovation are often intangible. For instance, high value is attached to the projection of a more innovative image with customers and the aspiration of a superior reputation for the provision of state of the art financial products and services. In contrast to Drew (1995), though, the correlation between speed of innovation and increased anticipated future revenues has been significant, with 70 percent of respondents expecting higher revenues from the development of new products and services. Furthermore, these findings are supported by additional interviews that have been carried out with a number of financial services consulting companies, software firms and financial organisation such as the American Stock Exchange in New York, and the SEE in Switzerland. The development of advanced ICT systems per se (e.g., EC) has further been mentioned as an alternative cost-effective and convenient platform for the distribution and dissemination of digital financial products and services. Although, novel products and services delivered via EC systems may provide a source of high value added, the windows of opportunity may be narrow as digital financial services and products are relatively easily modified and copied. Alternatively, if the life cycle of products and services is short per se, the time span left to exploit value from innovative services may be very limited. We believe that the use of advanced digital technology may eventually be beneficial for the exploitation of existing financial products and services and the exploration, design and distribution of new alternatives. However, the success of these innovative forms of digital offerings and their distribution are bound to the development of sophisticated management accounting and risk

management systems that can assess the value of individual products and services. Therefore, in the absences of these systems it may be difficult for financial institutions to measure the real values of new products and services[330]. Moreover, the lack of adequate pricing mechanisms and risk management systems will further limit the ability of a financial institution to price individual offerings on a competitive basis and maintain sufficient return on investment.

Appendix 6

Secure Internet Banking Systems[331]

According to a 1995 Internet Society[332] press release on the growth of the Internet over the last three years, 13 countries experienced over 1,000 percent growth in the number of servers connected to the Internet. To date, this growth rate has modestly declined, yet the overall growth is expected to continue; especially in Emerging Markets[333]. In the US alone, the Internet presence (servers connected) grew 31,000 percent during the same period. As of mid 1995, 173 countries had some form of Internet connectivity. Initially the Internet and other interorganisational digital network systems were US Department of Defence funded data exchange network systems designed to provide a platform for information exchange in an unstable environment.

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[330] Interviews with Swiss Bank Corporation, Auditing, Basle, 05/13/96; and Bank Cial AG, Accounting, Basle, 09/15/95, 12/21/95, and 05/09/96.

[331] This hypothetical WWW Banking System has been constructed based on the Interviews conducted with both financial services institutions and IT consulting firms (e.g., Andersen Consulting, London; Sema Group, London; Coopers & Lybrand, London). In addition, extensive research on the WWW regarding the presence of financial institutions and the type of services being provided online has been undertaken during the period of January 1996 – August 1996.

[332] Communication with the Internet Society, May 1996; communication with Online Resources & Communications Corporation, February 1996.

[333] *Fortune* (1997) "Asia's InfoTech Explosion – The World's Fastest Growing Technology Market is Just Getting Started." Special Report, August 18, pp. 48 – 69.

The recent phenomenal commercial growth of the Internet is largely attributable to the development of the WWW[334] and associated Browser interfaces and their capabilities to handle interlinked multimedia data. The Internet and the WWW have thus become a global virtual platform of exchange, with a wide variety of products (or rather the information about the products in the case of tangibles) and services available from a variety of sources around the world connected to the Internet and WWW. However, the success and the acceptability of WWW based exchange systems depends significantly on their ability to provide the same level of security, confidentiality, and convenience as traditional means of exchange such as bank branches, mail order, and store based transaction. With one of the core elements of any transaction being money, exchanged for services and products, banks and financial services providers are seeking new ways to improve the quality, effectiveness and scope of financial services by simultaneously increasing the effectiveness and efficiency of operating in this emerging global marketspace.

Secure Banking Architecture

Banks, financial services providers, brokerage institutions, and advisory services have a long tradition of data protection, privacy and access control to the physical locations of their organisations. With the arrival of WWW based financial services, this tradition is endangered[335]. The advent of interactive digital means of exchange, embedded in open

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[334] The WWW was established in 1990 at the CERN, a particle physics laboratory in Geneva, Switzerland. The WWW enables participants to share and access information in various ways by allowing highlighted words and pictures (icons) in a document to hyperlink to almost any other media (e.g., documents, movie clips, audio, pictures) anywhere on the interlinked Internet computer network. Communication with the WWW Consortium, January 1996.

[335] Interview Bank Cial AG Switzerland, Basle, December 21, 1995.

systems networks, poses a significant security threat to the tradition of providing secure financial services.

