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Organisational innovation in Dutch publishing firms

Proefschrift

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To Deloe

Preface

Writing a doctoral thesis on multimedia developments in the publishing sector is a dual struggle. First of all, there is the struggle of dealing with the typical characteristics of a dissertation project: long, uncertain, and solitary. Hence, any researcher who has just finished his or her research project is naturally inclined to allot a touch of heroism to the bygone endeavours. Hailed are the moments of utter despair and the fear of uncompromising deadlines, which not so long ago evoked quite the opposite feelings. In other words, ex-post rationalisation is practised in *optima forma*.

Studying a subject so volatile as multimedia turned out to be the second and most difficult struggle. Being present while the publishing sector experienced its most dramatic transformation since the invention of mechanical printing in the 15th century was very exciting. Developments took (and still are taking) place in such a rapid pace that any attempt to describe them is doomed to be outdated the moment it is laid down in writing. Hence, my investigation of multimedia developments in the publishing sector was guided by the conviction that, despite the inevitable transitoriness, there lies value in the historical account of contemporary developments. This conviction is grounded in the idea that future actions cannot be effectively undertaken without a sufficient comprehension of the past. After all, the present is the future's past.

Prior to my investigations, the Dutch publishing sector as such had already been extensively analysed and described. Two notable examples are the dissertations by Van den Brink (1987) and Kist (1996). Both authors wrote their *magnum opus* after a long and successful career in publishing. Under Van den Brink's leadership, Elsevier changed from a relatively modest national publishing company

into a leading international publishing conglomerate. Kist, on the other hand, started his publishing career with Samsom in Alphen aan den Rijn and finally retired as a member of the board of directors of Wolters Kluwer, another leading international publishing conglomerate.

When writing my own dissertation, there clearly was no way in which I could possibly match the practical knowledge and experience Van den Brink and Kist had when they wrote theirs. Hence, I had to take a different approach. On the one hand, I adopted a broad perspective by not only focusing on multimedia developments in the publishing sector, but on the management of industrial and organisational transformation in general. On the other hand, I adopted a narrow perspective by specifically focusing on Dutch traditional publishers of professional information. Besides these two major differences, I tried to make my work more accessible to an international audience by writing it in English. Following this approach, I aimed to achieve what scientific progress ultimately is about: taking the field further by standing on the shoulders of giants.

Although writing a dissertation is a predominantly solitary affair, it goes without saying that I am indebted to the people who supervised my dissertation research. From start to finish, Frans van den Bosch and Henk Volberda had to put up with yet another self-willed research associate. I am also grateful to Bert Jongsma (Sdu), Rien van Lent (Het Financieele Dagblad), and Nico van der Kley (Samsom H.D. Tjeenk Willink) for providing access to their companies. Moreover, I highly regard all the people within these organisations for the frankness, patience, and above all enthusiasm they displayed during my investigations. Furthermore, I want to thank all people who provided support during the moments when things needed a change for the better. This applies in particular to André van den Eventuin for his perseverance, Maurits van Oranje for his hospitality, and Marc Baaij for his encouragement. Finally, I envy Rosalinde for the way she completed her doctoral thesis. She set the example and encouraged me to match it.

Michiel de Boer
Amsterdam, May 2000

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1

Introduction

At the dawn of the third millennium, the world we are living in is facing a number of drastic economic, political, and social changes. An example of a phenomenon that is being associated with these dramatic changes is the rise of the digital era. Developments in information and communication technologies have generated an earthquake that has far-reaching implications for all levels and sectors of our society. Consumers, politicians, artists, and businessmen: all have to assess the implications of the digital era that are relevant to their particular situation.

Many different terms have been used to capture the essence of the developments in information and communication technologies. One of these terms is multimedia. Today, consumers are confronted with a massive amount of multimedia products and services to choose from. Politicians need to consider the role of multimedia with regard to issues such as privacy, freedom of speech, and access to government information. Multimedia provides painters, sculptors, and film directors with the opportunity to adopt or create new artistic forms and techniques. Businessmen may use multimedia to amend their marketing strategies, administrative systems, or even their entire set of business processes. In this study, the focus is in particular on traditional publishing firms and the way in which they are encountering the multimedia challenge.

Traditional publishing firms are having a hard time dealing with the vast range of multimedia opportunities and threats. Accordingly, there is a great number of questions that need to be answered in order to enhance the understanding of their challenge. What is multimedia? Where does it come from? How does it affect the information and communication industry? How can players such as traditional publishing firms deal with it? Academic research is one of the means suited to

provide the answers to these questions. The subsequent sections of this introduction chapter present the blueprint of my endeavour to enhance the understanding of the way in which traditional publishing firms are managing the multimedia challenge.

1.1 Research objective

Just like more recent terms like e-commerce and e-business, multimedia has swiftly become a popular term with many meanings. Above all, multimedia seems to be associated with unprecedented change. Still, in order to sever fact from fashion, the crucial question to be answered is whether the characterisations of the multimedia challenge are really idiosyncratic, or whether they are classifications of a changing situation in general. After all, the tenor of the opening lines of many writings in the field of management studies is that today's world is in a state of unprecedented flux. Statements like that are generally used to stress that things will never be the same, and to urge managers to buy the author's message in order to make it to tomorrow. The fact that there is a huge market for business prophecy[1] by itself proves that the world is indeed as insecure as the gurus claim it is. Yet, as the Greek philosopher Heraclites postulated: *pantha rei* meaning everything changes. What is more, everything changes all the time. Hence, statements that the world is in a state of flux are a just, but at the same time superfluous acknowledgement of a timeless phenomenon. What distinguishes one contribution from the other is often mere terminology. In the end, terms such as flux, turbulence, and volatility are all branches of the same tree. Given this observation, the multimedia hype should perhaps be taken with a pinch of salt. In this study, on the other hand, the multimedia challenge is believed to be a truly new and different phenomenon. Accordingly, the objective of this study is to provide both practitioners and academics with an enriched understanding of its particularities. Below, the managerial, empirical, and theoretical aspects of this objective are addressed. Along the way, the basic research question emerges.

1.1.1 Managerial and empirical challenge

When business environments are changing, so must business organisations operating in these environments. There are several different types of environmental

[1] The American economist Paul Krugman used the cynical term 'airport economics' to refer to the disproportionate impact rather disputable ideas have once they make the best-seller section on the counter of airport bookstands.

and organisational change that can be discerned. Environments may for instance change incrementally or radically, but also substantially or moderately. In all these cases, the change required by an organisation to stay in balance with its environment varies too.

A typical kind of environmental change is the convergence of technologies and the subsequent merging of various industrial sectors into a wider industrial complex. An emerging industrial complex (EIC) is a relevant phenomenon today. Especially when formed around so-called 'core technologies' such as microelectronics and biotechnology (Van Tulder & Junne, 1988), industrial complexes are assumed to form the basis of an industrial renewal of many sectors of the economy.[2] In the biotechnology complex, which is a well-known and extensively researched example, firms with a background in chemical, pharmaceutical, and agricultural sectors are becoming increasingly intertwined. The financial services complex, made up of firms with a background in banking, insurance, and information technology, is another example. The emerging multimedia complex (EMC), which is discussed below, can be seen as a third exponent.

Based on the principle of digitisation, a wide range of business sectors related to information and communication technology (ICT) is now merging into a large industrial complex, often referred to with the term multimedia complex. Although the rise of ICT already commenced a number of decades ago, in the 1990s it gained critical momentum with the explosive growth of the Internet[3]. Now ICT is increasingly transforming the way in which individuals, organisations, businesses, and societies operate. After all, an important characteristic of human beings is social interaction. The exchange of information is an essential element of this interaction, and digitisation has enabled people to speed up, enlarge, broaden, and improve a wide range of activities that rely on the processing of information.

In general, the implications of an emerging industrial complex are various. Competition may suddenly come from an unexpected or even previously unknown direction. Customers, stimulated by new possibilities, may demand different products and services. Production, marketing, distribution, and other business

[2] In 1996, the theme of the annual Strategic Management Society Conference was for instance 'Managing out of Bounds' (cf. Hamel & Prahalad, 1996), indicating the importance of the phenomenon of blurring industry boundaries.

[3] The Internet itself dates back to the 1960s, but remained relatively small and unknown until the rise of Internet Service Providers (ISPs) such as America Online, and the spread of browser software such as Netscape's Navigator in the early 1990s.

processes may drastically change. In summary, a wide range of opportunities and threats lies ahead for firms faced with an emerging industrial complex. For firms previously operating in one of the industries constituting an emerging industrial complex, the new environmental conditions demand fundamental organisational transformation or metamorphosis. Metamorphosis literally means a change of form.[4] With regard to organisations, metamorphosis logically means a change in the nature or form of an organisation. Metamorphosis can for instance refer to changes in a firm's mission, strategy, structure, processes, or culture. Operating in the emerging multimedia complex calls for a special kind of metamorphosis. With some witticism, the term *mediamorphosis* is born.[5] This term is defined as the process of organisational transformation in response to, and anticipation of the emerging multimedia complex.

By considering the kind of metamorphosis that is needed in an emerging industrial complex in general, the challenge of managing the process of mediamorphosis in the emerging multimedia complex in particular can be better understood. Since the emerging multimedia complex covers a vast amount of players, the empirical challenge of this study is to examine the management of mediamorphosis in a specific subset of players, namely traditional publishing firms.

Traditional publishing firms constitute a sector that is heavily affected by the multimedia developments. Not only has digitised information become an important factor in the operations of publishing companies, it also is affecting their products and services. Besides existing and still flourishing media such as books, newspapers and journals, information can now also be delivered via a range of new electronic and optical media such as online databases, CD-ROM, and the Internet. A crucial

[4] The term metamorphosis stems directly from ancient Greek. The word *meta* is a prefix denoting, among other things, change of position or condition. The word *morphe* means form. An example of metamorphosis in the biological sense is the transformation of a caterpillar into a butterfly. Through the centuries, metamorphosis has been a well-liked subject in literature. Classic examples are the books *Metamorphoses* by the Roman writers Ovid and Apuleius. In Ovid's work, metamorphosis is used in a mythical sense to denote changes of human beings into animals or trees. A well-known example from this century is the book *Die Verwandlung* by Franz Kafka. Metamorphosis also is a well-liked subject in art. An example is the drawing *Metamorphose* by the graphic artist M.C. Escher. Classical music, to close, has its equivalent in Richard Strauss' composition *Metamorphosen*.

[5] The intellectual father of this wordplay is Roger Fidler; inventor of a portable electronic newspaper called Tablet and former new media director of the American publisher Knight-Ridder. Fidler first used the term in 1991 and later published a book with the same title (Fidler, 1997).

aspect of these new media is the change from an analogue to a digital form of representation. Information is no longer only represented by ink on paper, grooves in vinyl, or waves in ether. New media are ruled by two fundamental values: 0 and 1. Another important characteristic of new media is that their initial development took place "... beyond the bounds of the traditional publishers' strategic heartland" (Kist, 1987: 4). Hence, the traditional publishing sector provides a prototype of a previously distinct sector which now, together with previously unrelated other sectors, constitutes an emerging industrial complex.

In order to fully understand the issue of managing mediamorphosis, the empirical investigation of the question how firms actually manage mediamorphosis needs to be complemented with a theoretical investigation of the question how firms can potentially manage mediamorphosis. In order to answer this second question, one can draw on a wide range of notions and concepts from management literature. Here, ideas from a number of theoretical streams that address issues such as industrial development, organisational innovation, and knowledge management are used. Below, a brief introduction to these fields is provided.

1.1.2 Theoretical challenge

Within the field of management studies, there is a number of basic theoretical questions that everyone struggles with. Perhaps the most fundamental questions are why firms exist (cf. Coase, 1937), and why firms differ (cf. Nelson, 1991). Other basic questions relate to why and how firms grow, change, innovate, compete, and succeed. Besides these timeless questions, within every period there also is a number of specific trends noticeable. Within the ongoing search for new modes of thought and analysis (Lenz & Engledow, 1986) or new paradigms (Prahalad & Hamel, 1994), two of the currently dominant perspectives are evolutionary economics and knowledge management. For reasons explained below, both perspectives seem very well suited to frame the process of mediamorphosis. In addition, this study builds on the more established organisation design perspective.

Evolutionary economics stresses the dynamics of a capitalist economic system and puts emphasis on innovation as the main source of dynamics. Moreover, evolutionary economics recognises the importance of the links between organisational, managerial, social and technological innovations. All this makes evolutionary economics an appropriate source for investigating the emergence of the multimedia complex and the consequences this has for firms having to innovate in this context.

Knowledge management, the second perspective, is rooted in a number of economic, organisational, and strategic management theories. It partly originated

under the label of the resource-based view of the firm (RBV), which is a stream of literature stressing the idiosyncrasy of organisational resources. The related knowledge-based view of the firm (KBV) perceives organisational knowledge as the primary source of a firm's competitive advantage. This makes the knowledge management perspective an appropriate source for investigating the way in which a firm can manage its organisational knowledge such that it successfully innovates in the emerging multimedia complex.

Finally, the organisation design perspective perceives a firm as a tool or instrument to effectively perform a task. Organisation design in this respect is more than just creating a formal organisation structure. Organisation design encompasses the overall layout of an organisation form, including individual and collective roles such as temporary task forces, standing committees, project teams, or various other liaison devices that overlay the formal organisation structure. This makes the organisation design perspective an appropriate source for investigating the way in which a firm can establish a fit between the various dimensions of its organisational form, and the various dimensions of the context in which it operates.

Summing up, the theoretical challenge of this study is to examine how developments in three domains of the management literature, namely evolutionary economics, knowledge management, and organisation design, can contribute to the understanding of the management of metamorphosis in general, and the management of mediamorphosis in particular. As a consequence, this study may indirectly contribute to the development of a dynamic view of the firm at the intersection of economics, organisation theory, and strategic management. Together, the managerial, empirical, and theoretical challenges provide the ingredients for the question that serves as starting point for this research project. This research question is formulated below.

> *Question 1.1: How can and do traditional publishing firms, faced with the emergence of the multimedia complex, manage the required process of mediamorphosis?*

1.2 Research methodology

The research methodology describes the methods that are used to reach the research objective and to answer the research question. As indicated above, the objective of this study is twofold. On the one hand, the aim is to enhance the understanding of the management of mediamorphosis in the context of the multimedia complex in particular. On the other hand, the aim is to further develop

theoretical notions concerning the management of metamorphosis in the context of an emerging industrial complex in general. In order to reach this dual objective, the following research methodology is used. The three theoretical perspectives mentioned above are discussed in order to generate relevant concepts. Based on these concepts, definitions and assumptions are formulated, and a conceptual framework of mediamorphosis is developed. Subsequently, the conceptual framework is applied in a particular empirical examination of the management of mediamorphosis; namely that of Dutch traditional publishing firms. Finally, the conceptual framework is evaluated by confronting it with the empirical data.

The focus in this study on the transformation process of individual firms stresses the complex and intangible nature of the research question. This implies that the use of a cross-sectional study to provide statistical generalisations is not considered to be the appropriate methodology (Aharoni, 1993). Instead, a more in-depth examination of the conceptual framework and its assumptions is chosen. The empirical research is based on 'fine-grained' (Harrigan, 1985), qualitative case studies of a limited number of individual firms. The choice for using a case study methodology is in line with the nature of the research questions (i.e. 'how?' rather than 'what?'), and the fact that the focus is on a contemporary phenomenon within a real-life context over which the researcher has little control (Yin, 1994). To embed the case studies in their relevant context, first a somewhat more 'coarse grained' (Harrigan, 1985) investigation of the emerging multimedia complex and traditional publishing sector is undertaken.[6]

Applying a conceptual framework to a number of individual case studies implies that the predictive power of the results and implications is limited. This is, however, not seen as a fallacy, for the objective is not to develop or test a grand theory of organisational transformation, or to present a comprehensive account of the emerging multimedia complex. Instead, the aim is to combine the integration and extension of existing theory, with an application to a specific empirical situation. This asks for a 'middle-range' type of theory (Merton, 1968). Such a theory lies in between casually generated working hypothesis and grandiose attempts to explain all social behaviour with a given systematic set of assumptions. Middle-range theories attempt to predict and explain only a subset of all organisational phenomena (Bourgeois, 1979; Pinder & Moore, 1979). In this study,

[6] The explanation of the research methodology in this section only briefly touches the overall approach followed. The methodology used to conduct the case study research is discussed in further detail in Chapter 5.

this subset refers to the management of mediamorphosis in the emerging multimedia complex.

1.3 Research in perspective

As argued, this study is positioned in accordance with both practical and theoretical topicality. It illuminates an empirical phenomenon that is believed to be highly relevant at the turn of the 21st century. This study also fits into a currently dominant stream of academic research. In this way, the objective of this research is to provide a distinctive contribution to the understanding of today's managerial challenges, while standing on the shoulders of today's leading academics. This approach acknowledges that there are definite differences between the economic and managerial challenges of yesterday, today, and tomorrow. As technological, economic, and social conditions shift, so does the nature of organisations (Weber, 1910). A brief look at the history of management studies supports this idea. Over time, consecutive streams of literature dealt with issues that once were relevant, but are now (partly) outdated. Hence, schools such as scientific management (cf. Taylor, 1911; Fayol, 1916) and human relations (cf. Mayo, 1933; Roethlisberger & Dickson, 1939) have all to a certain extent been fostered by the, at that time, prevailing economic conditions, nature of organisations, and human values.[7]

Apart from this co-evolution of science and reality, there is another reason for streams of literature to rise and fall. The sociology of science generates consecutive lines of thought, or 'paradigms' (Kuhn, 1962; Burrel & Morgan, 1979) that for a particular period in time dominate the line of thinking. In the so-called hard or natural sciences (e.g. physics, chemistry, and biology) paradigm shifts are often evoked by fundamental new insights. In the soft or social sciences (e.g. psychology, sociology, and economics) these shifts are more a matter of changing perspectives. After all, the differences between the physical worlds according to Copernicus, Newton, and Einstein are of a different kind than the differences between the economic worlds of Smith, Marx, and Keynes. Nonetheless, in both natural and social sciences research paradigms come and go. By deliberately aiming at a topical empirical phenomenon as well as literature stream, it is recognised that the validity of this work is finite. Still, with the passing of time, this study will remain as a historical account of a particular state of flux. Accounts like this are

[7] For an overview of the development of management theory see for instance Shafritz & Ott (1992).

very valuable, for understanding the past is important when shaping the future, as illustrated by Neustadt & May (1986).

1.4 Outline

Now that the blueprint of the research project has been revealed, the final step is to present the dissertation outline. This outline is depicted in Figure 1.1. Chapter 1 needs no comments, as it sets the stage. Chapter 2, 3, and 4 examine how developments in the selected domains of the management literature contribute to the understanding of the management of metamorphosis in general, and the management of mediamorphosis in particular.

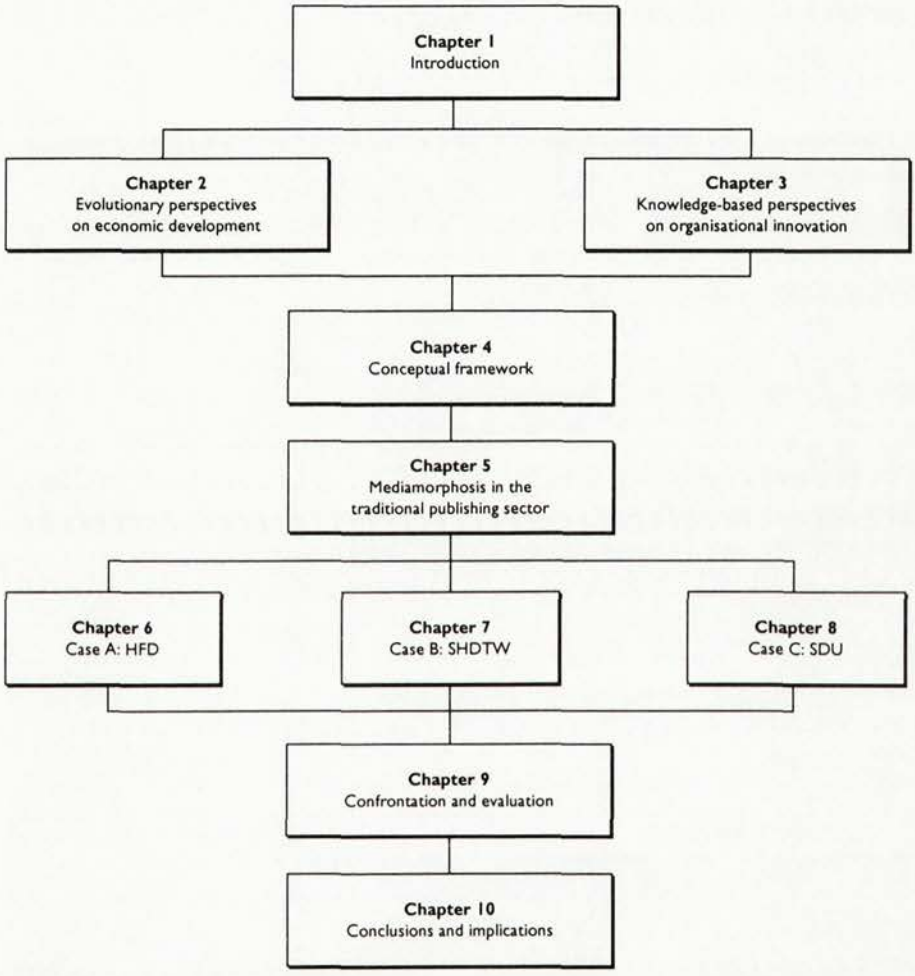


Figure 1.1 Dissertation outline.

Chapter 2 focuses on evolutionary perspectives on economic development, while knowledge-based perspectives on organisational innovation are the focus of Chapter 3. Chapter 4 combines the concepts from Chapter 2 and 3 with the organisation design perspective and integrates the three streams into a conceptual framework. This conceptual framework serves as bridge between the theoretical part, and the empirical part addressed in Chapter 5 to 8. Chapter 5 sketches the landscape of the emerging multimedia complex and traditional publishing sector. As such, it serves as an appetiser for the case studies presented in Chapter 6, 7, and 8. Together, these three chapters examine how traditional publishing firms, faced with the emergence of the multimedia complex, actually manage the required process of mediamorphosis. In Chapter 9, the empirical findings are compared and evaluated. Finally, Chapter 10 summarises the research and draws conclusions.

2

Evolutionary perspectives on economic development

2.1 Introduction

When the objective is to understand organisational change processes in a changing environment, one first needs to explore the mechanisms that drive the environment to change. Secondly, one needs to know how the changing environment affects firms operating within it. Theories that explicitly underscore the dynamic nature of a firm's behaviour in relation to its environment can be found in the growing range of evolutionary perspectives on economic development.[8] By adopting a more process-oriented approach, the evolutionary perspectives provide an alternative for the prevailing ideas stemming from neo-classical economics, which focus on static analyses. Some even argue that the evolutionary perspectives brought life back into the study of economics (Hodgson, 1993).

This chapter commences with a brief discussion of the roots of evolutionary thinking, which can be found in biology. Next, the focus turns to evolutionary perspectives on economic development. The two main concepts discussed in this respect are industrial life cycles and organisational innovation. Because both concepts are believed to be strongly interrelated, the aim of this chapter is to provide a picture of industrial and organisational co-evolution. The question that drives this aim is formulated as follows.

[8] Saviotti & Metcalfe (1991) provide a useful overview of evolutionary perspectives on economic and technological change, including a discussion of the major contributing traditions.

Question 2.1: What is the appropriate type of innovation for organisations operating in the various stages of economic development in general, and the stage of an emerging industrial complex in particular?

2.2 Roots of evolutionary thinking

The roots of evolutionary perspectives on economics can be found in biology. Evolutionary biology is concerned with the origin, development and extinction of living species. As such, evolutionary biology provides an explanation of life that is still causing heated debate. After all, the evolutionary interpretation runs opposite to the still widely accepted theological interpretation, which assumes that every form of life has been individually created by God (i.e. creationism). While evolutionary biologists assume that species are subject to change, creationists believe that once species are created, they remain constant forever. Nonetheless, the debate between biologist and creationists is not the subject here.[9] Instead, the foundations of evolutionary thinking are briefly reviewed.

2.2.1 Evolutionary biology

Within the field of evolutionary biology there are several, partially alternative explanations of the process of evolution.[10] Saltationism, for instance, assumes that new species originate through saltations, or sudden and discontinuous creation. Gradualism, another school, rejects the idea of discontinuity. Orthogenesis, a particular form of gradualism, assumes that species evolve along predetermined paths towards some final, perfect state. A third school, named transformational evolutionism or Lamarckism (Lamarck, 1809), rejects the idea of determinism present in orthogenesis and assumes that species strive for perfection through cumulative adaptive changes over time. The mechanism behind Lamarckism is soft inheritance. This means that a living being passes on genetic material which is not constant, but which can be modified by that living being. A fourth, and unmistakably the most well-known school is variational evolutionism or Darwinism (Darwin, 1859). Darwinism differs from Lamarckism with respect to two important assumptions. While Lamarckism assumes orderly, deliberate adaptation and soft

[9] Interestingly enough, the contrast between the evolutionary and theological interpretations of life led to much confusion and uncertainty in the heads of the first evolutionary biologists, who at the same time were devoted believers.

[10] A comprehensive overview of the field of evolutionary biology can be found in Mayr (1982; 1991).

inheritance, Darwinism assumes random variation and hard inheritance. Random variation means that variation takes place irrespective of a species' need. Hard inheritance means that genetic material is constant and cannot be modified by the living being or its environment. Hence, changes in an individual organism cannot be passed on to its descendants.

In Darwin's terms, the evolutionary process can be described as follows. An individual organism can be characterised by its genotype and phenotype. The genotype is the genetic constitution of an individual. An individual's genotype is the result of the recombination of its antecedents' genetic material.[11] The genotype is determined at the conception and remains constant over time. The genotype is the blueprint of the phenotype, which is the sum of an individual's observable characteristics. An individual's phenotype is the target of selection. Selection of a certain phenotype means that the genotype survives. Darwinism, therefore, can be summarised by the terms variation, selection, and retention. Genetic variation results in organisms that need to fit with their environment in order to survive the process of natural selection and reproduce themselves. Once reproduced, the organism's genetic material is retained. Further developments in the field of biology, especially molecular biology and the study of DNA, have led to a rejection of Lamarckism as explanation of biological evolution. Hence, Darwinism is the widely accepted school.

2.2.2 Social ecology

From evolutionary biology, to use an appropriate metaphor, it is known that the most interesting species originate on the verge of different environments, such as land and sea. In science, the same holds true. The interaction between ideas from different sciences has led to provoking new theories. In this manner, evolutionary biology has been both the result and source of the interaction between biology and other sciences. Darwin's ideas on natural selection for instance, were inspired by Malthus' work on the study of populations (Malthus, 1798). In a similar way, the interaction between evolutionary biology and economics has resulted in the economics of nature, or ecology.

Ecology is concerned with the dynamic relationship between an organism an its environment. Ecological ideas have served as inspiration to economists and the

[11] This implies that Darwinism does not explain genetic novelty. In general, the problem with evolutionary theory is that it does not explain the ultimate origin of life. Hence, one could argue that the explanation of the origin of life remains the exclusive domain of creationism.

subsequent conception of 'social ecology' (Emery & Trist, 1972). In contrast with the ideas of classical and neo-classical economists that organisations are closed and rational systems, social ecologists assume that organisations are open systems which expose bounded rationality. Just like in evolutionary biology, in social ecology the central argument is that there needs to be a fit between an organisation and its environment in order to survive. A well-known example in this respect is the 'population ecology' school (Hannan & Freeman, 1977), which focuses on populations or groups of organisations, rather than individual organisations. Population ecology assumes that organisational survival is completely determined by the environment. Hence, the ability of management to influence an organisation's fit with its environment and, accordingly, the survival process is very limited. This implies that Hannan & Freeman's ideas are in line with Darwinism. Most social ecologist, however, take a more Lamarckian point of view.[12] In contrast with biological species, both organisational species and individual organisations are assumed to be capable of transformational evolution in order to retain their fit. The Lamarckian point of view is also adopted in this study because it is believed that innovation is the main source of an organisation's ability to conduct transformational evolution. Below, evolutionary economic theories that focus on innovation are further elaborated on.

2.3 Evolutionary economics

One of the cornerstones of evolutionary economics is clearly the work of Schumpeter. Among the merits of his work are the consistent emphasis on innovation as the main source of dynamism in economic development, the sense of historical perspective, and the recognition of the importance of the links between organisational, managerial, social and technological innovation. The crucial distinction Schumpeter (1934) made is between economic life as a 'circular flow' *(Kreislauf)* and 'economic development' *(wirtschaftlichen Entwicklung)*. The picture of economic life as a circular flow refers to an economic system that evolves towards an equilibrium position in which change is merely continuous. Economic development, on the other hand, refers to an economic system undergoing discontinuous change and, hence, disturbance of equilibrium. This second kind of

[12] Astley (1985) provides a comparison of two ecological perspectives, namely population and community ecology, while Baum & Singh (1994) address ecological theories at four levels of analysis: intra-organisational, organisational, population, and community. An overview of the field of organisational ecology, including Lamarckian perspectives, is provided by Amburgey & Rao (1996).

change, which can be described as spontaneous, radical, and irreversible, is the primary driving force behind long-term economic development.[13] According to Schumpeter, economic development is defined as the process of carrying out 'new combinations' (*neue Kombinationen*) of the economic system's existing supplies of productive means. These new combinations, which in a competitive economy imply the 'creative destruction' of the old combinations, refer to "any 'doing things differently' in the realm of economic life" (Schumpeter, 1939: 84).

Since economic development refers to changes that arise from within the economic system itself, rather than forced upon it from outside, an important role in the process of carrying out new combinations is fulfilled by the entrepreneur. The term entrepreneur in this respect refers to a function rather than a profession. Entrepreneurship is an individual trait that some people express some of the time. As soon as the entrepreneur stops carrying out new combinations and settles down to run a business as other people run theirs; he or she becomes a manager instead. Hence, the entrepreneur matches economic development just as the manager matches the circular flow.

Akin to Schumpeter's distinction between circular flow and economic development is Nelson & Winter's (1982) continuum of situations ranging from the edge of full routine on the one hand, to the edge of major innovation on the other hand. The occurrence of similarities is clearly not surprising, given the fact that Nelson & Winter themselves state that the term neo-Schumpeterian would be as appropriate a designation for their entire approach as the term evolutionary. Still, there are important differences as well. The discussion below focuses on the differences that are most relevant to the subject of this study. These include levels of analysis, and types of change.

2.3.1 Levels of analysis

An important characteristic of any theory of economic behaviour is the level of analysis it focuses on. Examples of hierarchical orderings of different levels of analysis are widespread in the literature (cf. Boulding, 1956; Dill, 1958; Fahey & Narayanan, 1986; Perrow, 1986; Castrogiovanni, 1991). In essence, the distinctions

[13] Schumpeter's use of the term economic development should not be confused with the general use of this term in economics and related disciplines, which embraces various connotations. Schumpeter exclusively reserved the term economic development for change that is discontinuous, although in his texts the literal use of the term is sometimes inexact. In this study, the term economic development is used to point at a changing economic system in general.

made in these contributions run from the individual as the lowest possible level, to the general environment as the highest level of analysis. In between, a wide variety of levels is suggested. For reasons of simplicity, the classification used in this study includes four levels: individual, organisation, industry and overall economic system. In Table 2.1, the contributions of Schumpeter and Nelson & Winter are characterised according to this classification.

	Schumpeter	Nelson & Winter
Individual	Entrepreneur	Skills
Organisation	–	Routines
Industry	–	Variation and selection
Economic system	Economic development	–

Table 2.1 The contributions by Schumpeter and Nelson & Winter at different levels of analysis.

Although entrepreneurship as individual trait plays an important role in Schumpeter's ideas, his main interest is in the process of development by creative destruction on the level of the overall economic system. In contrast, Nelson & Winter's evolutionary theory focuses more on the firm and industry level of analysis. Their line of reasoning is bottom-up. First, they provide a discussion of individual behaviour using the term skills, followed by a discussion of organisational behaviour using the term routines. The discussion of the role of skills in individual behaviour is, however, only an initial step. The real concern is with the routinised behaviour of firms, as well as with the selection processes that, as a result of interfirm variation, occur at the level of the industry. Because this study investigates the process of organisational transformation in the context of an emerging industrial complex, the levels of analysis primarily focused on are the organisation and the industry. Hence, this study most closely resembles the choice made by Nelson & Winter, whose ideas on skills and routines are further addressed in Chapter 3.

2.3.2 *Types of change*

Both Schumpeter and Nelson & Winter make a distinction between two types of change. Schumpeter uses the terms circular flow and economic development to refer to incremental and radical change of the economic system respectively. Albeit

on a different level of analysis, Nelson & Winter further elaborate on this distinction by presenting a more nuanced continuum running from an organisation in full routine to an organisation carrying out a major innovation. These two parallel continua are depicted in Table 2.2.

	Radical change		**Incremental change**
Economic system	Economic development	⟷	Circular flow
Organisation	Major innovation	⟷	Full routine

Table 2.2 Continua of economic and organisational change.

According to the prevailing interpretation of the literature, Schumpeter is mainly concerned with the left-hand, radical end of both continua, while Nelson & Winter are mainly concerned with the right-hand, incremental end. This distinction runs parallel to the distinction by Cheah (1990) and Nooteboom (1993b) between Schumpeterian (S-type) and Austrian (A-type) entrepreneurship.[14] Table 2.3 provides a concise characterisation of the extreme positions on the continua of economic and organisational change.

	Schumpeter	**Nelson & Winter**
Innovation	– Radical	– Incremental
	– Routine destroying	– Routine enhancing
Change	– *Discontinuous*	– *Continuous*
	– Out of equilibrium	– Towards equilibrium
Entrepreneurship	– S-type	– A-type
	– Expansion of choice	– Suppression of choice
	– Creation of potential	– Realisation of potential

Table 2.3 Characterisation of extreme positions on the continua of economic and organisational change.

[14] Austrian entrepreneurship refers to the school of economics as represented by, among others, Menger, Hayek and Kirzner. An overview of the influence of the Austrian school in strategic management is provided by Jacobson (1992).

It would, however, be wrong to conclude that the two extremes are contradictory or mutually exclusive. In his later work, the Austrian school representative Kirzner (1985) for instance recognised the complementarity of S-type and A-type entrepreneurship. More specifically, real-life innovation and entrepreneurial processes are characterised by the 'dynamic alternation' (Volberda, 1998) between the two extremes over time. The intermediate forms these processes assume at a particular moment in time depend on the stage of industrial and technological development. After all, in each stage of development, there needs to be a fit between the organisation and its environment. Next, a closer look at the characteristics of the various stages of development is provided.

2.4 Stages of industrial and technological development

The management literature provides numerous attempts to classify different types of industries. A classic example is the one by Emery & Trist (1965), who identified four kinds of environments an organisation might confront: placid-randomised, placid-clustered, disturbed-reactive, and turbulent field. They described each as increasingly more complex than the previous one. Classifications like this can be very helpful in understanding the nature of a particular industry. Still, such classifications do often not provide insight in the dynamics of an industry's development process. Hence, a further examination of models that specifically focus on stages of industrial and technological development is needed.

2.4.1 Life cycle models

The focus on stages of economic development to a large extent goes back to the seminal ideas by Kuhn (1962) on the role of paradigms, and the ideas by Lakatos (1978) on the role of research programmes in the development of science.[15] Specifically with regard to the development of technology, this has resulted in discussions of regimes and natural trajectories (Nelson & Winter, 1977), paradigms and trajectories (Dosi, 1982), and distinctions between stages such as phyletic evolution and quantum speciation (Astley, 1985), and technological discontinuities and dominant designs (Tushman & Anderson, 1986).[16] Albeit under different

[15] For a thorough discussion of ideas related to structure of scientific development see Musgrave & Lakatos (1973).

[16] Other examples of contributions to the field of technology and innovation that more or less explicitly focus on stages of the development process are Utterback & Abernathy (1975) and Clark (1985).

labels, the following stages are often included in these technology life cycle models: discontinuity, era of ferment, dominant design, and era of incremental change (Anderson & Tushman, 1990).[17]

There are also models that focus on industry life cycles, rather than technological development. These industry life cycle models often make a distinction between the following stages: introduction, development and growth, shake out, maturity, and decline. The final stage of the industry life cycle (i.e. decline) may in some cases be substituted with rejuvenation, followed by a repetition of the entire cycle. Despite the subtle differences between technology and industry life cycle models, the main point captured from life cycle models in general is the notion that in different stages of the development process different organisational characteristics (e.g. innovation and entrepreneurial mode) are assumed to be appropriate. Examples of empirical studies that link such organisational characteristics to the various stages of industrial and technological development are briefly discussed below. Because the aim of this study is to understand the context of an emerging industrial complex, especially the first stages of the life cycle models are focused on.

Hamilton & Singh (1992) provide a useful discussion of the evolution of a firm's capabilities and its choices to externalise in relation to the development of the emerging technological field in which it operates. Based on an investigation of the US biotechnology industry, they argue that firms' dependence on external alliances decreases as the field evolves from a situation of technological discontinuity towards a situation of widespread commercial application. These findings are supported by Auster (1992) and Cainarca, Colombo & Mariotti (1992). The latter propose a more detailed technological life cycle model to explain why and to what extent firms have recourse to co-operative agreements. Analysis of cross-sectional data on agreements in the global information technology industry provides empirical evidence supporting the argument that both the propensity and the nature of agreements vary in the different stages of the technological life cycle. Especially in the first stages, when both the technological opportunities and uncertainty are high, co-operative agreements are abundant.

[17] To be precise, Anderson & Tushman present their model as consisting of two stages (era of ferment and era of incremental change) and two 'watershed events' (discontinuity and dominant design) that mark the transition between the two stages. The era of incremental change can be followed either by a new discontinuity, or a stage of decline.

In addition, Hariharan & Prahalad (1994) make a distinction between three stages of industry evolution and link this to the nature of competition and the strategic imperatives for success in each stage. Based on case studies of the videocassette recorder (VCR) and high definition television (HDTV) industry, it is argued that in the first stage the industry is characterised by competition for product concepts. The uncertainty regarding the product concept that will be preferred makes it difficult for firms to commit themselves by allocating resources (i.e. investing) to a specific concept. Consequently, the first strategic imperative is to create flexibility, and to learn about customer preferences and the technologies needed to meet these. The second strategic imperative is to accumulate technological learning that is broad and transferable to a variety of specific product standards. Put differently, in the first stage a firm has to build broad competencies in the family of technologies that are likely to be of importance in the industry. In addition, a firm needs to build a strategic infrastructure with which to commercialise its products later on.

	Stage 1	**Stage 2**	**Stage 3**	**Stage 4**
Label	Discontinuity	Ferment	Dominant design	Incremental change
Main characteristic	Introduction	Development and growth	Shake out	Maturity
Basis of competition	Innovation	Design	Market share	Profits, market share
Nature of commitment	Low, exploration	Moderate, selective	High, focused	High, focused
Interfirm co-operation	Moderate	High	Moderate	Low
Innovation mode	Radical	Radical	Incremental	Incremental
Innovation focus	Product	Product	Process	Process

Table 2.4 Characterisation of stages of industry evolution.

Summing up, the different life cycle studies stress the abundance of opportunities, the lack of standardisation, and the high level of uncertainty in the first stages of industrial and technological development. Accordingly, competition is on differentiation, rather than on costs (cf. Porter, 1980). Furthermore, in terms of the continua of economic and organisational change presented in Table 2.3, it may be concluded that radical innovation and S-type entrepreneurship are most appropriate in the first stages of the industry and technology life cycle. Finally, some of the studies point at the need to establish interorganisational relationships. A characterisation of the various stages is summarised in Table 2.4. The distinction in stages used in this table builds on the above mentioned technology life cycle model by Anderson & Tushman (1990).

2.4.2 The emergence of an industrial complex

So far, the investigation of stages of industrial and technological development has primarily been focused on single industries or technologies. However, the question to be answered in this study refers to a related, but somewhat different situation. The aim is to understand organisational transformation in a context in which different technologies converge into hybrid forms. The consequence of this phenomenon is that previously single and mature industries are merging into a larger industrial complex. Accordingly, the focus in this study is not on the development of a single industry or technology, but on the development of a wider industrial complex based on a number of technologies. In particular, the first stage, or the emergence of such an industrial complex is focused on. This does not mean that the above ideas do no longer apply. On the contrary, the emergence of an industrial complex is likely to have features similar to the first development stages of a single industry or technology. Still, an emerging industrial complex also has dissimilar features. In order to assess these features, first a number of descriptions is provided.

> "Organisational communities are functionally integrated systems of interacting populations; they are emergent entities that, over time, gain a degree of autonomy from their environments" (Astley, 1985: 234).

> "In a business ecosystem, companies co-evolve capabilities around a new innovation: they work co-operatively and competitively to support new products, satisfy customer needs, and eventually incorporate the next round of innovations" (Moore, 1993: 76).

> "An emerging industrial system consists of key entrepreneurs and firms that govern, integrate, and perform all of the functions required to transform a technological innovation into a commercially viable line of products and services delivered to customers" (Van de Ven, 1993: 36).

Besides these qualitative illustrations, there are also ways to characterise an industrial complex in quantitative terms. Examples of such quantitative methods are the assessment of inter-industry flows of innovation or R&D spending (Scherer, 1982; Duysters, 1995). Scherer, for instance, traced a large number of industrial R&D expenditures from their industries of origin to the industries in which the use of resulting products and processes was anticipated. The resulting technology flow matrix shows the extent to which the various industries are intertwined.

Having determined the basic features of an emerging industrial complex, the next step is to link these features to the organisational features that are assumed to lead to a strong fit. Even to a higher degree than in the first stage of the development of a single industry, in an emerging industrial complex the trade-off between intra and interorganisational co-ordination of activities becomes relevant. Because the traditional industry structures are subject to change, so are the positions of individual firms. Hence, firms have to reconsider their choices regarding the activities to be co-ordinated internally and the activities to be co-ordinated via actors in their environment.

Pennings & Harianto (1992) have addressed this choice by providing a large-scale empirical investigation of the adoption of videotex technology by firms operating in the US banking industry. This industry is characterised by the convergence of several technologies, among which telecommunication and computer technology. A sample of commercial banks was used to examine each firm's past, broken down in technological experiences and interfirm networking. The purpose of this analysis was to test a number of propositions regarding the conditions under which banks will be likely to embark on videotex. The results reveal that interfirm networking is conducive to the implementation of videotex, while technological experiences do not have a significant effect.