A WWW security architecture, as depicted in Figure 8, should embrace several layers of ICT to ensure digital security, comprising: confidentiality, data integrity, certification, authentication[336], non-repudiatible[337] and actual confirmation[338] of financial transactions across the network.

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[336] The verification of the identity of a person or process. In a communication system, authentication verifies that messages really come from their stated source. The identification of the trading partners is thus dependent on the provision of two distinct proofs of identification matched by a third person. Communication with the WWW Consortium, March 1996.

[337] The digital signature confirms that the actual exchange (e.g., services and/or products exchanged for monetary- or non-monetary compensation).

[338] Receipt for the transaction; credit and debit transcript for both parties involved in the exchange of products and services.

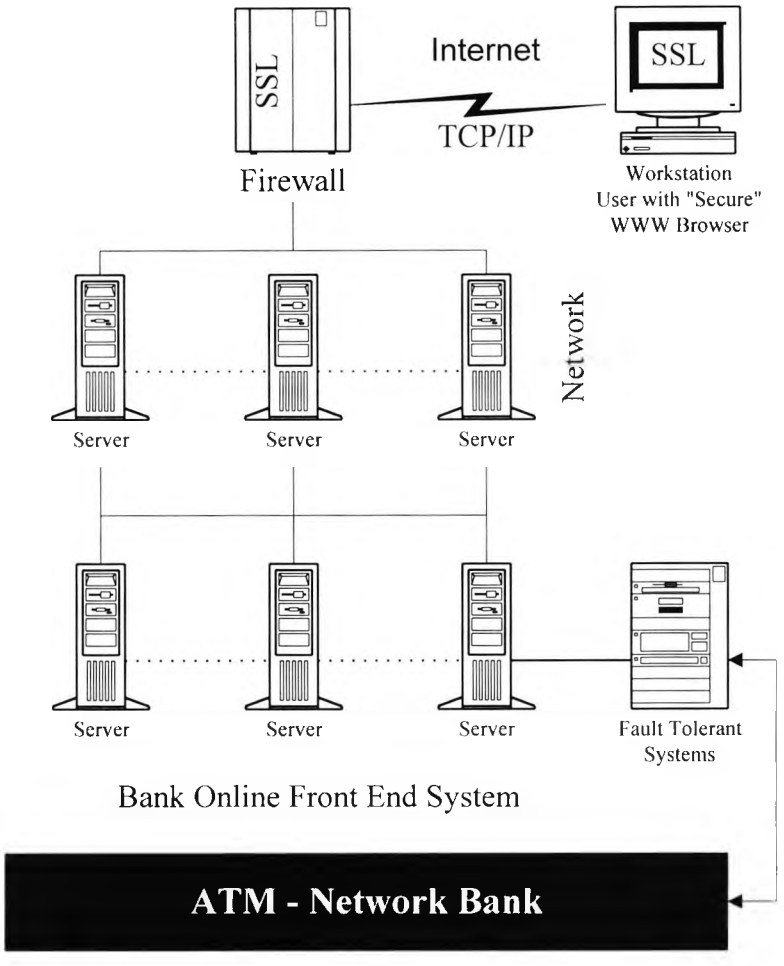

Figure 8 A Secure WWW Banking Architecture

WWW Banking security starts with the customer using a secure WWW browser. In the case of Online Bank, a fictive WWW based financial services provider, a WWW browser that supports the highest level of encryption is required to achieve maximum protection of financial transactions from tampering. Encryption prevents transactions from being "read" or tampered with by unauthorised parties over the Internet. Therefore, all logins and accesses to all the services on the Online Banking network are encrypted. Privacy to provide integrity of the data flow between browsers and the Online Banking server can for example be achieved by using Netscape's Secure Sockets Layer

(SSL[339]) protocol, which as emerged as a defacto industry standard due to the wide incorporation and adaptation by third parties. SSL, according to Netscape provides a secure channel for data transmission over the Internet[340]. It allows for the transfer of digital signatures for authentication procedures and provides message integrity, ensuring that the data cannot be altered "en route". Thus, Online Banking customers can be assured that they actual communication takes place with the Online Banking server and not a third party trying to intercept the transaction on the Internet or WWW by tampering with the digital network system.