The findings by Pennings & Harianto are supported by other research. For instance, the choices a firm has made regarding its external relationships in the past may turn into critical constraining or facilitating factors. Miner, Amburgey & Stearns (1990), who use the terms buffering and transformational shields, demonstrate that interorganisational linkages in the Finnish newspaper industry reduced organisational failure, increased organisational transformation, and altered the chances for failure after transformation.

Another important characteristic of an industrial complex is reflected by the assumption that the innovation challenge is significantly different compared to the context of a relatively clear defined industry that is based on a single technology. Among the terms used to characterise the particular features of innovations in an industrial complex are symbiotically related innovations (Astley, 1985), systemic innovations (Teece, 1986), and innovative systems (Van Tulder & Junne, 1988). At the same time, however, the theoretical understanding of the innovation process in an emerging industrial complex is far less developed than the innovation process in a single industry. Hence, the next section delves into this issue in further detail.

2.5 Organisational innovation

An important and widely researched organisational characteristic is innovation. Many consider innovation to be the primary driving force of progress and prosperity, both at the level of the individual firm and the economy in general. This conviction is for instance reflected in the following statement by Tushman & Nadler (1986: 74).

> "In today's business environment, there is no executive task more vital and demanding than the sustained management of innovation and change."

Due to its strong appeal, the innovation concept has resulted in a huge amount of widely diverging definitions, conceptual models, and empirical findings. This divergence has worried authors like for instance Downs & Mohr (1976: 700), who provide a somewhat cynical interpretation of the state of affairs.

> "One should certainly expect some variation of results in social science research, but the record in the field of innovation is beyond interpretation."

This critique is fed by the perceived lack of accumulation, which is considered to be the primary criterion for the progress of any scientific endeavour. The straightforward solution Downs & Mohr provide to this problem lies in the rejection of the notion that a unitary theory of innovation exists. Instead, one should acknowledge the existence of different types of innovations that can best be explained by a number of correspondingly distinct theories. In response, Damanpour (1991) has provided a meta-analysis of the effects of frequently used determinants and moderators on organisational innovation. His results suggest that the relationships between the determinants and organisational innovation are stable, thereby casting doubt on the previous assertions of their instability.

Accordingly, Damanpour argues that the need for several sub-theories, rather than a unitary theory of innovation is not as strong as suggested by Downs & Mohr.

Without aiming to trivialise this convoluted debate on theoretical unitarity, the arguments pro and contra statistical variation or instability are not considered to be of primary importance to this study. In this study, the belief is held that the innovation concept is of such a complex nature that the large-scale analysis of statistical correlation between abstract variables is considered to be insufficient to provide a comprehensive understanding of it, especially when viewed from a managerial perspective. Instead, this study aims to provide a contribution to one of the many possible sub-theories of innovation.[18] The focus is explicitly on the innovation challenge in the context of an emerging industrial complex. However, before elaborating on the innovation challenge that specifically matches this context, it is useful to first provide an overview of a number of ways to classify the innovation concept in general.[19] This in order to get a better understanding of the full picture.[20] So, first of all a basic definition is provided, which is further refined according to an additional number of dimensions of the innovation concept frequently used in the literature.[21] Before going into these dimensions in further detail, it is stressed that they are not necessarily of a similar order, nor are they mutually unrelated.

[18] As such, this choice is in line with the suggestion by Downs & Mohr, although the underlying reason of statistical instability is not used for adopting it. Without going into the methodological details, the real reason is related to Mohr's (1982) distinction between variance and process theories. Whereas variance theories focus on causal relationships between inputs (i.e. independent variables) and outcomes (i.e. dependent variables), process theories focus on the sequence of events that mark the development of the research object. In this study the process approach is adopted.

[19] The construction of typologies, taxonomies, and other categorisations can be seen as an endeavour in itself. It is not the aim of this study to make a contribution to this field as such, but rather to use the existing classifications as a point of departure for positioning the approach adopted in this study. For recent discussions of the theoretical aspects of classification systems see for instance Rich (1992), Sanchez (1993), and Doty & Glick (1994).

[20] Examples of previous attempts to review the research on innovation are abundant. Widely cited contributions are that by Zaltman, Duncan & Holbek (1973) and Rogers (1983).

[21] In his meta-analysis of innovation studies Damanpour (1991) provides a rather comprehensive overview of determinants and moderators of organisational innovation.

2.5.1 Basic Definition

Schumpeter is generally considered as the protagonist of bringing dynamics into economic theory. Hence, his definition of innovation as "the carrying out of new combinations", or "the different employment of the economic system's existing supplies of productive means" (Schumpeter, 1934: 68) is used as starting point for the discussion in this section.[22] Questions that logically arise when looking at this definition are whether innovation is a process or the outcome of a process, and what is meant with the term 'new'. When taking Schumpeter's definitions literally, it could be either the process of combining that is considered to be new, or the combination that results from that process.[23] Hence, in order to shed light on the innovation concept, first the issue of an innovation's novelty is discussed, followed by the issue of process versus outcome.

Novelty, as an innovation's primary characteristic, has created many debates among innovation researchers. Schumpeter (1934) himself used the 'economic system' as point of reference, but it is not quit clear what level of aggregation he referred to. More specific definitions of innovation in relation to its context are provided by Teece (1986), who uses the criterion of first commercialisation in the market, and Baden-Fuller (1994), who uses the criterion of altered industry rules. In contrast to these externally oriented definitions, there also is a wide range of authors who define innovation in relation to the innovating unit. An example of this is the definition of innovation by Zaltman, Duncan & Holbek (1973: 10) as "any idea, practice, or material artefact perceived to be new by the relevant unit of adoption". Similar contributions are that by Downs & Mohr (1976), Rogers (1983), and Van de Ven (1986). The latter explains his point as follows: "as long as the idea is perceived as new to the people involved, it is an innovation, even though it may appear to others to be an imitation of something that exists elsewhere" (Van de Ven, 1986: 592). Tushman & Nadler (1986: 75) give a further specification by providing the following definition: "innovation is the creation of any product, service, or process which is new to a business unit". Finally, and as always, there are people who want to have it both ways by relating their definition both to the innovating unit and its environment. Examples of this are Knight (1976) and Biemans (1989: 26), the latter who defines innovation as "any idea, practice, or

[22] Only in his later work, Schumpeter (1939, 1942) explicitly used the term innovation. The initial term used by Schumpeter (1934) was development.

[23] Confusion may be caused by the fact that the outcome of the innovation process can be a process in itself, as is discussed further on in this chapter.

material artefact that is perceived to be new by the early units of adoption within the relevant environment".

Obviously, the debate on novelty is to a large extent rooted in the differences in disciplinary backgrounds of the various authors. Organisation theorists are more likely to adopt a definition of innovation in relation to the organisation, while industrial economists are more likely to use a definition that refers to the industrial context. The adopted perspective simply depends on the research objective. Hence, it would be wrong to label either perspective as good or bad. Instead, a researcher should make its own well-considered choice. Because in this study the focus is on organisational transformation, novelty is primarily related to the level of the organisation.

Related to the debate on an innovation's novelty is the distinction one can make between innovation as a process, or as the outcome of that process. Again, this is not a matter of either or, but of professional interest. Schumpeter's definition as mentioned above seems to touch upon innovation both as process (i.e. the act of combining) and as outcome (i.e. the ensuing combination). Most other definitions, however, only refer to the outcome of the innovation process. One of the reasons for this is that, from an analytical point of view, the outcome of the innovation process is much more tangible and therefore easier to comprehend than the innovation process itself. Still, in this study the innovation concept is primarily approached from a process perspective. The process perspective best matches the focus on organisational transformation.

The underlying differences of the above definitions can be summarised according to a distinction made by Zaltman, Duncan & Holbek (1973). By providing three meanings of innovation, these authors cover both the dimensions of relative novelty, and process versus outcome. The three meanings of innovation are described as follows: the creative process of combining existing concepts to produce a new configuration, the process of adopting an existing innovation, and the innovation itself. In this study the choice is made to view innovation first of all in line with the first meaning, i.e. as a creative process of combining. This choice implies that merely adopting an existing innovation is not considered a true innovation process, unless it is followed by an additional act of combining. The focus on the innovation process does of course not imply that the combination as eventual outcome of this process is completely disregarded. After all, what is a race without a finish? The dimension of the outcome's relative novelty is addressed by adopting the point of view that the new combination that results from the innovation process at least has to be new to the organisational unit in which the process takes place. In first instance, this interpretation holds irrespective of the

new combination's impact on the organisation's relevant environment, whether conceived of as a market, industry, or economic system. Summing up, this first section results in a basic definition of the way in which innovation is used in this study. This definition is presented below.

> *Definition 2.1: Innovation is a managerial process of using an economic system's existing concepts to carry out combinations that are at least new to the organisational unit in which the process takes place.*

2.5.2 Levels of analysis

Related to the discussion of levels of analysis at which general economic behaviour can be viewed (cf. section 2.3.1), innovation can also be studied at many different levels of analysis. Normann (1971) in this respect makes a rather crude distinction between three levels: product, organisation, and environment. Another, somewhat more refined distinction is provided by Harianto (1989). He uses four levels: organisation, industry or market, inter-industry or community, and macro-economy or technology. As hinted at in the previous section, in this study the choice is made to perceive the innovation process primarily at the organisational level of analysis.[24] At the same time, Harianto's (1989) point is acknowledged that a comprehensive understanding of the innovation process at the level of the organisation requires the incorporation of elements of higher levels of analysis as well. Firm-level innovation cannot be treated in isolation of aspects such as the technological state of the art, the competitive forces of the industry, or governmental regulation. Without violating the choice of the organisation as the primary level of analysis, the focus in this study is also on what Harianto calls the inter-industry level of analysis. The obvious reason for this is that the context in which the innovation concept is studied in this study, namely the emergence of an industrial complex, is directly related to this level of analysis.

Summing up, the above discussion leads to a refinement of the innovation concept as defined in the previous section. The general term 'innovation' is replaced by 'organisational innovation', and the more general phrase 'the economic system's concepts' is replaced by 'the industrial complex' concepts'.

[24] Clearly, this specification is not conclusive. Organisations are no black boxes and can themselves be broken down into several sub-levels such as divisions, business units, departments, and teams. In this chapter, however, the organisation design issue is left unspecified. Instead, this issue is extensively addressed in Chapter 4.

Definition 2.2: Organisational innovation in an emerging industrial complex is a managerial process of using the industrial complex' existing concepts to carry out combinations that are at least new to the organisational unit in which the process takes place.

2.5.3 *Types of innovation*

The dimension that refers to the different types of innovation often causes confusion because different people tend to mean different things. Here, this dimension refers to the different types of outcomes the innovation process leads to and largely neglects the process itself. A widely used distinction is that between technological and administrative innovations (Daft, 1978). Another important distinction is between process and product innovation (Utterback & Abernathy, 1975). Still, the most comprehensive distinction is the one made by Schumpeter (1934), who discerned five types of innovations: new products, processes, markets, sources of supply, and organisational forms.[25] In this study, the choice is made to define the outcome of the innovation process first of all as a new organisational combination or configuration. Ultimately, however, new product-market combinations (PMCs) are seen as the outcome of the organisational innovation process.[26] The reason for this is first of all pragmatic. From an empirical research point of view, PMCs are relatively easy to identify as the outcome of a firm's innovation process. Furthermore, when studying innovation from a competitive point of view, PMCs seem a logical choice. In combination with the previous definitions, this results in the following refinement of the innovation concept.

Definition 2.3: Organisational innovation in an emerging industrial complex is a managerial process of using the industrial complex' existing concepts to carry out combinations that are at least new to the organisational unit in which the process takes place, and which ultimately spawn new product-market combinations.

[25] The fifth example of a new combination Schumpeter provides is rather ambiguous. In first instance he refers to 'the carrying out of the new organisation of any industry' (1934: 66), like the creation or breaking up of a monopoly position. In his later work, however, he replaces this notation with 'the setting up of new business organizations' (1939: 84).

[26] The term product is used purely for reasons of convenience; it refers to services as well.

2.5.4 Scope of innovation

The final dimension on which the innovation concept is discussed in this chapter is its scope. With this dimension the impact of the innovation at the relevant level of analysis is meant. Distinctions provided in the contemporary literature are between ultimate and instrumental (Grossman, 1970), variation and reorientation (Normann, 1971), and improvement, basic, and stalemate (Mensch, 1979). The value of these distinctions lies in their recognition of the differences in the consequences of innovations, for instance regarding the nature of competition and the required organisational capabilities. The above distinctions to a large extent run parallel to the continua presented in Table 2.3, namely incremental to radical change, and full routine to major innovation.

	Core concepts are reinforced	**Core concepts are overturned**
Linkages between core concepts and complements are unchanged	Incremental	Modular
Linkages between core concepts and complements are changed	Architectural	Radical

Table 2.5 Typology of an innovation's impact (Henderson & Clark, 1990: 12).

Although the distinction between radical and incremental innovation has produced important insights, there are also authors that contend that it is fundamentally incomplete. Among these are Henderson & Clark (1990), who make a distinction between four types of product innovations, namely incremental, modular, architectural, and radical.[27] This typology, which is represented in Table 2.5, is constructed according to the impact the innovation has on core concepts and the linkages between core concepts and complements. The term 'core concepts' in this respect refers to the knowledge the organisation has about the various components

[27] This distinction is partly based on the typology by Abernathy & Clark (1985), who split the impact of innovation according to technology and market. The result is a matrix consisting of four types of innovations, namely architectural, niche creation, regular, and revolutionary. However, this so-called 'transilience map', is considered to be less appropriate.

that constitute the product it develops. Linkages between core concepts and complements, on the other hand, refer to the knowledge the organisation has about the way in which the various components of the product are linked together.

The typology in Table 2.5 can easily be related to the discussion of the characteristics of an emerging industrial complex in the previous section. Among the terms used to characterise the innovation needed in an emerging industrial complex were symbiotically related innovations (Astley, 1985), systemic innovations (Teece, 1986), and innovative systems (Van Tulder & Junne, 1988). From Table 2.5, the type of innovation that most closely resembles this characterisation is the architectural innovation. An architectural innovation is an innovation that has a more significant impact on the relationships between the constituting components, than on the technologies of the components themselves. This very well matches the context of an emerging industrial complex, in which the opportunities for combining the complex' existing concepts may be more appealing than opportunities to change the concepts themselves. The relevance of the architectural type of innovation to this study is illustrated by the following quote.

> "The essence of an architectural innovation is the reconfiguration of an established system to link together existing components in a new way" (Henderson & Clark, 1990: 12).

Although Henderson & Clark use their typology with regard to product innovation, it seems to be applicable to organisational innovation as well. Firms can improve or change different parts or functions within their organisation, but they also can change the way in which the different parts or functions are related. Hence, in this study the belief is held that the process of organisational transformation in an emerging industrial complex should to a large extent be aimed at the carrying out of architectural innovations. Accordingly, the definition of the innovation concept is refined one more time.

> *Definition 2.4: Organisational innovation in an emerging industrial complex is a managerial process of using the industrial complex' existing concepts to carry out reconfigurations (i.e. architectural innovations) that are at least new to the organisational unit in which the process takes place, and which ultimately spawn new product-market combinations.*

2.6 Summary

This chapter started with a question regarding the appropriate type of innovation for organisations operating in the various stages of economic and technological development in general, and the stage of an emerging industrial complex in particular. Anchored in a review of evolutionary perspectives of economic development, the interrelatedness between two important concepts was stressed, namely industrial life cycles and organisational innovation. Since the focus in this study is on the organisational transformation of traditional firms in the context of an emerging industrial complex, especially the organisational characteristics that are relevant to this change were emphasised. With the emergence of an industrial complex, the context of a previously single and mature industry does no longer apply. The characteristics of the change from the so-called mature single industry (MSI) to the emerging industrial complex is summarised in Table 2.6.

	Stage 1	**Stage 2**
Label	MSI	EIC
Main characteristic	Maturity	Convergence
Basis of competition	Profits, market share	Knowledge
Nature of commitment	High, focused	Moderate, selective
Interfirm co-operation	Low	High
Innovation mode	Incremental	Architectural
Innovation focus	Process	Organisational configuration

Table 2.6 Characterisation of the change from a mature single industry (MSI) to an emerging industrial complex (EIC).

The characterisation of the mature single industry matches the characterisation of stage 4 in Table 2.4, while the characterisation of the emerging industrial complex is an amended characterisation of stage 1 and 2 in Table 2.4.

Although this chapter built on evolutionary ideas, it did not cover the full range of evolutionary issues. It focused especially on the interplay between industrial and organisational development. In terms of the triad variation, selection, and retention, the focus was primarily on the variation issue. Both the content and process of this

interplay were elaborated on, which resulted in a contextual or external view on the issue of organisational innovation. From the theories discussed in this chapter it can be deducted that, in general, organisational innovation is a process which should be aimed at establishing industrial and organisational synchronisation, or co-evolution. The task of a firm's management is to establish a match between industrial development and organisational development. With particular reference to the context of an emerging industrial complex, it was stated that a firm needs to focus at the carrying out of architectural innovations. The reason for this is that the specific characteristics of an emerging industrial complex ask for a different perspective on the organisational characteristics that are considered to be appropriate, when compared to the context of a single industry. The objective of firms is not so much to change the various technologies of the previously mature and single industries themselves, but to combine the various technologies into an organisational innovation that is likely to spawn new product-market combinations. Nonetheless, what the architectural innovation challenge actually means for the internal aspects of a firm was largely left unspecified. The next chapter further extends the above ideas by focusing on organisational innovation from an internal, knowledge-based perspective.

3

Knowledge-based perspectives on organisational innovation

3.1 Introduction

The industrial and organisational co-evolution addressed in the previous chapter was primarily analysed from an outside-in perspective. Although the implications of the changing environment for organisational innovation were explicated, the organisation itself was still primarily treated as a black box. In order to bring balance to the analysis, this chapter provides a picture of the flip side of the coin of co-evolution. It illuminates the internal aspects of the requirements for architectural innovation evoked by the change from a mature single industry to an emerging industrial complex. The focal contribution to the internal analysis of carrying out architectural innovation is made by the knowledge-based view of the firm (KBV). During the last decade, knowledge-based theories have attracted strong attention in the field of management in general and strategic management in particular.[28] Congresses on knowledge management are omnipresent, and the penetration of knowledge management in business is growing fast.[29] In addition, knowledge-based

[28] An indication of this trend is the 1996 winter special issue of the Strategic Management Journal named 'Knowledge and the Firm' (Spender & Grant, 1996).

[29] This has resulted in (more or less ostentatious) job titles such as 'Chief Knowledge Officer', 'Group Director of Learning', 'Corporate Manager of Intellectual Properties', 'Global Director of Intellectual Asset Management', or simply 'Head of Knowledge'.

thinking is becoming increasingly present in economics and politics.[30] But most important, the knowledge concept is chosen because knowledge is a key economic factor in the emerging multimedia complex in general and the traditional publishing sector in particular. Elaborating on the definition of organisational innovation in the previous chapter, the crucial question to be answered in this chapter reads as follows.

> *Question 3.1: How can a firm manage its organisational knowledge so that it enables the effectuation of organisational innovation in general, and architectural innovation in particular?*

By answering the above question, this chapter illustrates that evolutionary economics and the knowledge-based view are complementary perspectives. In order to understand the background of the organisational knowledge concept, first of all an overview is provided of important contributions that constitute the roots of knowledge-based thinking. This overview is subsequently used to provide a knowledge perspective on managing architectural innovation.

3.2 Roots of knowledge-based thinking

The roots of knowledge-based thinking in management are quite diverse, including philosophy, economics, sociology, and psychology. Without attempting to seriously participate in either one of these disciplinary discussions of knowledge, the aim of this study is to borrow elements from theories of knowledge that can help to enhance the understanding of the link between the concepts of organisational knowledge and organisational innovation. Hence, the scope of the chapter is limited to contributions explicitly made to the field of (strategic) management. Tracing back the various roots to their discipline of origin would be a task too extensive. Furthermore, the fact that such reviews already exist would make it a superfluous attempt. Nonetheless, it is necessary to explain at least the basic elements of the adopted knowledge theory.

The concept of knowledge has intrigued some of the world's greatest thinkers, including Aristotle, Plato, Kant, Hegel, Heidegger, and Wittgenstein.

[30] The Panorama of EU industry for the year 1996-97 for instance contained a special feature called 'Immaterial investments as an innovative factor'. In the Netherlands several ministers have initiated knowledge debates on economics and education, and in 1996 the central statistical office (CBS) published the first annual report named 'Knowledge and the economy'.

Epistemology is the name of the field that addresses the most fundamental question, namely 'What is knowledge?'. This question will not be addressed here, for even the field of epistemology lacks a clear consensus on this matter. Hence, despite its wide use in relation to the post-industrial information society, knowledge is not a homogeneous or clearly defined concept. Here, the choice is simply made for a particular approach to knowledge which fits within the theory of organisational knowledge, or 'corporate epistemology' (Von Krogh, Roos & Slocum, 1994).

An important contrast among epistemologists is related to the division between rationalism and empiricism. Rationalism, which is most compendiously represented by Descartes' partition of the body and mind, assumes that knowledge can be derived at through deduction from axioms. Empiricism, on the other hand, assumes that knowledge can be derived at through induction from experience. Another important contrast can be found in the division between realism and subjectivism. In contrast to the philosophical perspective of meta-physical realism, Kant for instance is an advocate of the idea that we construct even our most basic perceptions in terms of categories that are part of us, not of what we perceive. This implies that true objectiveness is an illusion.

The notion of the subjective construction of knowledge, which is based on particular experiences in particular contexts, can be used as explanation of the idiosyncrasy and variation among individual human beings. Moreover, the notion of subjectivism can also be extended to the level of analysis relevant to this study, namely that of organisations. The main function of an organisation is to serve as focusing device which provides the categories by which members of the organisation are to perceive, interpret, evaluate, and subsequently act upon the particular context in which they operate (Nooteboom, 1993a). So, subjectivity is replaced by intersubjectivity, and individual construction is replaced by social construction (Berger & Luckmann, 1966). The explanation of variation in the perspective of subjectivism corresponds with the explanation of variation in the perspective of evolutionary biology. Accordingly, the epistemological notion of socially constructed knowledge may constitute a theoretically sound basis for linking the evolutionary perspectives discussed in the previous chapter, with the knowledge-based perspectives discussed in this chapter. Before turning to management theory explicitly aimed at organisational knowledge, the underlying theory of the firm is discussed.

3.2.1 Resource-based view of the firm

Theories of the firm try to answer fundamental questions, like why firms exist (cf. Coase, 1937) or why firms differ (cf. Nelson, 1991). The answers to these kinds of questions have resulted in various models of the nature of firms (Williamson & Winter, 1991).[31] A well-known example of an economic theory of the firm is for instance transaction cost economics (TCE), which is rooted in the work by Coase (1937), and which is further developed by Williamson (1975; 1985). Another important economic theory of the firm is agency theory, which is represented by authors such as Jensen & Mecklin (1976) and Fama (1980), and which has its antecedents in the early literature on the separation of ownership and control (cf. Smith, 1776).

The contribution to the stream of economic theories of the firm most relevant to this study is the resource-based view of the firm (RBV).[32] The resource-based view of the firm is a stream of literature that perceives a firm's internal resources as the primary source of its competitive advantage. This perspective claims that, at least in the long run, a firm should focus on actively building a unique bundle of resources, rather than passively reacting to the external conditions it is facing. Below, a discussion is presented of a number of important aspects of the resource-based view in order to illuminate the characteristics of this perspective.[33]

Resources and growth

One of the cornerstones of the resource-based view, although only recently recognised as such, is the work by Penrose. In contrast to abstract theories of price and production, Penrose (1959: 24) saw the firm as "... a collection of productive resources the disposal of which between different uses and over time is determined

[31] For an overview of economic theories of the firm see Douma & Schreuder (1991).

[32] Although for reasons of simplicity a general label is used, there really is no such thing as a clearly defined and homogeneous set of resource-based theories. The explicit focus on resources, competencies, and capabilities has been relatively widespread, if not to say a fad, during the last years. Various authors, in their quest for prominence, have promoted all sorts of terms and concepts that in many cases contain trifling novelty or added value. Hence, the current state of the art is rather fragmented and lacks a coherent, consistent accepted model. The reason why the term resource-based theories is chosen as heading is that it was the first term generally practised.

[33] For more detailed reviews of the resource-based view consult Conner (1991), Mahoney & Pandian (1992), and Foss (1993b)

by administrative decision." The particular characteristic of this contribution is that its emphasis is on the internal, inherited resources of a firm, and a firm's internal growth processes (i.e. without merger or acquisition). The main questions Penrose put forward refer to the principles that govern the growth of firms, and the speed and duration of this growth. It is the 'area of co-ordination', or the 'area of authoritative communication' which defines the boundaries of the firm. A firm's ability to maintain sufficient administrative co-ordination sets the limit to its size.

Resources, the central concept in Penrose's theory, are divided into two kinds: physical and human. More important is the notion that it is not a resource itself that is the input in the production process, but rather the service that the resource can render. A resource consists of a bundle of potential services and can be defined independently of its use. In contrast, a service cannot be defined in this manner. The services yielded by a resource are a function of the way in which the resource is used. It is largely in this distinction that the source of the uniqueness of an individual firm can be found.

Related to the distinction between resources and services is Penrose's discussion of the direction of a firm's innovation process. It is argued that this direction is not haphazard but closely related to the nature of a firm's existing resources, and to the type and range of productive services they can render. This point, which was eagerly adopted and elaborated by Nelson & Winter (1982), is in line with the incremental perspective adhered to by the Austrian school of economics discussed in Chapter 2. In this study, however, it is believed that the primary focus Penrose places on the role of a firm's internal resources in the innovation process underestimates the potential of exploiting external resources, and thereby the opportunity to not only create incremental innovations, but also architectural innovations. The importance of external resources for innovation and growth has for instance been pointed at by Mattsson (1986) and Håkansson & Snehota (1989).[34]

Resources and competitive advantage

Besides Nelson & Winter (1982), Wernerfelt (1984) was one of the first to explicitly pick up the ideas put forward by Penrose and to breath new live into them. Wernerfelt introduced the term 'resource position' and pursued the objective of developing simple economic tools for the analysis of a firm's resources position, in

[34] These authors are related to the so-called IMP group, a primarily Swedish effort to study interorganisational relationships and networks. An overview of the work of the IMP group can be found in Axelsson & Easton (1992).

particular the relationship between resources and profitability. An example is the discussion of 'resource position barriers' as indicators of potential for high returns. Furthermore, and in analogy to the product portfolio concept by Henderson (1979), Wernerfelt came up with the term 'resource portfolio'. A firm has to seek a balance between exploitation of existing resources and the development of new ones. Rumelt (1984) also addressed this point when defining a firm's competitive position as a bundle of unique resources and relationships, and stating that the task of general management is to "... adjust and renew these resources and relationships as time, competition, and change erode their value." Rumelt (1984: 558).

Most of the attention by Wernerfelt and Rumelt is, however, not paid to the process of creating, renewing and adapting resources, but rather to the conditions under which a resource is likely to spawn a competitive advantage.[35] The emphasis on 'isolating mechanisms' (Rumelt, 1984), such as the above resource position barriers, and 'uncertain imitability' (Lippman & Rumelt, 1982) in this respect is similar to the use of for instance 'entry barriers' (Bain, 1956) and 'mobility barriers' (Caves & Porter, 1977) in the field of industrial organisation.[36] Still, the resource-based view initially was a reaction to the so-called structure-conduct-performance (SCP), or Mason-Bain paradigm (Mason, 1957; Bain, 1968) within the field of industrial organisation. After all, the SCP paradigm views external forces as the primary source of a firm's competitive advantage, which is for instance expressed by Porter's (1980) well-known model on industry forces. Hence, although Penrose's initial argument was to take an inside-out perspective and to focus on the nature of a firm's internal resources, the development of the resource-based view to a large extent took place along a disguised outside-in perspective. Resource conditions and industry factors became each other's images in the mirror of industrial organisation.

Summing up, the resource-based view of the firm should be interpreted as an attempt to explain and predict why some firms are able to establish positions of sustainable competitive advantage and, in doing so, earn superior rents. Hence, the resource-based view is a static theory about the 'why', rather than a dynamic theory about the 'how' of sustainable competitive advantage. Still, the resource-based view

[35] Other important contributions to the resource-based view that focus on competitive advantage are Dierickx & Cool (1989), Barney (1991), Peteraf (1993), and Amit & Schoemaker (1993).

[36] Mahoney & Pandian (1992) provide an extensive list of examples of isolating mechanism, which are derived from the resource-based theories, as well as strategy research, organisational economics, and industrial organisation.

proved to hold strong potential for a more dynamic approach to a firm's resources. This dynamic approach is addressed below.

3.2.2 Dynamic capabilities

Over time, the resource-based view became influenced by theories of evolutionary economics and strategic management. The focus shifted away from static resources, towards concepts such as 'core competencies' (Prahalad & Hamel, 1990) and 'dynamic capabilities' (Teece, Pisano & Shuen, 1997). Since the work by Nelson & Winter (1982) formed an important stimulus for making the resource-based view more dynamic, a closer look at their work is required.

Skills, routines and path dependencies

As explained in Chapter 2, Nelson & Winter's line of reasoning is bottom-up. First, they provide a discussion of individual behaviour using the term skills, followed by a discussion of organisational behaviour using the term routines. The understanding of the role that routinisation plays in organisational behaviour is enhanced by first considering the role that skills play in individual behaviour. Nelson & Winter (1982: 73) define a skill as:

> "... a capability for a smooth sequence of coordinated behavior that is ordinarily effective relative to its objectives, given the context in which it normally occurs."

Skills are characterised by the fact that they are programmatic, the underlying knowledge is largely tacit, and their exercise involves the making of choices. The last point is very important. In contrast to orthodox treatment of economic behaviour, in which a clear distinction is made between objectives, capabilities and choice, Nelson & Winter emphasise that capabilities and choice are strongly interrelated. This implies that the sort of choice that takes place in the process of exercising a skill is choice without deliberation.

> "Skills are deep channels in which behavior normally runs smoothly and effectively. It is far from the case that behavior must take a unique course, but the reconciliation of smoothness and effectiveness with the availability of numerous options is accomplished by making option selection largely automatic. Skillful acts of selection from the available options are constituents of the main skill itself: they are 'choices' embedded in a capability." (Nelson & Winter, 1982: 84).

The strong link between capabilities and choice has further implications for situations in which choice is deliberate.

> "The modification of skilled performance by deliberate choice greatly expands the potential diversity, flexibility, and adaptability of behavior – but always at an opportunity cost in terms of foregone uses of conscious attention, and usually at the cost of introducing some hesitation and awkwardness into an otherwise smooth flow of behavior." (Nelson & Winter, 1982: 85).

Thus, imposed by the fact that rationality is bounded, Nelson & Winter notice a trade-off between deliberate choice and choice embedded in a capability. The suppression of choice conditions the smoothness of behaviour but holds the risk that this behaviour is irrelevant when seen in its context. On the other hand, deliberate choice may lead to more relevant behaviour but holds the risk that this behaviour is poorly co-ordinated and unskilful in action. In other words, there is a tension between doing the right things and doing things right.

Extending the discussion of individual skills to the level of the firm, the term routine is introduced to reflect the skills of an organisation rather than an individual. A routine is defined as:

> "a repetitive pattern of activity in an entire organization, to an individual skill, or, as an adjective, to the smooth uneventful effectiveness of such an organizational or individual performance" (Nelson & Winter, 1982: 97).

Nelson & Winter (1982: 99) point at the apparent correspondence between the terms routine, knowledge and memory when studying organisational behaviour: "routinization of activity in an organization constitutes the most important form of storage of the organization's specific operational knowledge". In order to explicate this, the authors draw a picture of an organisation in routine operation, which is akin to Schumpeter's notion of an economic system as a circular flow. Organisational members are constantly bombarded with messages coming from both the organisation itself and the external environment. These messages, once received and interpreted, call for the performance of routines from the 'repertoires' of the organisational members. This generates a stream of new messages that, together with other messages, once again lead to input to be received, interpreted and acted upon. In order for this circular system to be effective it must meet some highly specific conditions. The central issue in this respect is co-ordination: individual members have to be co-ordinated in such a way that they correctly interpret and respond to the messages they receive.

Addressing the cognitive aspects of the performance of organisational members does, however, not provide the full picture of an organisation in routine operation. Nelson & Winter argue that there are also strong motivational aspects involved in dealing with issues such as laxity, rule breaking, defiance, and even sabotage. Consequently, the objective is to combine rule-enforcement mechanisms and other motivators in such a way that, although both manifest and latent conflict persists, manifest conflict follows largely predictable paths and stays within predictable bounds that are consistent with the ongoing routine. Nelson & Winter (1982: 110) refer to this as "a comprehensive truce in intraorganizational conflict".

In summary, Nelson & Winter view the firm as a repository of knowledge which is accumulated through a process of local learning, and which shapes the firm's future search activities. Competition between firms is determined by the differences in their distinctive knowledge base and firms that are best capable of learning how to change their internal decision rules in the face of environmental disturbances are most likely to survive. Still, this learning process is incremental and path-dependent.

Competencies, capabilities and accumulation

Noticing the fragmented state of the resource-based view and, therefore, the need for coherence, Teece, Pisano & Shuen (1997)[37] built a model using elements from the contributions by Dierickx & Cool (1989), Prahalad & Hamel (1990) and Chandler (1990). Furthermore, they built their model on the theoretical foundations laid down by Schumpeter (1934), Penrose (1959), Williamson (1975; 1985) and Nelson & Winter (1982). The objective of this model is, just like in the case of the resource-based view, to explain sustainable competitive advantage. Nevertheless, the essence of the dynamic capability model is that it not only addresses the 'why', but also the 'how' of a firm's sustainable competitive advantage. This is expressed by the following definition.

> "The strategic problem facing a firm in a world of Schumpeterian competition is to decide upon the competencies needed to thrive, and the methods to nurture them." (Teece, Pisano & Shuen, 1992: 19).

So, taking the traditional resource-based view as starting point, Teece, Pisano & Shuen seek extension with respect to the dynamic aspects of skill acquisition,

[37] The first version of this article appeared as an unpublished working paper (Teece, Pisano & Shuen, 1990), and was revised a number of times before published.

learning and, capability accumulation. The model proposed to analyse these aspects consists of sequentially linked concepts, running from factors on the input-side, to products on the output-side. Factors of production are the undifferentiated inputs available in factor markets (e.g. land, inexperienced labour, and capital). Factors of production are turned into firm-specific assets, or resources, which are difficult to imitate (e.g. patents, trademarks, and experienced engineers). Enabled by integrated clusters of resources, a firm forms its distinctive activities, which are labelled as organisational routines or competencies (e.g. quality management, miniaturisation). Those competencies that are critical to a firm's survival are called core competencies. By utilising its competencies, final goods and services are produced by a firm. In order to make the sequence from factors to products work, a firm needs to have the capacity to renew, augment and adapt its core competencies over time. This capacity is called dynamic capability.

An important addition of the dynamic capability model to the resource-based view is the notion that presenting the firm as a bundle of resources is not sufficient. One should also consider the mechanisms by which firms accumulate and dissipate new skills and capabilities, as well as the forces that limit the rate and direction of this process. Hence, the firm should be recognised as "a distinctive institution with specific capabilities to coordinate economic activities" (Teece, Pisano & Shuen, 1992: 21), which is in line with Coase's (1937) view that the essence of the firm is its ability to achieve 'organisational co-ordination' which displaces market organisation. The extent to which a firm is good at doing this, is the main determinant of firm differences. Possible examples of the reasons why a firm becomes superior, in for instance a particular technological domain, are that the firm:

> "... allocates resources to more promising projects, it harnesses experience from prior projects, it hires and upgrades human resources, it integrates new findings from external sources, and it manages a set of problem-solving activities associated with that technology" (Teece, Pisano & Shuen, 1992: 23).

Subsequently, three sets of factors are identified as the foundations of a firm's dynamic capability: the process of learning, forces constraining and focusing the learning process, and the selection environment in which the firm competes. Below, these three factors are briefly discussed.

Learning is a process by which repetition and experimentation enable tasks to be performed better and quicker and by which new production opportunities are identified. In the context of an organisation, learning has several key characteristics.

First, learning involves organisational as well as individual skills. It requires common modes of communication and co-ordinated search procedures. Secondly, the knowledge generated by such activity resides in organisational routines, which are patterns of interactions that represent successful solutions to particular problems. A further distinction in this respect is made between static and dynamic routines. Static routines refer to the capacity to replicate certain previously performed task, while dynamic routines are directed at establishing new competencies. Apart from some minor literal differences, this discussion is very similar to the ideas on skills, routines and knowledge put forward by Nelson & Winter.

An important aspect of the learning process is the notion of path dependencies, which was also addressed by Nelson & Winter. A firm's previous behaviour to a large extent determines its future behaviour because learning tends to be local: opportunities for learning will be proximate to previous activities. Related to the notion of path dependencies is the notion of 'complementary assets' (Teece, 1986). The presence of complementary assets helps steering the evolution of new technologies, as well as the commercialisation of these technologies by individual firms. At the same time, new products and processes may enhance or destroy the value of such assets, thereby constraining the learning process.

As recognised in the evolutionary perspective on economic development described in section 2.3, competitive processes are inherently selection processes, either through direct selection of firms that are more fit, or through adaptation of firms that are less fit.[38] The relationship between the two is that the intensity of selection pressures is critical in determining how rapidly firms need to augment their competitive capabilities if they are to survive. Again, this draws us to the field of industrial organisation. For example, Porter's (1980) model of industry forces provides a set of tools for considering how the structure of an industry shapes the competitive environment and the selection pressures on firms operating in that industry.

In order to identify the relevant elements of the various roots of knowledge-based thinking, it is useful to summarise the contributions on their distinctive attributes. This is done in Table 3.1. Despite the fragmented state of the field of resource-based thinking, the different contributions exhibit strong similarities. Especially the contributions that explicitly focus on dynamic issues such as routinisation and path dependencies can very well serve to explicate the concept of

[38] This distinction between selection and adaptation runs parallel to the distinction between Darwinian and Lamarckian evolution discussed in section 2.2.1.

organisational innovation put forward in Chapter 2. This judgement does not imply that the contributions that focus on the static relationship between resources and competitive advantage are useless or irrelevant. All of these to some extent provide useful insights. The point is that their predominant focus on the static conditions that render a firm's resource bundle potentially rent generating is not in line with the central focus of this study. The objective of this study is to understand how firms, over time, can co-ordinate their resources so as to carry out innovations. This requires a more dynamic perspective.

	Unit of analysis	Research question	View of the firm
Penrose	Firms' internal growth processes	What principles govern the growth of a firm?	Administrative unit as well as a collection of resources
Wernerfelt, Rumelt, and others	Conditions of a firms' resources	What conditions determine a firm's competitive advantage?	Resource bundle
Nelson & Winter	Individual skills and organisational routines	What role does routinisation play in organisational behaviour?	Repository of accumulated knowledge
Teece, Pisano & Shuen	Firms' dynamic capabilities	What are the foundations of a firm's dynamic capabilities?	Institution with specific capabilities to co-ordinate economic activities

Table 3.1 Summary of the roots of knowledge-based thinking.

3.3 Knowledge-based view of the firm

A long time before management researchers began investigating knowledge, economists had already formulated theories regarding the role of knowledge in an economic system. Examples are the work by Becker (1993) and Machlup (1984) on 'human capital'. In these neo-classical economic theories, however, human capital is still primarily treated as resource or production factor. Still, these theories, as

Nordhaug (1993) argues, evoked a change in the way organisations were interpreted in the management literature. No longer were organisations only viewed from a production-centred perspective, but also from a learning-centred perspective. The latter implies that human and 'organisational capital' (Tomer, 1987) in the form of skills, competencies, and knowledge carried by employees and teams, rather than physical and financial capital, form a decisive basis for the economic interpretation of an organisation's productivity and effectiveness (Winch & Schneider, 1993).

The specific focus on knowledge as a strategic asset is, however, only of recent date. The important difference between the economic focus on resources and human capital on the one hand, and the strategic focus on knowledge on the other hand, is that the former does not take into account the qualitative aspects of this invaluable resource. The strong potential of knowledge as a strategic asset has led to a surge of studies on organisational knowledge and learning (Imai, Nonaka & Takeuchi, 1985; Winter, 1987; March, 1991; Kogut & Zander, 1992; Dodgson, 1993; Nonaka, 1994).[39] The following discussion does not provide a definite picture of this highly volatile field. The purpose of this study is not to define or extend a general knowledge-based theory of the firm, but to elaborate on knowledge-based ideas with a specific focus on the concept of architectural innovation as discussed in the previous chapter.

3.4 Dimensions of knowledge

The concept of organisational knowledge is a multiplex issue. It simultaneously incorporates elements such as cognition, language, meaning, communication and learning. Hence, in the literature on organisational knowledge a wide range of dimensions is used to characterise different types of knowledge (cf. Winter, 1987). An important dimension in the debate on organisational knowledge is the distinction between information and know-how (Kogut & Zander, 1992), which is rooted in a much broader philosophical discussion not addressed here. A related dimension is the one running from tacit to explicit knowledge (cf. Nonaka, 1994), which is based on the work by Polanyi (1958; 1966).[40] Explicit knowledge, which

[39] Similar to the situation of the resource-based view, it is stressed that the knowledge-based view of the firm is still more like a 'patch-work' (Foss, 1993a), rather than a clear-cut presentation of ideas. As Spender & Grant (1996) rightfully state, the knowledge-based view is not, as yet, a theory of the firm and in this stage of development synthesis would, therefore, be premature.

[40] Polanyi's distinction is vividly illustrated by the statement "we can know more than we can tell" (Polanyi, 1966: 4).

corresponds to know-that, is formal and systematic. Tacit knowledge, which corresponds to know-how, is highly personal and, therefore, hard to formalise and communicate.

3.4.1 Individual knowledge

Theories on organisational knowledge often start with an analysis of individual knowledge. One option is to assume that knowledge is exclusively related to the brains of individual human beings. This implies that knowledge is not carried by 'dead' things such as buildings, machines, or products (cf. Starbuck, 1984; Hedlund, 1994). Accordingly, it can be argued that organisational knowledge is not knowledge carried by an organisation as a separate entity, but knowledge resting in the heads of the members of the organisation. This argument is in line with Grant (1996b), who states that most explicit and all tacit knowledge is stored in individuals. Following the same line of reasoning it is assumed that organisational learning does not exist. Organisational learning is learning by individuals within organisations, not learning by organisations. Individuals may collectively learn, or their learning may be enhanced by putting them into groups. Still, groups themselves do not learn, as also argued by Simon (1991: 125).