To start a transaction, the customer uses his or her browser to send a secure message using the SSL communication protocol to an Online Banking server. The Online Banking server responds by authenticating the customer and initiating session encryption. Once the Online Banking session is securely established, Online's systems process and route transaction data using internal protocols. This prevents non-Online Banking Internet traffic from proceeding past Banks Online's series of firewalls and filtering routers. Bank Online protects financial transactions through a number of barriers that prevent unauthorised access. The first barrier is a system of filtering routers and firewalls, which separate the outside Internet from Bank Online's internal network. The filtering router verifies the source and destination of each Internet packet, and deter-

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[339] The SSL Protocol is designed to provide privacy between two communicating applications (e.g., a client server system). Second, the protocol is designed to authenticate the server, and optionally the client. SSL requires a reliable transport protocol (e.g. TCP/IP) for data transmission and reception. The advantage of the SSL Protocol is that it is application protocol independent. A "higher level" application protocol (e.g. http, ftp, telnet, etc.) can be put on top of the SSL Protocol. The SSL Protocol can negotiate an encryption algorithm and session key as well as authenticate a server before the application protocol transmits or receives its first byte of data. All of the application data (and protocol data) is transmitted in encrypted form to ensure privacy. The SSL Protocol provides "channel security" which has three basic properties: 1. The channel is private. Encryption is used for all messages after a simple "handshake" is used to define a secret key. 2. The channel is authenticated. The server endpoint of the conversation is always authenticated, while the client endpoint is optionally authenticated. 3. The channel is reliable. The message transport includes a message integrity check. Communication with Netscape, February 1996.

[340] Communication with Netscape, May - July, 1996.

mines whether or not to let the packet pass a firewall system; access is denied if the packet is not directed at a specific, available service. The firewall is used to shield the Online Banking servers from any unauthorised Internet access. After being identified as genuine Bank Online traffic, data is allowed to pass through the firewall while all other traffic from the Internet is rejected. In addition, the "firewall system" is the only server in Bank Online's client server network that communicates via TCP/IP – the Internet's communication protocol. No internal Bank Online transaction processing systems are reachable using TCP/IP. This prevents unauthorised users from accessing any internally stored transaction data from the Internet.

The Case of "Security First Network Bank"

Security First Network Bank (SFNB) is the first of a new breed of **Software Banks**, trying to build a customer base by using exclusively EC systems, which can only be reached and operated in the virtual marketspace. The Bank's philosophy is centred around the two words "security" and "network" that together form 50 percent of the banks mission statement as declared in the company's name. The financial institution operates on the Virtual Bank Manager software system from Five Paces[341], since October 1995. Since then, First Security Network Bank – the first WWW bank to have received FDIC[342] approval – offers a wide range of financial products and services, in-

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[341] Five Paces has developed Virtual Bank Manager (VBM), a software solution that allows financial institutions to conduct secure on-line transactions over the Internet; VBM is the first module within Virtual Financial Manager software package with other modules under development to be used with Virtual Financial Manager or, as in the case of the Virtual Bank Manager, as stand-alone solutions. Communication with Five Paces, April 1996.

[342] The Federal Deposit Insurance Corporation (FDIC) is a US governmental agency, created in 1933, which insures deposits up to US$100,000 per depositor, per bank, subject to certain conditions. The FDIC, in addition to the provision of partial default insurance for the financial services customers, requires that insured financial institutions, like "Security First", follow an established set of requirements to promote safe and sound banking practices. The FDIC scheme covers checking accounts, money market

cluding checking accounts, money market accounts and certificates of deposits. SFNB further plans to offer, pending regulatory approval, brokerage services, insurance services, and small business accounts. At present, SFNB offers 24-hour access to its financial services with no monthly fees and no minimum required balance on its Internet checking accounts. Accessible from any workstation with a secure WWW browser, SFNB is protected by a multi-layered security architecture[343], which in the case of SFNB is embedded in the Virtual Bank Manager software module.

"Software Banking" – The Virtual Bank Manager

Virtual Bank Manager (VBM) is the core of Five Paces Internet banking software application package. It comprises, based on public key cryptography, standard financial services such demand deposit accounts, automated payment services, checking facilities and maintenance services such as account balance inquiries and transfer of funds possibilities. In addition, VBM's intuitive and fully customisable graphical user interface[344] provides access to genuine EC functions such as on-line statements, reports and register views, an interactive multimedia tutorial for new customers, an information server with product demonstration for potential customers, an on-line interactive help system, and the capability to correspond directly with the bank's customer services department via email. All electronic transactions and processes are recorded in computerised "log" files that are used to detect suspicious activities and further serve as audit trails to detect and prevent fraudulent transactions. The downside risk of these log files is a decrease of privacy – with the content and exchange partners potentially being revealed to the

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accounts, deposit accounts, savings accounts, certificates of deposit, and retirement accounts. Communication with the Federal Deposit Insurance Corporation, September 1996.