> "All learning takes place inside individual human heads; an organization learns in only two ways: (a) by the learning of its members, or (b) by ingesting new members who have knowledge the organisation didn't previously have".

In contrast to the idea that knowledge is exclusively individual, Kogut & Zander (1992) state that organisations are social communities in which individual and social expertise (cf. knowledge) is transformed into economically useful products and services. This process is governed by a set of higher-order organising principles that are not reducible to individuals. This argument reflects the idea that organisational knowledge is socially constructed: it rests in the organising of human resources and it is the persistence of social relationships in which knowledge is embedded. Hence, just as organisational routines are more than the mere sum of the skills of its constituent individuals (Nelson & Winter, 1982), this second perspective states that organisational knowledge is an attribute of the firm as a whole and is not reducible to what its individuals know together. Clearly, the debate between individual and organisational knowledge is too complex to be solved in this study. Instead, the next two sections address the way the two can be linked.

3.4.2 Organisational knowledge

Organisational knowledge can be treated on different levels of analysis. Hedlund (1994) for instance makes a distinction between four so-called 'agents of knowledge': individual, group, organisation, and interorganisational domain. Relating these four levels to the above distinction between tacit and explicit knowledge, Table 3.2 depicts a knowledge typology with related examples.

	Individual	**Group**	**Organisation**	**Interorganisational domain**
Explicit knowledge	Facts	Project manuals	Performance data	Patents
Tacit knowledge	Skills	Organising recipes	Corporate culture	Co-operation recipes

Table 3.2 Typology of knowledge.[41]

A complex issue concerning the typology of knowledge is formed by the relationship between the various knowledge levels. Nordhaug (1993), for instance, argues that the study of 'competencies' (e.g. Prahalad & Hamel, 1990) has missed rigour at the micro level of analysis. Hence, Nordhaug provides a foundation for the study of competencies at the organisational level of analysis starting with the conceptualisation of work-related competencies at the sub-individual level of analysis. In this view, individuals are assumed to carry a variety of these work-related competencies, which enables them to perform tasks.

This conceptualisation offers the opportunity to aggregate single competencies across individuals. Nordhaug (1993) in this respect talks about 'competence networks' and 'competence configurations', while Leonard-Barton (1995) speaks of an interrelated, interdependent 'knowledge system'. At higher levels of aggregation such as groups, knowledge is transferred between individuals and learning takes place. Interaction of individuals' competencies makes that a group potentially can perform more, as well as more complex tasks than individuals would be able to. Examples are project teams in innovation and product development. Hence, a group has greater competencies than each of the individuals does. Moreover, a group potentially has greater competencies than the sum of the

[41] This table is adapted from Kogut & Zander (1992), Hedlund (1994), and Nonaka & Takeuchi (1995).

constituting individuals' competencies. In fact, this notion that the whole is more than the sum of the parts (Simon, 1969), is the *raison d'être* of organisations. The subsequent section addresses a dimension of the knowledge concept that matches the idea of knowledge levels as discussed above. This dimension is the hierarchy of knowledge.

3.4.3 The hierarchy of organisational knowledge

Firms exist as institutions for producing goods and services because they can create conditions under which multiple individuals integrate their specialist knowledge (Grant, 1996b). This notion, which forms the basis for the idea that organisational knowledge can be viewed as a hierarchy, can be seen as an elaboration of the above mentioned distinctions that simply focus on different levels of analysis. The hierarchy of organisational knowledge presented by Grant (1996a) consists of four levels, which are connected via three stages of integration. At the base of the hierarchy lies specialised knowledge held by individual organisational members. Individuals can be trained to increase their specialised knowledge, as well as encouraged to interact with other individuals. The latter is aimed at facilitating the integration of different individuals' knowledge into higher-order capabilities that deal with specialised tasks. Moving up to the third level of knowledge, the task-specific capabilities are integrated into broader functional capabilities, such as marketing, manufacturing, and financial capabilities. Finally, the highest knowledge level results from integrating the functional capabilities into wide-ranging cross-functional capabilities, such as new product development capabilities.

The hierarchy of organisational knowledge requires some clarification. First of all, the purpose of the multi-stage integration process is to create organisational knowledge that is firm specific. This resembles the above mentioned ideas regarding distinctive capabilities, core competencies, and strategic assets (cf. Amit & Schoemaker, 1993; Prahalad & Hamel, 1990; Rumelt, 1984). Secondly, it is stressed that knowledge that serves as input to the multi-level integration process can either be located inside or outside the boundaries of the innovating firm. Most of the resource-based theories primarily focus on the internal aspects of a firm's knowledge, and to a large extent neglect aspects external to the firm (cf. Penrose, 1959). Leonard-Barton (1992) refers to the problems such a perspective can evoke in practice. The co-ordination of a bundle of internal knowledge may be a distinctive capability today, in the absence of access to external knowledge it may very well turn into a 'rigidity' tomorrow. Especially in an emerging industrial complex, knowledge often already exists somewhere within the traditional industries constituting the industrial complex, but is often unknown to firms

stemming from other traditional industries. Finally, an important aspect of the knowledge hierarchy is that it does not necessarily correspond to the hierarchy of authority in an organisation, although there must be some overlap in order to operate effectively. Hence, knowledge is not necessarily related to positions or units.

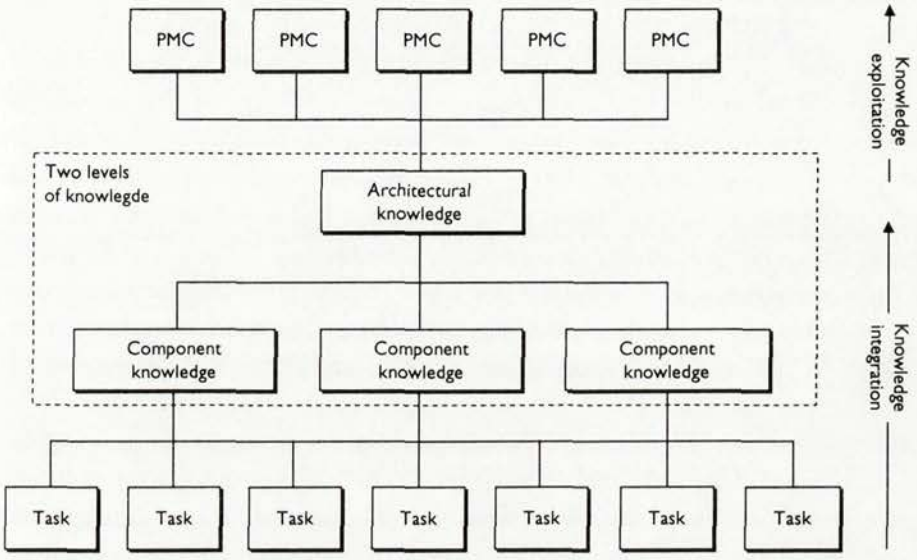


Figure 3.1 Hierarchy of organisational knowledge.

For the sake of analytical simplicity, in this study the multi-level knowledge hierarchy is reduced to two levels. Knowledge at the group level is defined as component knowledge, while knowledge at the organisation level is defined as architectural knowledge. This distinction runs parallel to Henderson & Clark's (1990) interpretation of architectural innovations, as discussed in the previous chapter. The simplified hierarchy of knowledge integration is depicted in Figure 3.1. Below, the two levels of the knowledge hierarchy are discussed in further detail.

On the one hand, component knowledge refers to knowledge already existing somewhere within the traditional industries constituting an industrial complex. This implies that component knowledge can be located within the focal firm, but also in the focal firm's environment. A distinction is made between three generic types of component knowledge: knowledge related to products (or services), production processes, and transactions. On the other hand, architectural knowledge refers to the organisational innovation that is built through a firm's

capability to synthesise and apply current and acquired knowledge (Kogut & Zander, 1992). Architectural knowledge consequently serves as a portfolio of options on future developments, or more specifically, as a 'platform' (Kogut, 1991) for generating product-market combinations (PMCs) that provide a firm with a favourable return on its investments. In other words, component knowledge is integrated into architectural knowledge, which subsequently is exploited by means of generating PMCs.

Since the deployment of integration capabilities cannot be separated from the way in which the firm is currently organised, it is stressed that knowledge advances incrementally. This incremental perspective on the development of knowledge is in line with the ideas by Nelson & Winter (1982) on innovation and entrepreneurship (A-type), as discussed in Chapter 2. It also is in line with the ideas by Penrose (1959) on the growth of firms. Consequently it cannot, as Kogut & Zander argue themselves, at the same time be in line with the ideas of Schumpeter (1934), who takes a much more radical perspective. The conclusion drawn with respect to this study is that the development of knowledge and the process of carrying out innovations are, although interrelated, two different issues. It is acknowledged that organisational knowledge develops incrementally (cf. A-type), but this does not instantly imply that the process of carrying out innovations also is incremental. The idea that innovations are products of a firm's integration capability implies that the process of carrying out innovations can resemble any of the four innovation types suggested by Henderson & Clark, namely incremental, modular, architectural, or radical. Especially in the context of an emerging industrial complex architectural innovation is the preferred type, although the underlying component knowledge may be developed incrementally.

3.5 Summary

To once again use the metaphor of architecture, building a wall requires bricks and the technique to lay bricks. The same holds for building a knowledge hierarchy. This requires component knowledge and the capabilities to integrate component knowledge into architectural knowledge. Whereas many have addressed the static issue of storing or carrying knowledge, integration explicitly addresses the dynamic issue of processing knowledge. The term integration underscores the idea of the knowledge hierarchy and forms a bridge between the various levels of the knowledge hierarchy. Closely related to the term integration are the terms 'combination' used by Kogut & Zander (1992), and the term 'configuration' used by Henderson & Clark (1990). The integration process uses various types of

component knowledge as inputs and results in an architectural innovation as referred to in the previous chapter. Subsequently, architectural innovation is turned into final products and services that are sold in the market place. The encouragement of people to interact with others to mutually integrate knowledge can be realised by means of three basic integration capabilities: systems capabilities, co-ordination capabilities, and socialisation capabilities. Each integration capability has different characteristics, which are addressed in further detail in the next chapter.

Summing up, in this chapter it was argued that the management of organisational innovation in the context of an emerging industrial complex should to a large extent be aimed at creating new architectural knowledge, which is a matter of integrating existing component knowledge. The integration process must be performed in such a way that the firm's knowledge architecture fits within the organisational context. How a firm actually brings about innovations is partly determined by its use of integration capabilities. Besides, it is also a matter of aspects such as form, size, strategy, financial position, and culture. The process of knowledge integration, which is discussed in the next chapter, brings together a number of these aspects.

4

Conceptual framework

4.1 Introduction

This chapter serves as a bridge between theory and practice. It integrates the ideas adopted from the evolutionary and knowledge-based perspectives, and presents a conceptual framework of organisational knowledge integration that can be used to analyse the process of mediamorphosis in practice.

The quintessence of the conceptual framework is the evolutionary principle of dynamic fit between a firm's organisational configuration and the context in which it operates. The idea of fit has also been extensively researched in organisation theories generally referred to as contingency theories. Most of this research, however, is limited to the fit between an organisational and environmental state at a particular point in time. What lacks in these studies is an explicit idea about how firms can transform themselves in case the initial fit no longer holds. In other words, there is substantial knowledge regarding the static aspects of contingency thinking, but much less regarding the dynamic aspects.

This chapter commences with a synopsis of the dynamic aspects of contingency thinking. Subsequently, the basic design of the conceptual framework is presented, followed by a specification of its constituting elements. The chapter ends with the presentation of a score card of fit (SCF) based on the conceptual framework.

4.2 Dynamic configurations

The central argument of contingency theory is that there is no single best way to organise and realise fit. Instead, the existence of variation among different

organisational elements is recognised, together with the possibility of multiple appropriate matches between the different states, modes or forms these elements may assume. Hence, there are several best ways to organise and realise fit.

Fit is a simple though profound concept that is at the heart of many management theories (Miles & Snow, 1984). There are dozens of studies that particularly focus on industry-organisation contingencies. Burns & Stalker (1961) for instance studied industrial firms to determine how their organisational structure and managerial practice related to their environmental conditions. They found that the type of organisation that existed in rapidly changing environments was different from the type of organisation within a stable environment. Burns & Stalker labelled the two organisation types as organic and mechanistic respectively. At the same time they recognised that these two types are ideal types and that the one was not preferred over the other. The nature of the environment determines which type of organisation is superior.

Emery & Trist (1965) proposed a more sophisticated view of different environmental conditions by offering a model that identified four kinds of environments an organisation might confront: 'placid-randomised', 'placid-clustered', 'disturbed-reactive', and 'turbulent field'. They described each as increasingly more complex than the previous one. Although Emery & Trist offered no specific suggestions as to the type of organisation suited best to each environment, their classification is not difficult to reconcile with Burns & Stalker's terminology. Emery & Trist's first two environments match with more mechanistic forms, whereas the other two require an organic form.

Lawrence & Lorsch (1967) went beyond both the works of Burns & Stalker and Emery & Trist. They elaborated on the match between organisation and environment by linking the degree of environmental uncertainty with two organisational dimensions: differentiation and integration. An important aspect of Lawrence & Lorsch's study is that they perceived both the organisation and the environment as having subsets. This implies that parts of the organisation deal with parts of the environment. The basic reason for differentiating the organisation into subsets, such as departments, is to deal more effectively with different environmental subsets. Lawrence & Lorsch postulated that the more turbulent, complex, and diverse the environment facing an organisation, the greater the degree of differentiation, as well as the need for integration to prevent the organisational subsets from going in different directions.

When comparing contingency theory with evolutionary economics, it is clear that both stress the importance of fit. Still, in evolutionary theory the idea of fit is more dynamic than in early contingency theory. The reason for this is the explicit

incorporation of the selection argument in evolutionary theory, which is expressed by the famous phrase 'survival of the fittest'. In contrast, most contingency theories focus on the static fit between organisations (i.e. their forms or strategies) and their environments (i.e. their stage of development or munificence). Over time, however, contingency theory also developed a more dynamic view on the idea of fit (cf. Child, 1972; Hrebiniak & Joyce, 1985). One of the most prominent examples of dynamic contingency theory is the so-called 'configurational school' (Mintzberg, 1990).[42]

The configurational school views the world in terms of integrated categories, referred to as configurations, *Gestalts*, or archetypes. For example, a firm's situation can be described as the configuration of its strategy, structure, and environment. Such a configuration is assumed to be dynamic. The various elements are subject to change, resulting in a certain degree of fit among them. Not all the elements of a firm's configuration are, however, liable to interference by the firm's management. A firm can change its strategy, but has little direct influence over its environment. Below, two important possibilities to change a firm's configuration are elaborated on.

4.2.1 Organisational (re)configuration

Actively changing a firm's configuration can be accomplished with the use of so-called 'design parameters' (Mintzberg, 1979). In contrast to its common connotation, organisation design is far from static. Moreover, organisation design is not restricted to structure (Volberda, 1998). Design, which naturally includes redesign, is the process of applying organisational instruments in general. This is in line with Simon (1969: 55), who stated that "Everyone designs who devises courses of action aimed at changing existing situations into preferred ones."

The integration of organisational knowledge, as discussed in the previous chapter, can also be perceived as a design or configuration challenge. Adopting this view, integrating component knowledge into architectural knowledge is enabled by two important processes. These processes run parallel to the classic distinction between differentiation and integration as mentioned above. The first process, which leads to differentiation, is aimed at adopting a certain organisational form. The second process, which leads to integration, is aimed at deploying integration

[42] The configurational school originated at McGill University in Canada. Well-known representatives of the configurational school are Mintzberg (1979) and Miller (1981; 1986).

capabilities in order to complement the generated differentiation. The role the two (re)configuration processes play in the integration of organisational knowledge is reflected in Figure 4.1.

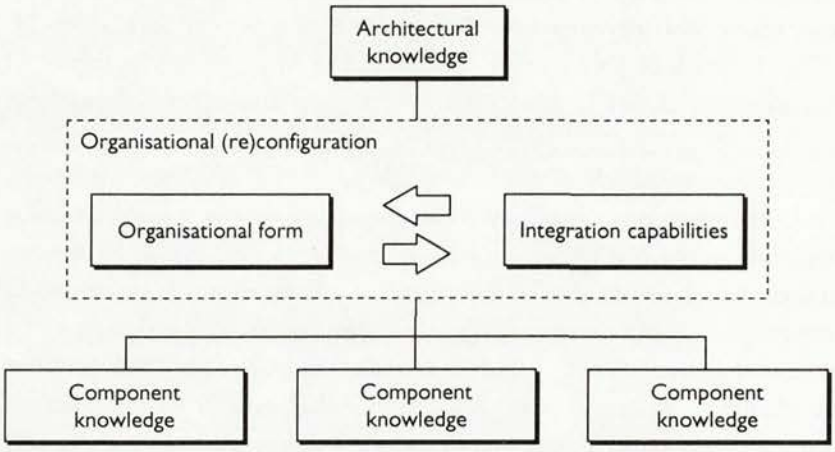


Figure 4.1 Two elements of organisational (re)configuration.

So, knowledge integration is about organisational (re)configuration. The purpose is to turn the right knobs, or design parameters, in order to alter the organisational conditions that foster knowledge integration. Below, the two elements of the (re)configuration process are discussed in further detail. Together with a firm's environmental characteristics, the two elements constitute the conceptual framework.

4.3 Conceptual framework

Using the above ideas on dynamic configurations in combination with the ideas on organisational innovation and knowledge integration discussed in Chapter 2 and 3, an integrated conceptual framework can now be constructed of the organisational knowledge integration process. This framework is outlined in its most basic form in Figure 4.2, and should be interpreted as follows. The industrial context in which a firm operates determines the type of process that is required to integrate component knowledge into architectural knowledge. It is a firm's challenge to match this requirement. In order to do so, a firm has two important design variables at its disposal, namely its organisational form and its integration capabilities. Together, the organisational form and the integration capabilities generate a firm's capacity to integrate component knowledge into architectural

knowledge. Preferably, this knowledge integration capacity matches the knowledge integration requirement generated by the stage of industrial development the firm is faced with (De Boer, Van den Bosch & Volberda, 1999). Below, the elements constituting the conceptual framework are discussed in further detail.

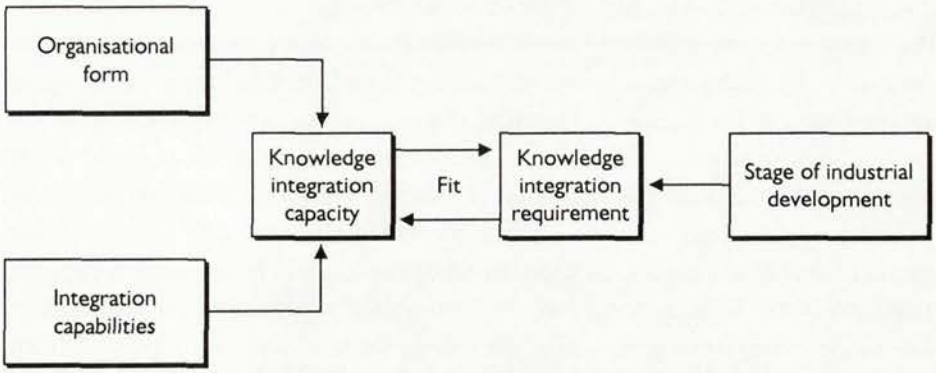


Figure 4.2 Conceptual framework of organisational knowledge integration.

In line with Grant (1996a), the knowledge integration capacity and requirement are characterised using three dimensions. These three dimensions are efficiency, scope, and flexibility. Efficiency of knowledge integration refers to the way in which architectural knowledge accesses and utilises component knowledge. Scope of knowledge integration refers to the breadth of component knowledge the architectural knowledge draws upon. Flexibility of knowledge integration, finally, refers to the extent to which the architectural knowledge can access additional component knowledge and integrate existing component knowledge. The idea behind this characterisation is that the industrial context in which a firm operates determines the relative importance of these three dimensions, or in other words, the efficiency, scope, and flexibility of the process that is required to integrate component knowledge into architectural knowledge. Accordingly, a firm has to find an appropriate way to actualise this type of knowledge integration. The extent to which a firm is capable of doing this, is dependent upon the match between its organisational form and integration capabilities. Below, the relationship between the different stages of industrial development on the one hand, and the three dimensions of the corresponding knowledge integration requirement on the other hand are further elaborated on. Next, the same is done for the relationship between a firm's organisational form and integration capabilities on the one hand, and the three dimensions of its knowledge integration capacity on the other hand. Together, the analyses of these relationships form the input to the score card of fit.

As such, the score card is an explication of the conceptual framework presented in Figure 4.2.

4.3.1 Stages of industrial development

As argued above, the idea behind the three dimensions of knowledge integration is that firms operating in different types of contexts are facing different challenges in their quest for architectural knowledge. Hence, based on this distinction, a set of assumptions can be formulated regarding the dimensions that are dominant in the type of context central to this study. Traditional publishing firms involved in the management of mediamorphosis are faced with a change from the stable context of a mature single industry to the turbulent context that is evoked by the emergence of the multimedia complex. In order to relate the knowledge integration capacity generated by the organisational form and integration capabilities to the knowledge integration requirement generated by the change firms undergo when moving from a mature single industry to emerging industrial complex, the characteristics of this change need to be further specified.

As indicated in Chapter 2, an important characteristic of an emerging industrial complex is technological convergence, which causes the blurring of industry boundaries. According to Chapter 3, this leads to the rise of opportunities to combine existing component knowledge into new architectural knowledge. Relating Table 2.6 to the three dimensions of knowledge integration, it can be deducted that the type of knowledge integration that is required in an emerging industrial complex should score high on both scope and flexibility of knowledge integration. At the same time, efficiency of knowledge integration, which is dominant in the context of a mature single industry (MSI), becomes of minor importance.

> *Assumption 4.1: In a mature single industry the dominant requirement of the knowledge integration process is efficiency.*

> *Assumption 4.2: In an emerging industrial complex the dominant requirements of the knowledge integration process are scope and flexibility.*

The assumptions regarding the knowledge integration requirement of the two stages of industrial development focused on in this study are summarised in Table 4.1. It should be clear that assumptions regarding other types of (changes in) contexts could be formulated in a similar manner.

	Mature single industry (MSI)	Emerging industrial complex (EIC)
Efficiency of integration	High	Low
Scope of integration	Low	High
Flexibility of integration	Low	High

Table 4.1 Stages of industrial development and their requirement for knowledge integration.

4.3.2 Organisational form

An organisational form is the division of tasks and activities into functions, units, and divisions. The conceptual framework distinguishes various organisational forms as design parameters of knowledge integration. Since each organisational form is different, each form is expected to stress different aspects of the knowledge integration process. In other words, a firm's choice for a particular organisational form has important implications for its ability to generate the type of knowledge integration process required by the context. To illustrate this, the focus is limited to four classic types of organisational forms, which primarily describe the firm's internal state. These are the functional, division, matrix, and innovative form (Ansoff & Brandenburg, 1971).

Besides these four classic types, numerous attempts have been made to come up with new types of organisational forms. After all, an important research effort in the field of management studies is the search for new organisational forms (Bartlett & Ghoshal, 1993; Daft & Lewin, 1993; Ilinitch, D'Aveni & Lewin, 1996). Examples of newly introduced forms are the internal network form (Miles & Snow, 1986), the N-form (Hedlund, 1994), and the hypertext form (Nonaka, 1994). Most of these new types of organisational form have, however, not yet been explored in sufficient detail to assess their properties regarding the above mentioned dimensions of knowledge integration.[43] Still, the conceptual framework is in principle suited to incorporate these new organisational forms as well.

The four selected organisational forms can be roughly determined by analysing the way of grouping of activities (e.g. according to work processes,

[43] Although (supposedly) new theories, typologies, and models are put forward regularly, some even argue that basic modes of thinking about organisational developments, processes, and structures remain very much the same (Lammers, 1988).

products, markets, or regions), the number of hierarchical levels (not to be confused with the knowledge hierarchy discussed in the previous chapter), and the extent to which management is divided into various functional areas, which is commonly depicted by the organisation chart (Volberda, 1998). In line with the three dimensions of knowledge integration mentioned above, the four basic organisational forms are described and compared in terms of their capacity to bring about efficiency, scope, and flexibility of the knowledge integration process.

Functional form

The first modern organisational form is the centralised functional form (Ansoff & Brandenburg, 1971). This form evolved around the turn of the century in response to the growth in size and complexity of the business firm, but is still widely used. The functional form, which is depicted in Figure 4.3, is based on a functional grouping of similar activities under major functional managers, a hierarchy of authority consisting of many hierarchical levels with small spans of control, and a degree of functionalisation of management which may be limited (no staff functions) or high (staff functions with formal authority).

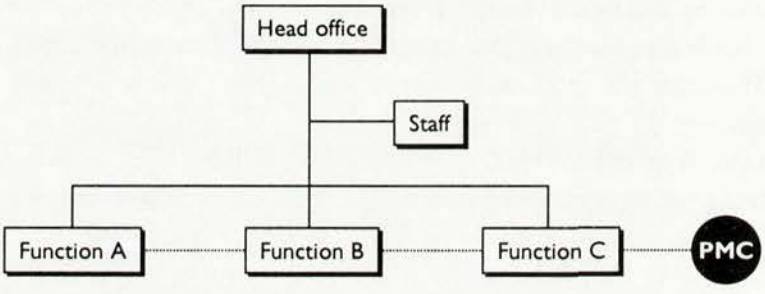


Figure 4.3 Functional form.

The principal advantage of the functional form is its efficiency attained from economies of scale, overhead, and skills. At the same time, the capacity of the functional form to bring about scope and flexibility of the knowledge integration process is rather limited. Hence, only in stable and homogeneous environments where there are few PMCs with a relatively long life cycle (such as a mature single industry), this form might be appropriate (Krijnen, 1979). In more unstable conditions, it is likely that conflicts of priorities occur, decisions and products begin to queue up, communication lines become too long, and time responsiveness to external conditions is insufficient.

Assumption 4.3: The functional form has a high capacity for efficiency, but a low capacity for both scope and flexibility of knowledge integration.

Division form

The development of the second basic organisational form was pioneered by the US companies DuPont and General Motors in the 1920s. This form, named the decentralised divisional form, spread rapidly after World War II to become the standard form for large and medium sized corporations (Ansoff & Brandenburg, 1971). The division form, which is depicted in Figure 4.4, is based on grouping by product-market combinations, a limited hierarchy of authority consisting of few hierarchical levels with large spans of control, and a limited functionalisation of management in the form of some central staff functions.

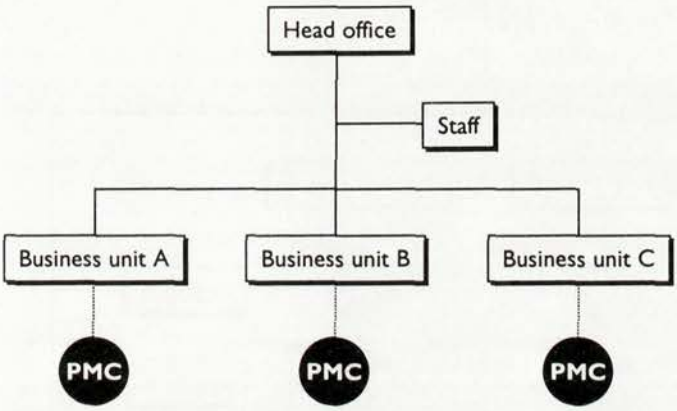


Figure 4.4 Division form.

Because of the autonomy of divisions in terms of operational decisions and their direct contacts with the environment, the capacity of the division form to bring about flexibility of knowledge integration is higher than the functional form. Nonetheless, to this increase of flexibility capacity, economies of scale have to be sacrificed. Furthermore, the capacity to bring about scope of knowledge integration is limited to a single division. The loose coupling among divisions facilitates divisional knowledge integration, but suppresses integration of knowledge between multiple divisions. Therefore, the division form is most appropriate in a dynamic environment with a large number of different groups of PMCs that have few characteristics in common and of which the life cycle is relatively long (Krijnen, 1979).

Assumption 4.4: The division form has a low capacity for both scope and efficiency, but a high capacity for flexibility of knowledge integration.

Matrix form

The next basic form emerged in the post World War II period. Ansoff & Brandenburg (1971) labelled this form the adaptive or project management form, but it is more widely known under the name of matrix form. The matrix form, which is depicted in Figure 4.5, is based on a dual grouping of activities, a dual hierarchy of authority consisting of few hierarchical levels, and a high degree of functionalisation of management tasks.

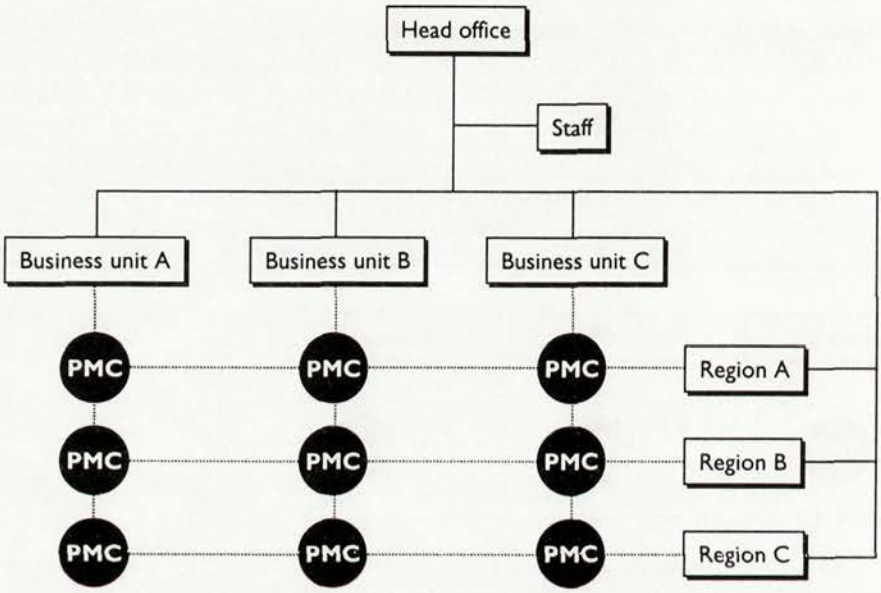


Figure 4.5 Matrix form.

The matrix is a combination of the principle of specialised functional departments, and the principle of self-sufficient, more or less autonomous units or divisions, in situations where a number of (temporary) divisions or autonomous units need to be created. The ability of each unit to seek the organisational form most appropriate to the project it is handling facilitates the scope and flexibility of knowledge integration. The fact that available means and persons can be allocated to various projects also facilitates the scope and flexibility of knowledge integration. Hence, on account of its high capacity to bring about scope and flexibility of knowledge integration, the matrix form is deemed appropriate for organisations

that function in environments with many new PMCs with relatively short life cycles (Krijnen, 1979). Nonetheless, the scope and flexibility capacity of the matrix form is detrimental to its efficiency capacity. Economies of scale will be limited because different functions, experts and tools will be needed in different simultaneously executed projects, which results in only partly occupied resources.

> *Assumption 4.5: The matrix form has a low capacity for efficiency, but a high capacity for both scope and flexibility of knowledge integration.*

Innovative form

Ansoff & Brandenburg (1971) suggested a fourth basic organisational form that negates some of the disadvantages of the matrix form, namely the innovative form. The matrix form is not applicable in a large majority of manufacturing firms in which economies of scale are important, assets and competencies are relatively inflexible, and products have long lives. The underlying principle of the innovative form, which is depicted in Figure 4.6, is to gather currently profitable, established product markets into a current business group and to place the development of new PMCs into a team-based innovation or new business development group.

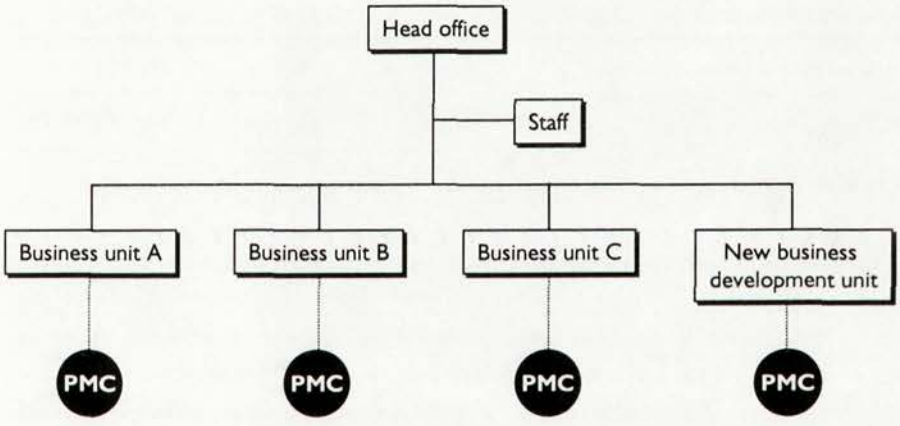


Figure 4.6 Innovative form.

Compared with the division form, the establishment of a new business development group increases the capacity to bring about efficiency and scope of knowledge integration, while the existing business superiority generates the capacity to bring about flexibility of knowledge integration. Hence, the innovative form offers a high capacity for efficiency, scope, and flexibility of knowledge integration.

Nonetheless, it is noted that the efficiency capacity depends on whether the new PMCs are transferred to a new or an existing division.

Assumption 4.6: The innovative form has a high capacity for efficiency, scope and flexibility of knowledge integration.

So, in each of the four basic organisational forms, knowledge is divided and needs to be integrated in a certain way. In the functional form, component knowledge is specialised according to functional areas, while in the division form component knowledge is integrated in semi-autonomous divisions. The matrix form tries to specialise knowledge in functional areas, but also to integrate knowledge in project teams. Finally, the innovative form separates component knowledge from the standard operating core. Altogether, the assumptions regarding the capacity for knowledge integration of the four basic organisational forms are summarised in Table 4.2.

	Functional form	**Division form**	**Matrix form**	**Innovative form**
Efficiency of integration	High	Low	Low	High
Scope of integration	Low	Low	High	High
Flexibility of integration	Low	High	High	High

Table 4.2 Basic organisational forms and their capacity for knowledge integration.

It is noted that in this study a longitudinal, process-oriented perspective is adopted. Hence, a distinction is made between different types of transformations in the firms' organisational form over time, instead of a distinction between different types of organisational form at a particular point in time. Hence, the contingency typology in Table 4.1 is used to mark the organisational forms at the begin and end of the transformation process. The implications a transformation from one particular organisational form to another organisational form has for the knowledge integration capacity of a firm can be deduced from these two snapshots. For example, a firm that transforms from a functional to an innovative organisational form faces an increase of both the scope and flexibility capacity of its knowledge integration.

Nonetheless, one has to put the classification of organisational forms in perspective. As Child (1984: 103) pointed out: "a purely structural design will not

of itself guarantee any desired pattern of behaviour". Hence, the integration capacity offered by a certain organisational form can be strengthened by the use of temporary task forces, standing committees, project teams, or various other liaison devices that overlay the basic organisational form (Galbraith, 1973; Mintzberg, 1979). These devices are called integration capabilities. So, integration capabilities may enhance the knowledge integration capacity generated by a certain organisational form.

4.3.3 Integration capabilities

As indicated in Chapter 3, the idea behind integration capabilities is that it is the integration of knowledge into architectural knowledge, rather than individual component knowledge itself that forms the basis of a firm's competitive advantage. What is neglected in most publications, however, is a specification of the different integration capabilities a firm has at its disposal and the impact these are likely to have on the outcome of the knowledge integration process. Therefore, the conceptual framework suggests three types of integration capabilities, namely systems, co-ordination, and socialisation. Systems capabilities enable the creation of new architectural knowledge through formal systems such as codes, plans, and procedures. Co-ordination capabilities enable the creation of new architectural knowledge through managerial instruments such as training, liaison devices, and participation. Socialisation capabilities, finally, enable the creation of new architectural knowledge through cultural institutions such as values and norms. It is noted that the three integration capabilities can be both of an intra and interorganisational nature. In other words, a firm developing new architectural knowledge can use the capabilities to integrate component knowledge located within its own organisation, or component knowledge located within actors operating in its environment. The idea behind the typology is that the different types of integration capabilities to a different extent are capable of enhancing the knowledge integration capacity generated by the organisational form.

Systems capabilities

Systems capabilities, in terms of directions, policies, procedures, and manuals, are used to integrate explicit knowledge bases. Nonaka (1994) calls this 'combination'. Systems capabilities describe the degree to which behaviours are programmed in advance of their execution (Galbraith, 1973; Khandwalla, 1977). It reflects the degree to which rules, procedures, instructions, and communications are laid down

in written documents or formal systems.[44] The primary virtue of systems capabilities is that they eliminate the need for further (informal) communication and co-ordination among sub-units and positions. Consequently, they provide a memory for handling routine situations. In such routine situations, the behaviour of participants is predictable, that is, they know what to do, and they can react very quickly. In addition, Grant (1996a) in this respect argues that the more complex an activity, the greater the number of locations in which that activity must be replicated, and the more stringent the performance specifications for the outcome of that activity, then the greater is the reliance on knowledge integration by systems capabilities.

So, individuals exchange and combine explicit knowledge through formal exchange mechanisms such as procedures, formal language, codes, working manuals, and information systems. The use of these *ex ante* designed systems capabilities can lead to new architectural knowledge. While systems capabilities have a very high potential for enhancing the efficiency capacity of knowledge integration, the potential impact on the scope and especially flexibility capacity is less satisfactory.

> *Assumption 4.7: Systems capabilities have a high potential for enhancing the capacity for efficiency, but a low potential for enhancing the capacity for both scope and flexibility of knowledge integration.*

Co-ordination capabilities

While systems capabilities integrate knowledge by *ex ante* rules and procedures, co-ordination capabilities may enhance knowledge integration by establishing relations between members of a group. Nonaka (1994) uses the term 'internalisation' in this respect. Co-ordination capabilities refer to lateral ways of co-ordination that may be explicitly designed, but may also emerge out of a process of interaction (De Leeuw & Volberda, 1996). In this situation there is not a separate information processing system, but knowledge integration is effectuated by a specific bundle of relations between members of a group. Co-ordination capabilities accumulate in a firm as a result of training and job-rotation, natural liaison devices, and participation.

An organisation can achieve indirect knowledge integration by hiring educated professionals who can be further trained in the organisation. As such, education and training indirectly achieve what rules and procedures as a part of systems capabilities do directly. On the job, professional or craft workers appear to

[44] Formalisation as used in this study should not be confused with formalisation as used by many organisation theorists, namely in connection with authority.

be acting autonomously, but in fact they are guided by trained skills and acquired knowledge. In addition, in a very turbulent environment, mutual adjustment becomes the favoured means of knowledge integration. Mutual adjustment between individuals or units can be evoked by means of liaison devices. Such liaison devices result in lateral forms of communications and joint decision-making processes that cut across lines of authority. Consequently, liaison devices decentralise knowledge integration without creating self-contained units. The effect is that the capacity to process information and to integrate knowledge is increased (Galbraith, 1973).

Finally, in situations in which delegation is a necessity, participation in decision making can supply the knowledge integration to offset the differentiation that delegation causes (Khandwalla, 1977). Participation describes the extent to which subordinates take part in the decision making of superiors. Low levels of participation therefore result in poor knowledge integration, because there is little sharing of information. A high degree of participation results in more global and rich architectural knowledge, based on various contributions of lower levels. To conclude, while co-ordination capabilities offer a low potential for enhancing the efficiency of knowledge integration and are more costly than systems capabilities, they offer a high potential for enhancing the capacity for scope and flexibility of knowledge integration.

> *Assumption 4.8: Co-ordination capabilities have a low potential for enhancing the capacity for efficiency, but a high potential for enhancing the capacity for both scope and flexibility of knowledge integration.*

Socialisation capabilities

In addition to the direct integration of knowledge by rules and procedures, and the indirect integration of knowledge by training, liaison devices, and participation, a third type of integration capabilities can be distinguished. Socialisation, which is a term also used by Nonaka (1994), is a capability which integrates component knowledge by specifying broad, tacitly understood rules for appropriate action under unspecified contingencies (Camerer & Vepsalainen, 1988). These capabilities refer to the ability of the firm to produce a shared ideology that offers members an attractive identity as well as convincing interpretations of reality. The infusion of beliefs and values into an organisation takes place over time, and produces a distinct identity for its participants, colouring as it does all aspects of organisational life, and giving it a social integration that goes far beyond the systems and co-ordination capabilities discussed above.

Camerer & Vepsalainen (1988) argue that socialisation capabilities offer a very high potential for enhancing the efficiency capacity for knowledge integration. However, they have serious doubts about the potential for enhancing the scope and flexibility capacity for knowledge integration. Socialisation capabilities can create mental prisons that hamper seeing important changes, for instance in the market (De Leeuw & Volberda, 1996). The limited potential for enhancing the scope capacity of socialisation capabilities is also acknowledged by Nonaka (1994). Because socialisation never makes knowledge explicit, local knowledge cannot easily be leveraged by the organisation as a whole. Moreover, the strong cultures that arise when relying on socialisation capabilities usually suffer from xenophobia (Ouchi, 1981). Strong cultures resist deviance, retard attempts at change, and tend to foster inbreeding. Socialisation capabilities rest in firms with a strong identity, in which one can find a coherent set of beliefs, highly shared values, a common language, and a strongly agreed-upon kind of appropriate behaviour. In addition, every member identifies strongly with, and professes loyalty to, the goal of preserving, extending, or perfecting the organisation's mission, and so can be trusted to make decisions in the organisation's interests. Such a situation leaves little room for integrating knowledge in ways that contradict shared beliefs.

> *Assumption 4.9: Socialisation capabilities have a high potential for enhancing the capacity for efficiency, but a low potential for enhancing the capacity for both scope and flexibility of knowledge integration.*

Together, the assumptions regarding the potential for enhancing the knowledge integration capacity of the different types of integration capabilities are summarised in Table 4.3.

	Systems capabilities	**Co-ordination capabilities**	**Socialisation capabilities**
Efficiency of integration	High	Low	High
Scope of integration	Low	High	Low
Flexibility of integration	Low	High	Low

Table 4.3 Basic integration capabilities and their potential for enhancing the capacity for knowledge integration.