[343] See section Secure Banking Architecture and Figure 8.

authorities and the potential risk of unauthorised access to confidential information stored in the log file.

Full customisation of the graphical user interface permits VBM deploying financial services providers to adapt the end user interface to their genuine specification and thereby retain cultural values and a specific image, for example a firm logo, associated with their respective financial services organisation. Furthermore, this page can be updated to instantly reflect newly available financial services and products; the same mechanism can further be used to "broadcast" changes in financial market indicators. Five Pace is in a position to provide, upon customer request, all the interface customisations (e.g., home page design, hardware and software installations, and maintenance) for the hardware infrastructure and software functions a bank requires to operate VBM. Thus, a financial institution running VBM can further decide to make use of the existing outsourcing facilities for its marketspace operations as provided by Five Pace.

Appendix 7 – Conjectures, Propositions Summary

The adherence to the high levels of confidentiality and "secrecy" of the financial services industry have been a major obstacle during the writing up stage of this thesis. Out of the 13 case studies that have been conducted, only two have received permission from corporate communications or equivalent to be published in this work. Moreover, the format and the actual information disclosed had to be altered significantly to hide the real identity of the organisations in question. However, the other eleven organisations have objected to the publication of the findings – as a case study – in this thesis. They have, however, not objected to the publication of aggregated frequency data

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[544] Communication with Security First National Bank, May 1996.

(across all organisations involved). Accordingly, this Appendix is aimed at shedding some light on the support of propositions and conjectures by individual case studies. The 13 case studies that have been conducted as part of this research work included nine large international financial institutions, three private banks in Switzerland and England and a network of small interlinked financial boutiques – companies that provide advisory services for particular market segments in the financial services industry.

The case writing procedures for this work comprised a series of different types of reports and cases that have been prepared in the course of the research. First, each case was structured in an analytical chronology, laying out the plot across different levels of analysis. This helped to clarify sequences of events, suggested causal linkages and early analytical themes. We then decided to give semi-final drafts to interviewees (including other relevant people) and invited them to correct errors of fact, and supply alternative interpretations to those that we made. Several issues emerged from this site validation and feedback procedure. First, there is no possibility of maintaining real anonymity inside a site of investigation. Even with pseudonyms, everyone within the organisation knew exactly who was who. Thus, many actual sources had to be further disguised or excluded and initial quotations have been removed or turned into the overall content of the case to maintain the requested **confidentiality** of interviewees. Many cases have thus been woven into the fabric of the overall text to dilute the explicit case in an attempt to maintain the highest possible level of confidentiality. Second, some people felt vulnerable as information not previously known to others had eventually been made public. Likewise, people often felt at unease about verbal statement that they initially made. Consequently, we have been asked to either remove them completely or disguise the source, respectively. These concerns have been justified because careers and interpersonal relationships could be affected. Finally, people almost never

objected to frequency data that have been aggregate across all participating organisations. However, they usually objected to direct quotes or specific characterisations of their behaviour or the inclusion of "competitive information" in the proceedings (and thus this work). Again, people felt that the "leak" would be obvious and could exhibit negative repercussions. The next step in the case writing procedure was to reorganise the cases among several conceptual themes – for example exploitation (outlined above) and exploration of advanced technology within organisation. The theme on exploration was then roughly structured around different contingencies of VE systems while the theme exploitation has further been discerned into retail banking, capital markets, infrastructure, globalisation and knowledge.

As a result of these constraints and in order to preserve the requested high levels of confidentiality, we have only been able to "publish" two out of the 13 case studies as mentioned above. The rest of the information – comprised in interview data – has been woven into the text throughout the relevant chapters. This form of disclosing information has been the only acceptable way of not violating the request confidentiality of interviewees.

Proposition and Conjecture Summary

Propositions and Conjectures[345]	Support
C1 – Additional customisation and segmentation of information products and services, based on digital data, are unlikely to face considerable barriers – except from (the cost of) advanced technology itself. *Chapter 4*	11 out of 13 85 %
P1 – Sustaining advanced technology based competitive advantages by exploiting existing capabilities may be quite effective when a unique line of business with high market share comprises a large advanced technological content. *Chapter 4*	7 out of 13 54 %

[345] Propositions and Conjectures are listed in the sequence they appear in the actual chapters. Note that **C** refers to conjectures and **P** refers to propositions.