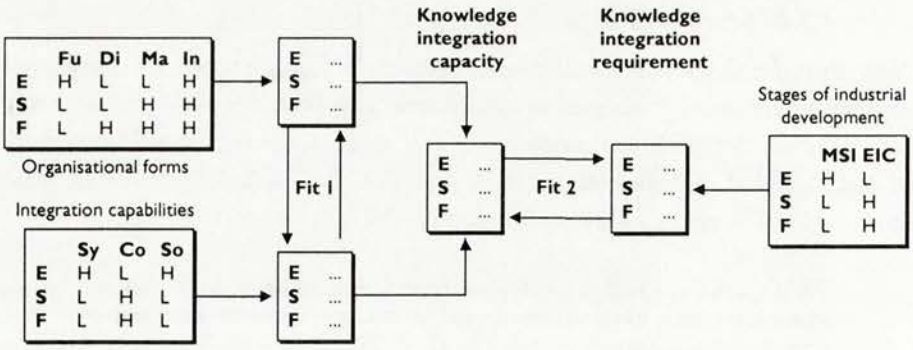
4.3.4 Score card of fit

Now that the theoretical assumptions regarding a firm's knowledge integration capacity and knowledge integration requirement have been discussed, the next step is to combine the various assumptions. In this manner, the conceptual framework of organisational reconfiguration can be translated into a score card of fit. This score card builds on the following definition by Miles & Snow (1984: 11).

> "Fit is a process as well as a state — a dynamic search that seeks to align the organization with its environment and to arrange resources internally in support of that alignment."

Hence, firms may be different, but their organisational configuration must be internally and externally consistent (Miles & Snow, 1978). A firm's internal consistency, or internal fit, refers to the match between its organisational form on the one hand, and its integration capabilities on the other hand. The co-existence of a firm's organisational form and integration capabilities results in a certain score of knowledge integration capacity. When the organisational form and integration capabilities match, it is assumed that a firm can effectively reconfigure its organisational knowledge. In other words, it can effectively integrate component knowledge into new architectural knowledge. In contrast, a firm's external consistency, or external fit, refers to the match between its knowledge integration capacity on the one hand, and the knowledge integration requirement generated by the stage of industrial development on the other hand. When there is close external fit, i.e. the actual knowledge integration capacity matches the knowledge integration requirement, the new architectural knowledge is likely to serve as an effective platform for generating a portfolio of successful PMCs.

The idea of internal and external fit can be depicted as a score card which combines Table 4.1, Table 4.2, and Table 4.3. The score card, which is a specification of the conceptual framework presented in Figure 4.2, is presented in Figure 4.7.



Legend

Fu	functional	Sy	systems	E	efficiency	H	high
Di	division	Co	co-ordination	S	scope	L	low
Ma	matrix	So	socialisation	F	flexibility		
In	innovative						

MSI	mature single industry	
EIC	emerging industrial complex	

Figure 4.7 Score card of fit.

In order to be able to apply the score card to a firm involved in the process of mediamorphosis, its functioning needs further explanation. At a particular point in time, a firm can be characterised by the organisational form it has adopted and the integration capabilities it employs. Together, the organisational form and the integration capabilities generate a particular type of knowledge integration capacity on the three dimensions. This capacity is determined as follows:

1. The score generated by the organisational form is easy to determine, because at a particular point in time, a firm can adopt only one type of organisational form. The capacity for knowledge integration offered by a particular type of organisational form can be find in Table 4.2. On each of the three dimensions of knowledge integration the score can only be high (H) or low (L).
2. The score generated by the integration capabilities is a little less easy to determine, because a firm generally employs several types of integration capabilities at the same time. Accordingly, the one or two most dominant types of integration capabilities are listed. The potential for enhancing the capacity for knowledge integration offered by a particular type of integration capability can be found in Table 4.3. In case two integration capabilities are listed, their overall potential to enhance the knowledge integration capacity is determined by the highest score. Hence, on each of the three dimensions of knowledge integration the overall score can only be high (H) or low (L).

3. Together, a firm's organisational form and integration capabilities determine its overall knowledge integration capacity. The capacity for knowledge integration offered by a particular type of organisational form can only be enhanced in this respect. When an organisational form does not offer capacity for knowledge integration, it cannot be still created by means of deploying integration capabilities. On the other hand, in case an organisational form offers the capacity for knowledge integration, while the integration capability does not offer the potential to enhance this capacity, the capacity is not realised. Hence, on each of the three dimensions of knowledge integration the overall capacity score can only be high (H) or low (L).
4. Having determined a firm's knowledge integration capacity, the score card can subsequently be used to asses the fit between the firm's knowledge integration capacity and the knowledge integration requirement generated by the environment.

The score card of fit can be used at various points in time. In this study the choice is made to apply the score card during two stages in the process of mediamorphosis, namely Stage 1 and Stage 2. The first stage of mediamorphosis marks the situation in which the characteristics of the emerging multimedia complex are beginning to have an implication on firms that have a background in a mature single industry. In this first stage, the environmental changes are perceived by the firm to be still only of minor importance. The transition from the first to the second stage of mediamorphosis runs parallel to the growing recognition within the firm that the environmental changes have to be met with organisational changes. Accordingly, the transition is marked by the occurrence of an important organisational measure, such as the adoption of a new organisational form or the employment of different integration capabilities. For both stages the score card is filled out.

The argument for determining the degree of fit between the firm's organisation and environment in the two stages reads as follows. A firm realises a high fit on a dimension of knowledge integration when its capacity score matches or exceeds the environment's knowledge integration requirement for that dimension. When the capacity score is lower than required, there is a low fit. The overall fit realised by a firm is determined by the dimensions on which the knowledge integration requirement is highest. Logically, a firm realises a maximum fit when on all dimensions of its knowledge integration capacity its scores match or exceed the environment's knowledge integration requirement. Using the score card

of fit as presented above, propositions can be formulated regarding the fit of a firm moving from a mature single industry to an emerging industrial complex. In other words, the propositions regarding a firm moving from a context requiring efficiency (MSI) to a context requiring scope and flexibility (EIC) of the knowledge integration process can be logically deducted when combining Table 4.1, Table 4.2, and Table 4.3.

> *Proposition 4.1: Firms operating in a mature single industry generally need to employ a functional form, and either systems or socialisation capabilities in order to generate the required knowledge integration capacity.*

> *Proposition 4.2: Firms operating in an emerging industrial complex generally need to employ either a matrix or innovative form, and co-ordination capabilities in order to generate the required knowledge integration capacity.*

Summing up, the conceptual framework and score card of fit developed in this chapter can be applied to Stage 1 and Stage 2 of the process of mediamorphosis taking place within traditional publishing firms. This application subsequently can be used to judge the assumptions and propositions. In order to do so, an answer to the following question is needed. This question is addressed in further detail in Chapter 5 to 8.

> *Question 4.1: How do firms, moving from a mature single industry to an emerging industrial complex, match the change in the knowledge integration requirement with changes in their knowledge integration capacity by means of changing their organisational form and integration capabilities?*

5

Mediamorphosis in the traditional publishing sector

5.1 Introduction

Because of their tremendous impact, the developments in information and communication technology have generated a lot of attention. Whereas terms as multimedia, interactivity, and virtual reality were hardly heard of only a decade ago, by now they are attracting widespread media coverage and have been incorporated in our daily vocabulary. Business Week, for example, declared 1995 as the 'Year of the Internet', while in November of that year, even the more conservative journal The Economist changed its book review section into a review section of books and multimedia. Moreover, The Wall Street Journal Europe issued a supplement named 'Convergence', and the Financial Times introduced a separate section on ICT. So, it is clear that since the mid 1990s the digital era has been gaining critical momentum. In fact, it is widely accepted that the emerging multimedia complex will offer some of the largest business opportunities of the 21st century. Still, it is sometimes hard to tell ripe from hype. Hence, this chapter first of all aims to provide clarity around the confused terminology by addressing the recent developments in information and communication technology and providing a sketch of the multimedia landscape. Subsequently, the analysis zooms in at one of the constituent sectors of the emerging multimedia complex, namely traditional publishing. The key characteristics of this sector are described, with particular reference to the European and Dutch situation. Finally, the methodology used to conduct the case study research is explained. Because the Dutch publishing sector forms the context of the case studies presented in Chapter 6, 7, and 8, a number of specific examples of the process of mediamorphosis is presented.

5.2 The digital era

In 1946, the first all-electronic computer, named ENIAC[45], was demonstrated at the University of Pennsylvania. The machine weighted 30 tons, filled the space of a two-car garage and contained 18,000 vacuum tubes. It drew so much electricity that it caused the lights in a nearby town to dim each time it was used (Bunch & Hellemans, 1993). Today, computing devices are omnipresent. Microchips are applied in cars, electric shavers, telephones, and many other devices that run on electricity and require steering and control functions. So, the main driving force behind this tidal wave of innovations is the change from an analogue to a digital form of representation, storage, and transportation of information. In addition, the performance indicators of processing chips are doubling every two years, while their size is getting smaller and smaller. The result of it all has been a transformation of the way in which individuals, organisations, businesses, and societies as a whole function. Compared to the agricultural era and the industrial era, the impact of information and communication technology has been labelled as the 'post-industrial society' (Bell, 1973), 'third wave' (Toffler, 1980), 'information age' (Eisenhart, 1994), or simply digital era. In the digital era, service occupations are becoming the dominant forces of economic activity, versus the 'extractive' activities of the pre-industrial society, and 'fabrication' activities of the industrial society.[46]

Although largely being driven by technological innovations, technology is clearly not the only factor that shapes the future of the digital era. Social, economic, political, and psychological factors are at least as important.[47] Information and communication technology is creating complete new ways in which we live our lives. It not only redefines our personal work and leisure time, it also affects politics, crime, and the distribution of wealth (Forester, 1985). In other words, the digital era is a sociologic-economic-technological 'paradigm shift' (Tapscott & Caston, 1993). The purpose of this study, however, is not to provide a comprehensive account of this paradigm shift. Here, the focus is primarily on the economic and business implications of the digital era.

[45] ENIAC stands for electronic numerical integrator and computer.

[46] Initially, the idea of the post-industrial society was based on the economic studies by Machlup and Porat in the 1960s, who assessed the proportion of information related job activities in the US economy.

[47] One could even argue that the digital era is shaped by biological forces, considering the recent creation of species such as the *homo zappens* and the *screenager*.

The rise of the digital era has generated tremendous consequences for businesses of any nature. Individual businesses are faced with the challenge of adopting information and communication technology and incorporating it into their business processes. This challenge is, however, only indirectly addressed in this study. Above all, the focus is on players who are involved in the generation of information and communication products and services. These players are for instance active in telecommunication, computer hardware, and publishing. Among this large and diverse set of players, convergence clearly is the dominant trend when compared to the situation of a number of decades ago. Heretofore seen as separate industries with their own set of technologies, products, markets, and distribution networks are increasingly being viewed as component pieces of a new 'meta-industry' (Eisenhart, 1994). This meta-industry has been labelled under different names. Among the more ordinary names are 'multimedia cluster' or 'information and communication industry'. Examples of more exotic names are 'Infocosm' (AT Kearny) and 'Communacopia' (The Economist). In this study the term 'emerging multimedia complex' (EMC) is practised for the reason that it is both literally and figuratively an exponent of an emerging industrial complex (EIC).

5.2.1 The emerging multimedia complex

The multimedia complex is not a homogeneous set of firms. Hence, exploring new landscapes requires new maps. During the last two decades several attempts have been made to develop analytical maps of the multimedia landscape. Some of these maps use the functionality of the different actors as classification criterion, others use traditional industry classifications, and yet another option is to depict the actors' interrelatedness as a value chain. An early, and by now well-known example of mapping the multimedia landscape is the 'information business map' provided by McLaughlin & Birinyi (1984). More recent contributions are provided by Aksoy (1992), Hagel & Eisenmann (1994), and Stewart (1994).[48] One of the simplest classifications is suggested by Tapscott (1996), who makes a distinction between three multimedia Cs: content, computing, and carriage.

The content sector constitutes firms involved in the creation of information and communication content, such as films, television programmes, entertainment, music, games, newspapers, and books. Until recently, most of the content was still analogue. Today, however, content is more and more created, amended, and stored

[48] ARC Associates, in co-operation with the Wall Street Journal Europe, regularly publishes up to date overviews of the interrelatedness of the different sectors of the multimedia complex.

in digital form. Typical content players include Disney, Polygram, Nintendo, and Time Warner. Computing, the second sector, refers to firms involved in the manufacturing of hardware and software to process information and communication content. The computing sector can be seen as the primary driving force behind the emergence of the multimedia complex. Typical computing firms include Intel, IBM, Ericsson, and Toshiba (hardware), as well as Microsoft, Netscape, and Oracle (software). Finally, the carriage sector refers to firms involved in the transport or distribution of information and communication content. Examples of carriage infrastructure are telephone and television cables, satellites, and other networks. Typical carriage firms include AT&T, MCI, and BT. The focus in this study on traditional publishing firms implies a focus on the content sector of the emerging multimedia complex.

Because the emerging multimedia complex is changing at a very high rate it is difficult to provide descriptions or characterisations which do not lose their relevance within a short period of time. Hence, only a few typical issues and trend are briefly discussed to provide some flesh to the multimedia skeleton. An important aspect of the emerging multimedia complex is that it completely overthrows existing value chains, competition rules, and relevant resources. Hence, what once seemed to be the best way forward might very soon turn into a disaster. An example of this is the fact that the locus of making money in the multimedia landscape has shifted over time. In the 1970s it were the big hardware manufacturers, in the 1980s it were the software companies, while in the 1990s it were the netware developers. With the turn of the century ahead, the question rises who will be in the future driver's seat (Collis, Bane & Bradley, 1996). Content providers are a likely candidate. This is expressed by the eagerness observed among hardware manufacturers to buy their way into the content sector. In the 1990s Sony hooked up with Columbia Pictures, Matsushita with MCA, and Toshiba with Time Warner. Many of these alliances, mergers, or acquisitions were, however, revoked only a few years later.[49]

Another trend in the multimedia landscape is the battle for global hardware and software standards. Notorious in this respect is the VCR battle in the 1970s between Philips (V2000), Sony (Betamax), and JVC (VHS), which was ultimately won by JVC. More recently, a similar battle took place between Philips (DCC) and Sony (MD) with regard to the music cassette. Standards create compatibility, which is beneficial to both users and producers. Standards may also, however, create

[49] An overview of merger and acquisition activities in multimedia is provided by KPMG (1993).

extreme market dominance, which may be detrimental to competition and innovation. Well-known examples of such monopolies are the positions of both Intel and Microsoft, which dominate over 80% of the markets for processors and operating systems respectively.

A final aspect of the emerging multimedia complex is that it has always attracted strong personalities, who in some cases developed into real tycoons. Such tycoons are largely found in the US, the traditional media Mecca. Examples are (or were) Michael Eisner of entertainment company Disney, John Malone of cable company TCI, Ted Turner of broadcasting company CNN, Steve Jobs of computer company Apple, and Bill Gates of software company Microsoft. But also outside the US several examples can be found. Among these are Italy's Silvio Berlusconi, Australia's Rupert Murdoch, and Britain's late Robert Maxwell. And even the Netherlands, albeit more modest, have their local equivalents in Joop van den Ende and John de Mol. They are the founders and former owners of media production company Endemol, which is among the biggest players in Europe.

The Dutch multimedia complex

Viewed from the demand side, the Netherlands is not really a media-minded country. The average number of movie tickets sold is just over one per person per year. The figure for book sales is not impressive either: less than two per person per year. On the supply side, however, the Netherlands hosts a number of big media firms. The Amsterdam and Schiphol Airport area has a favourable position in this respect.[50] Within this area, a high concentration of multimedia and related firms can be found, such as publishing firms, advertising agents, Internet providers, television producers, and European or Dutch headquarters of international companies such as Microsoft, IBM, and Cisco. In addition, Philips, which is one of the world's biggest consumer electronics firms, has recently moved its headquarters to Amsterdam. A selection of ten important multimedia players of Dutch origin is presented in Table 5.1. The players included in this selection all have their stocks traded at the Amsterdam Exchanges (AEX).

[50] In general, firms in high technology industries tend to cluster at particular locations (Swann, Prevezer & Stout, 1998). This also holds for information and communication technology. Examples are the hardware developments in the San Francisco Bay Area ('Silicon Valley') and software developments in New York ('Silicon Alley').

Company	Activities	Multimedia sector
Baan Company	Computer software	Computing
De Telegraaf	Publishing, television stations	Content
Endemol	Television programmes, entertainment	Content
KPN Telecom	Telecommunication	Carriage
Philips	Consumer electronics, telecommunication	Computing, carriage
Reed Elsevier	Publishing	Content
Tulip	Computer hardware	Computing
VNU	Publishing, television stations	Content
Wegener	Publishing, television stations	Content
Wolters Kluwer	Publishing	Content

Table 5.1 Selection of Dutch multimedia players.[51]

It is clear that the above list expresses a dominance of content firms in the Netherlands. More in particular, five out of the ten firms are traditional publishing firms. This is one of the reasons why the next section zooms in on the traditional publishing sector.

5.3 The traditional publishing sector

Being developers and distributors of all types of information products and services, publishers are placed squarely in the midst of the emerging multimedia complex. Although the emergence of the multimedia complex has made traditional industry classifications largely obsolete, publishing is still often named together with printing, simply because the two sectors are historical twins. Until 1995, for instance, the European Commission grouped the publishing and printing sectors

[51] This table needs some explanation. Endemol was a Dutch company until spring 2000, when it was taken over by the Spanish multimedia giant Telefónica. KPN Telecom is the former state-owned post and telecommunication company. In 1998 the original company was split up into two separate companies. Reed Elsevier is not a purely Dutch company. In 1993 it was founded as a consequence of the merger between the British company Reed, and the Dutch company Elsevier.

(NACE 473 and 474 respectively)[52] together in its yearly 'Panorama of EU industry'.[53] The same holds for the US classification, where SIC 27[54] stands for printing, publishing, and allied industries. So, printing and publishing activities are closely related, but on the level of the individual firm the two are less and less intertwined. Nonetheless, when providing an outline of the publishing sector, including its history, one simply cannot ignore these traditional classifications. Following the EU classification of printing and publishing, a number of interesting facts can be detected. Below, the characteristics of the traditional publishing sector on both the levels of the European Union and the Netherlands are described. But first, a brief history of publishing is provided.[55]

5.3.1 History of publishing

The early roots of the term publishing are merely "to make public".[56] When printing technologies came into existence, the possibilities of making information public drastically increased. Instead of manually copying, books could suddenly be mass-produced. Hence, publishing became more and more associated with the production, sale, and distribution of printed material. With the emergence of the digital era, the possibilities of making information public once again drastically increased. Next to the range of paper, or so-called folio media, information could also distributed via new, digital media. Still, despite of all the developments, the main function of a publisher remained more or less the same. Hence, a publisher is defined as follows.

[52] NACE stands for *nomenclature d'activités economoniques*.

[53] On a higher level of aggregation, publishing and printing were even linked with the production of pulp, paper and board (NACE 471) and the converting of paper and board (NACE 472). The 'Panorama of EU industry' for the year 1996-97 was the first that included a separate section on the information society, labelled as the revised NACE 64 and 72. Still, even in this edition publishing was combined with printing and reproduction of recorded media into the revised NACE 22, while electronic information services are grouped under NACE 72.

[54] SIC stands for standard industrial classification.

[55] The history and characteristics of the publishing industry, in particular in relation to the Dutch situation, have been extensively described and analysed by Van den Brink (1987) and Kist (1996).

[56] The word publishing stems from the Middle English *publisen* or *publishen*. Ultimately, however, the roots go down to the Latin *publicare*, meaning to make known publicly.

Definition 5.1: A publisher is a professional organiser of content, multiplication, making public, and dissemination of information aimed at specific, as well as sufficiently sizeable groups of customers. (cf. Van den Brink, 1987: 104).

This definition illustrates a number of points. First of all, a publisher is an intermediary between writer and reader. As such, a publisher operates as a spider in a web of information flows. Essentially, a publisher does not create or manufacture a physical product, but is the central organiser of a number of parties who contribute to the fulfilment of a demand for information. A publisher is responsible for the overall process from information source to information user. Because a publisher subcontracts most of the actual activities in this process, the value added by a publisher is often quite limited.[57] Still, by taking the commercial risk, a publisher appropriates the majority of the overall value added during this process.

As also indicated in Definition 5.1, the activities that constitute the publishing process are basic human communication activities. Over time, these activities time have been enriched with the development of speech, script, paper, and digital media. Still, the widespread and large-scale application of publishing was initiated by the invention of mechanical printing. Different parts of the world followed different development paths in this respect, but in the Western world the bible printed by the German Johannes Gutenberg in 1456 can be seen as stepping-stone.[58] Gutenberg was the first to apply mass-production principles to the process of reproducing manuscripts, which until then was predominantly carried out manually.[59]

Since publishing was established in an era of illiteracy, books for a long time were exclusively being read by clergymen, and later also the educated and affluent. Hence, publishing remained a 'cottage industry' consisting of relatively small firms and dominated by gentlemen art dealers. Because of its small scale and cultural character, publishing could hardly be labelled as an industrial activity. Even today,

[57] Interestingly enough, the German term for publishing, namely *verlegen*, literally means contracting out.