Propositions and Conjectures[345]	Support
C2 – Market organisation or segmentation implies that different segments are handled by *partially* different production technologies. *Chapter 4*	6 out of 13 46 %
C3 – Advanced information and communication technologies provide means to perform and execute *partially* different production technologies in centralised locales. *Chapter 4*	10 out of 13 77 %
C4 – The differentiation of production technologies, and thus the provision of a heterogeneous portfolio of products and services, can be partially automated by deploying advanced technologies and open system exchange networks from a centralised location. *Chapter 4*	10 out of 13 77 %
C5 – Financial institutions – providing a large array of heterogeneous services – exhibit fundamentally different patterns of information and technology requirements than organisations operating in less information intensive environments. *Chapter 4*	5 out of 13 38 %
C6 – Unless active distribution channel management is accompanied with substantial restructuring of the traditional branch network – within the broader context of the corporate distribution strategy – the competitive situation of the traditional branch deteriorates further and eventually calls for further rationalisation. *Chapter 4*	8 out of 13 61 %
P2 – We surmise that the unbundling of services has precipitated a rise in the importance of product and services expertise at the expense of the overall value of the generalist customer-firm relationship. *Chapter 4*	11 out of 13 85 %
P3 – Effective globalisation strategies of financial services providers are likely to yield success in a limited range of core products and services, and not necessarily across the entire line of corporate offerings. *Chapter 4*	9 out of 13 69 %
C7 – The development of value networks among financial institutions will significantly increase the ability of a single financial organisation to remain competitive and sustain its competitive advantage in the financial services industry. *Chapter 5*	7 out of 13 54 %
P4 – Customer segmentation and aspired levels of profitability will help financial institutions to determine the optimal balance of explorative and exploitative delivery channels. *Chapter 5*	11 out of 13 85 %
C8 – The establishment of corporate wide infrastructure standards, even if they will take years and consume a significant amount of resources, is an investment that is certain to bring rewards. *Chapter 5*	11 out of 13 85 %
P5 – Higher levels of operational information- and data processing value network infrastructure capacity, imply ceteris paribus, a higher level of customer service and satisfaction.	11 out of 13 85 %

Propositions and Conjectures[345]	Support
Chapter 5	
C9 – The higher the level of informational capability, supported by a value network, the higher the long-term value a financial institution can offer to its clients. *Chapter 5*	12 out of 13 92 %
P6 – European Allfinanz services may be initial better suited to develop virtual banking activities and lay the foundation to form sophisticated technology partnerships to build a virtual value network. *Chapter 5*	9 out of 13 69 %
P7 – In virtual environments, advanced information and communication technology, aimed at the co-ordination of economic exchange, provides opportunities to lessen or alleviate market imperfections. *Chapter 6*	9 out of 13 69 %
P8 – Advanced information and communication technologies – aimed at facilitating and enhancing EC – provide opportunities to lessen or alleviate value network exchange imperfections. *Chapter 6*	9 out of 13 69 %
P9 – The price offered to "non-EC adopting" suppliers will eventually be lower than the price before the introduction of a basic electronic exchange system. Thus, the resulting cost differentials may result in fewer total suppliers than was originally the case, despite the fact that basic electronic exchange systems have reduced transaction costs. *Chapter 6*	7 out of 13 54 %
P10 – The introduction of information and communication technologies may not necessarily lead to a larger volume of spot market transactions – as some firms may choose not to participate. *Chapter 6*	7 out of 13 54 %
C10 – Brand, image, reputation and the level of customer trust in a financial institution are critical factors in stimulating initial interactive forms of economic exchange on virtual platforms. *Chapter 6*	13 out of 13 100 %
P11 – The number and quality of interorganisational communication and information connections between a faulty organisation and the rest of the value network may determine the potential magnitude of a crisis. *Chapter 6*	10 out of 13 77 %
C11 – Advanced technology driven virtual value networks, such as those in the financial services industry, are not only highly sensitive to external shocks such as tampering, but are also highly error prone to advanced technology or network communication problems per se. *Chapter 6*	9 out of 13 69 %
P12 – A wealth of data may create a poverty of attention given to a particular piece of information, and thus the need to allocate attention and time slots efficiently among the overabundance of data and information sources. *Chapter 6*	8 out of 13 61 %
C12 – In a data and information rich environment, information about products and services becomes increasingly as important as the actual product and/or service.	12 out of 13 92 %

Propositions and Conjectures[345]	Support
Chapter 6	
C13 – Increasing levels of data availability require increasing levels of information about the content and the quality of available data – and the products and services based on these data. *Chapter 6*	12 out of 13 92 %
P13 – Organisations that blend communications with additional exchange functionalities and content in a commercial environment will eventually emerge as organisers of sophisticated and high value added electronic communities. *Chapter 7*	11 out of 13 85 %

Table 9 Proposition Summary – Proposition Summary

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