[58] A comprehensive historical account of the early development of information and communication technologies can be found in Kist (1996).

[59] Gutenburg used unattached metal letters and a special printing press. Xylography, or reproduction with the help of woodcuts, was already in use at that time. Because the woodcuts could not be altered, however, xylography did not evoke a major breakthrough, while Gutenburg's method did.

there are representatives of the traditional publishing era that abhor the idea of being named in one and the same breath with manufacturing activities. After all, publishing firms do not have factory chimneys. Still, the developments in information and communication technology are now seriously changing the nature of the publishing, printing and pre-press sectors, as indicated in the following quote by Feldman (1990: viii).

> "If we attempted to characterise the electronic information industry in a few words, we would have to say it is fragmented, diverse, jargon-ridden, fast moving, rich with as yet unrealised potential, and full of implications for anybody who either publishes or uses information."

The impact of technology on the demand for output of the publishing sector is multi-faceted. As the benefits of advances in information and communication technology become increasingly diffused across a wider population, the market for electronic information is expanding and the spectrum of media is becoming wider and also more volatile. Hence, there is a need to reformulate expansion strategies based on print to take account of screen-based media. The general message in this respect is to master a wide range of traditional and new media. The changes from traditional to digital era publishing are reflected in Table 5.2.

	Traditional publishing	**Digital era publishing**
Information representation	Analogue	Digital
View of business	Format-based	Content-based
View of offering	Products	Products and services
View of customer	Passive reader	Active user
Media formats	Folio	Folio and electronic
Process technologies	Mechanical	Electronic
Marketing orientation	Product-focused	Customer-focused
Communication	One-way	One-way and two-way
Distribution	Physical	Physical and electronic
Management	Format-specific	Integrative

Table 5.2 The paradigm shift to publishing, based on Eisenhart (1994: 38).

Summing up, publishing, until recently, could be characterised as a mature sector of moderate and steady growth. The digital era, which now threatens the future of paper-based production, is causing important changes. These changes, however, will take a long time span to take place. Typical in this respect is that already in 1969 publishers were discussing the expected breakthrough of electronic publishing at the world's biggest book fair, the Frankfurter Buchmesse. Still, it took until 1993 to create the momentum for a separate forum on digital information, the Frankfurt Electronic Media Conference.

5.3.2 The European publishing sector

The majority of the printing and publishing companies in the EU is (very) small, and serves local or regional markets. This is particularly true in the printing sector.[60] Of the total population of printing and publishing companies, around 85% are employing less than 20 workers, while only 1% employ more than 500 workers. Among the latter group of big companies are international conglomerates such as Bertelsmann and Axel Springer (Germany), Havas (France), Pearson and Reuters (UK), Reed Elsevier (UK/the Netherlands), and Wolters Kluwer (the Netherlands). Publishing companies are among the most profitable companies in Europe, which is reflected in Table 5.3.

Despite of the fact that the majority of publishing companies consists of small companies, the publishing sector is highly concentrated. In each EU country the ten largest publishing companies control between 50 and 70% of industry turnover. The two main trends noticeable among the larger players are concentration and globalisation. The first trend is expressed by growth via merger and acquisition, which favours economies of scale. This trend is not equally marked in all countries, but it is growing everywhere. Despite of this concentration, small publishing houses have a capacity for creativity and flexibility that allows them to stay in the market as well. Hence, the bulk of the industry's firms is likely to remain small.

Together, printing and publishing have shown a steady growth over the last decades. In most EU countries, consumption and production nearly doubled between 1984 and 1993. Although overall consumption growth slowed down in 1992, and was even negative in 1993 (reflecting the recession in the EU), it picked up again in 1994. At the same time, employment in the sector grew steadily from

[60] The EU printing industry is separately described in Kitson, Prince & Mønsted (1993).

1986 until the onset of the recession in 1991, when it peaked at more than 884,000 employees. By 1994 it had fallen to an estimated 820,000 employees.

Rank	Company	Country	Sector	ROCE[61]
1	Emap	UK	Publishing	208.6
2	Wolters Kluwer	NL	Publishing	121.2
3	Reed Elsevier	UK/NL	Publishing	93.8
4	Rentokil Group	UK	Chemicals	71.1
5	WPP Group	UK	Advertising	67.6
6	Vodafone	UK	Telecommunication	64.2
7	Polygram	NL	Entertainment	62.8
8	Berendsen (Sophus)	DK	Business services	56.1
9	Reckitt & Colman	UK	Healthcare	54.9
10	Astra	S	Drugs	52.3

Table 5.3 Top ten most profitable European companies, based on the 1994 FT500 (source: The Financial Times, January 20, 1995).

Trade intensities are very low in the printing and publishing sector. The export/production ratio is about 4 to 5%, and the import/consumption ratio is around 2.5%. This reflects a number of factors. On the one hand, much of the output is based on locally or regionally articulated and specified demand preferences. On the other hand, major national markets are often dominated by large domestic business groups. Still, the EU trade balance with the rest of the world is in surplus both in value and volume terms. In 1993, the value of EU printing and publishing exports was well over twice the value of imports.

Within the EU, wide use of the English language has allowed the UK to benefit the most from the single European market created in 1992, closely followed by the Netherlands. In absolute figures, the UK is the largest EU printing and publishing producer, and is becoming a crucial centre for European publishers, as well as an important entry point for North American printers and publishers.

[61] ROCE stands for return on capital employed.

Although the EU printing and publishing sector is becoming more internationalised, it remains more a collection of national industries than an integrated European industry. The multiplicity of languages provides an important barrier in this respect. The relative printing and publishing specialisation in the various EU countries is depicted in Table 5.4.

Rank	Country	Ratio	Rank	Country	Ratio
1	The Netherlands	1.70	6	Portugal	1.08
2	United Kingdom	1.60	7	Belgium	1.02
3	Denmark	1.35	8	Italy	0.79
4	Spain	1.28	9	Ireland	0.74
5	France	1.13	10	Greece	0.67

Table 5.4 Printing and publishing production specialisation[62] per EU country[63] in 1994 (source: 'Panorama of EU industry' for the year 1996-97).

In September 1993, the Clinton/Gore Administration presented a plan regarding the development of a 'National Information Infrastructure' in the US. In response to these initiatives displayed by the US government, the EU is trying hard to stimulate the development of a strong European industrial complex related to information and communication technology. Accordingly, DGXIII, the EU Directorate General responsible for telecommunication, information market and exploitation of research, has initiated several programmes.[64]

Between January 1995 and June 1996, studies on the supply, demand and infrastructure of the markets of electronic information services (EIS) for professional purposes were conducted in 17 countries of the European Economic Area (EEA).[65]

[62] Ratio of production in printing and publishing compared to the overall manufacturing industry, divided by the EU ratio.

[63] Figures for both Germany and Luxembourg were not available.

[64] One of these programmes is IMPACT, which stands for information market policy actions. Part of the IMPACT programme is IMO, which stands for information market observatory. IMO publishes a wide range of reports on information and communication technology in the EU.

[65] The EEA constituted the member states of the EU plus Norway and Iceland.

Country	Market share (supply)	Market share (demand)	EIS intensity
United Kingdom	63.5	28.4	1.38
France	11.4	18,5	1.01
Germany	5.7	14.4	0.35
The Netherlands	4.3	6.3	0.94
Italy	4.1	8.5	0.41
Denmark	2.0	3.8	1.26
Sweden	1.9	4.3	1.07
Norway	1.6	3.2	1.47
Finland	1.6	2.8	1.63
Portugal	1.0	1.8	0.99
Spain	0.9	1.8	0.19
Belgium	0.7	1.8	0.40
Greece	0.6	1.0	0.63
Austria	0.4	1.5	0.30
Ireland	0.2	0.7	0.71
Luxembourg	0.1	1.0	3.68
Iceland	0.0	0.2	1.70
Total	**100.0**	**100.0**	**0.66**

Table 5.5 The European information industry in 1994 (source: 'Member States Study').[66]

[66] Market share (supply) refers to the worldwide revenues of EIS suppliers in each EEA country as percentage of the total EEA revenues. Market share (demand) refers to the revenues from EIS in each EEA country (= total expenditure of users in each country) as percentage of the total EEA revenues (= market volume). EIS intensity refers to the total EIS expenditures in relation to the gross domestic product of each EEA country in ‰ Liechtenstein, although part of the EEA, did not participate in this study.

This so-called 'Member States Study' provides accurate insight into where the different European countries are heading specifically in relation to electronic information services. Compared to the situation in 1992, the market almost grew with 50%. Figures regarding the supply and demand side of the market for EIS are presented in Table 5.5.

The Dutch publishing sector

As indicated in the previous section, the Netherlands historically hold a strong position in printing and publishing, both in absolute and relative terms. Based on figures from the Dutch central bureau of statistics, the overall turnover of Dutch publishers reached more than Dfl. 8.7 billion in 1996. Similar to the situation in the EU in general, the publishing sector in the Netherlands is characterised by a large number of (very) small companies and a limited number of (very) large players. The first group primarily consists of publishers of specialised books and journals, often founded by a single person with a special interest in a particular subject, and often employing less than five people. The second group consists of (international) conglomerates of all sorts of publishing activities, which were formed through a process of mergers and acquisitions, and which are employing thousands of employees. Well-known examples of the second group are Reed Elsevier, VNU, and Wolters Kluwer, which belong to the premier league of multinational publishers. The Dutch top 5 is presented in Table 5.6.

Rank	Publishing company	Turnover	Profit
1	Reed Elsevier	8,892	1,589
2	Wolters Kluwer	4,315	479
3	VNU	3,369	322
4	Wegener Arcade	1,498	69
5	De Telegraaf	1,284	85

Table 5.6 Top 5 Dutch publishers according to turnover and profit in 1996.[67]

[67] All figures in Dfl. million. The official figures for Reed Elsevier were presented in pound sterling. In 1996 Wegener Arcade was still one company. In 1999 it was split up into Wegener and Arcade, just as prior to 1995.

5.3.3 The information pyramid

The publishing business can be divided in a number of ways. Most statistics use a classification according to different media, or product types. The common distinction in this respect is newspapers, books, journals, and miscellaneous. Another well-known way of classifying the publishing business is according to different market segments. This results in the information pyramid, which is depicted in Figure 5.1. The pyramid consists of three levels: scientific, professional, and consumer information.[68] Below, the characteristics of the three levels are further explained.

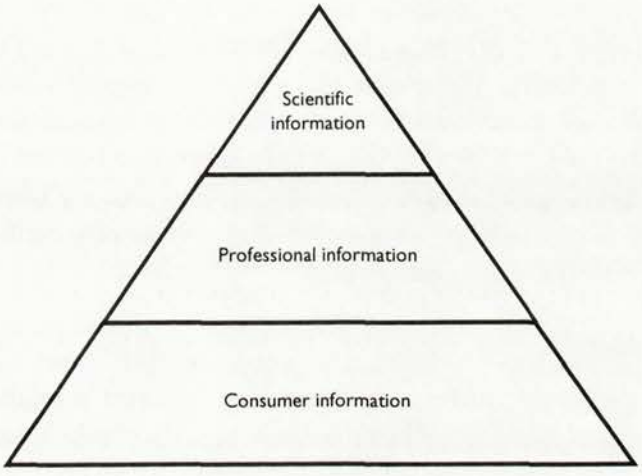


Figure 5.1 The information pyramid.

Scientific information

The upper level, the market for scientific information, is highly international and made up of only a relatively small number of customers. The necessity of information is very high. Scientists need to be able to track the advancement of their specific field very conscientiously. Hence, this segment is often referred to as 'need to know' or 'must have' information. The main medium has for a long time been the scientific journal, but is now increasingly being supplemented by digital media such as CD-ROMs and on-line databases.

[68] The second level of professional information is sometimes further split up into segments for educational and business information (cf. Jagersma, 1994). Here, the second level is treated as one.

The content of the information products in this market segment is produced for, as well as by the scientific community. Since this community traditionally has almost no commercial interest, the content is delivered almost for free to publishers. At the same time, the subscription rates to scientific journals are very high, price elasticity is minimal, and demand is almost insusceptible to economic trends. Hence, profitability is both enormous and predictable in this market segment. Estimates run to more than 40% for some products. Important players in this segment include Reed Elsevier and McGraw-Hill.

For a number of reasons, the scientific information market is rather peculiar. First of all, the user, purchaser, and payer of information are all different. A scientist uses the information, the library of his or her institute orders the information, and the university (which is highly subsidised) pays for the information. As such, it resembles the market for subscribed drugs. Another characteristic of the market for scientific information is that is highly international. In contrast with publishing markets in general, the scientific information segment is dominated by one language (English) and customers of a single product can often be found in many different countries. As a consequence, operations of scientific publishers are often internationally organised as well.

Professional information

The middle level, the market for professional information, is larger than the scientific segment. Except for some financial professions (e.g. stockbrokers and chartered accountants), and legal professions (e.g. barristers), the necessity of information is generally less than in the scientific segment. The media spectrum is quite varied in this segment. It includes folio products such as journals, newsletters, newspapers, books, and loose-leaf systems, but also congresses, fairs, seminars, courses, and workshops, as well as digital media such as CD-ROMs, e-mail services, television, fax-service, and various Internet applications.

Similar to the characteristics of the scientific information market, the majority of professional information products is sold directly and on subscription basis. The fact that there often is no intermediary party (e.g. a bookstore) involved, combined with the fact that subscribed information is pre-paid, secures publishers of a profitable and steady income stream. Profitability generally lies between 15 and 20%. Important players in this segment include Reed Elsevier, Wolters Kluwer, Reuters, Knight-Ridder, and Dun & Bradstreet.

The 'Member States Study' mentioned above, contains detailed figures regarding the two highest levels of the pyramid specifically with regard to electronic information services. These figures are reflected in Table 5.7.

Subject area	Revenue	Market share
Financial information	1,848.0	33.5
Company profiles, credit ratings	1,375.5	25.0
Government/political information	903.0	16.4
Further business and economic information	415.7	7.5
Scientific, technical and medical information	334.5	6.1
Legal information	171.7	3.1
Travel and tourism information	43.1	0.8
Patent information	40.0	0.7
Other	379.5	6.9
Total	**5,511.0**	**100.0**

Table 5.7 The most important scientific and professional subject areas for the European information industry in 1994 in million ECU and in % (source: 'Member States Study').

Consumer information

The lowest level of the information pyramid, the market for consumer information, is the biggest and most varied segment. Consumer information is to a large extent aimed at leisure and entertainment. Hence, this segment is often referred to as 'nice to know' information. The spectrum of media is even wider than in the professional segment. It includes newspapers, books, general-interest magazines, film, radio, and television. Despite of numerous ambitious projects with video-on-demand and pay-per-view, new media are still only making up a very small portion of the overall market.[69]

An important difference with the scientific and professional segment is that the consumer segment is strongly influenced by advertising. For product categories such as commercial television a publisher's income is even completely generated by

[69] Compared to Europe, the US in general is ahead with new media developments. This holds especially with regard to the consumer information segment. The larger installed base of equipment such as PCs, modems, and CD-ROM players is an important factor in this respect.

advertising. The reliance on advertising money makes the consumer information segment very sensible to economic trends. Profitability generally lies between 7 and 15%. Important players in this segment include Time Warner, Walt Disney, and Bertelsmann. Together, the main characteristics of the three layers of the information pyramid are summarised in Table 5.8.

	Scientific	Professional	Consumer
Market size (customers)	– –	+/–	++
Market spread (geographical)	++	+/–	– –
Information necessity	++	+	+/–
Price elasticity	–	+/–	+
Economic sensibility	– –	+/–	+
Product profitability	++	+	+/–
Importance of advertising	– –	+/–	++
New media opportunities	++	++	+/–
Traditional media	journal book	newspaper journal book loose-leaf newsletter	newspaper book magazine radio television video
New media	database CD-ROM Internet	Internet Intranet CD-ROM CD-i database audiotex videotex	CD-ROM CD-i Internet

Table 5.8 Classification of the three types of market segments constituting the information pyramid.[70]

[70] ++ reflects the high end of a continuum, – – reflects the low end.

The following section addresses the implications of this classification for the strategic behaviour of publishing firms. In addition, the section on the case study methodology that is presented further on, addresses the implications of this classification for the selection of case study firms.

5.3.4 Strategic behaviour

As indicated in Definition 5.1, an overriding characteristic of publishers is that they are 'narrowcasters' rather than 'broadcasters'. The aim is to define market segments that are narrow enough to attract specific attention, while broad enough to be economically viable. This holds for all the segments of the information pyramid. Hence, all three segments are highly segmented. Besides the general aspect of segmenting, the strategic behaviour of publishing firms can be characterised in a number of ways. Below, three of these aspects are focused on, namely positioning, mergers and acquisitions, and innovation and new business development.

Positioning

In general, publishers have positioned themselves on one or two layers of the information pyramid. This also holds for the Dutch players. Elsevier, before merging with Reed, concentrated in particular on the scientific segment. After merging with Reed, which focused on the professional segment, the company now follows a dual strategy. Activities that do not fit in either the scientific or professional segment are disposed of. Recent examples of this are Reed Elsevier's sale in 1995 of NDU, its Dutch newspaper division, and Bonaventura, its general interest magazine group. Early 1998, Reed Elsevier also sold IPC Magazines, its British magazine division.[71] Wolters Kluwer, the second major Dutch publisher has positioned itself predominantly in the professional segment. Finally, VNU for long has been accused of not following a clear positioning strategy. Traditionally, it has been active in the consumer segment with general interest magazines, regional newspapers, television production and broadcasting. During the last two decades, VNU more and more expanded into the professional segment. The most vivid example of this was the acquisition of ITT World Directories for Dfl. 4.2 billion in December 1997. Moreover, VNU has sold most of its printing activities. The

[71] It is noted that Reed Elsevier is still to some extent active in the consumer information segment. It for instance contains a division that is active in the publishing of consumer books.

positions of the three major Dutch publishers on the information pyramid are presented in Figure 5.2.

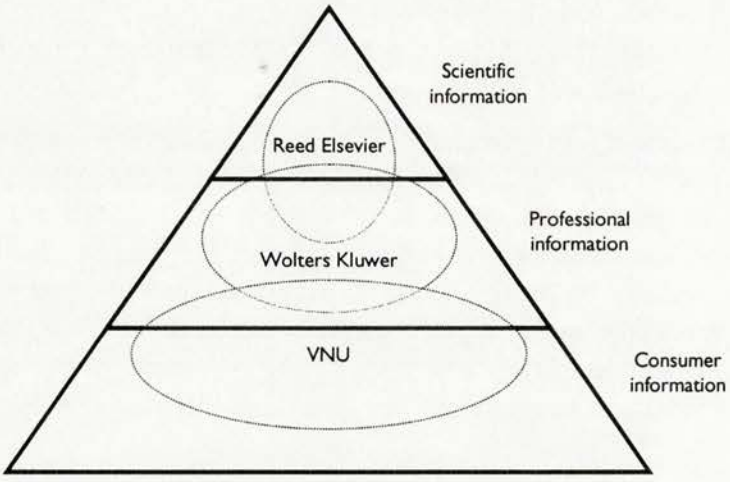


Figure 5.2 Positioning of the three major Dutch publishers on the information pyramid.[72]

Mergers and acquisitions

For long, the dominant strategy among publishing firms has been growth by merger and acquisition. This strategy has led to an increasing concentration, as pointed out by Compaine (1982). In many cases, the aim was not to integrate the acquired companies into the existing organisation. Instead, the acquired companies were left decentralised and their turnover and revenues were simply added up at the corporate level. A typical example of a Dutch company following this strategy is Wolters Kluwer. For long, Wolters Kluwer was composed of tens of small publishing firms serving local market segments in different, mainly European countries. Only recently, Wolters Kluwer undertook bigger acquisitions, such as the incorporation of CCH in 1995. A consequence of the ongoing merger and acquisition behaviour is an even higher concentration ratio than already present. Hence, recent mergers and acquisitions in the Netherlands have generated criticism

[72] The size of the ellipses does not refer to the size of the firms but corresponds with the width of the pyramid. Furthermore, the position of the ellipsis points at the companies' primary market segment, which does not imply that this is the only market segment targeted.

from both the Dutch and EU government, as well as from customers. Among these mergers and acquisitions are the take-over of Koninklijke Vermande by Sdu, and the take-over of Colofon by Reed Elsevier. Most striking in this respect, however, was the intended merger between Wolters Kluwer and Elsevier. In the fall of 1997, Wolters Kluwer and Elsevier, one of the two parent companies of Reed Elsevier, announced that they had plans to merge with each other. This merger was scheduled to take effect early 1998 and would create the world's biggest publishing company of scientific and professional information. In reaction to these plans, the European Commission started an inquiry into the compliance of the merger with European competition rules. Before a verdict was reached, however, Elsevier and Wolters Kluwer cancelled the entire merger in the spring of 1998. Hence, the companies Reed Elsevier and Wolters Kluwer remained separate entities.

Besides following an expansion strategy, publishing firms have loosened up their historical bond with graphic firms during the last decades. Publishers disposed of printing, pre-press, and reprographics because of the capital-intensive investments needed, low profitability levels, as well as an overall tendency in business to go 'back to basics'. In the digital era, the divestment argument has become even stronger. The introduction and adoption of new media have made traditional printing, pre-press, and reprographics activities partly obsolete. Still, there also is a flip side to this story.

Innovation and new business development

A third strategic option that has received limited attention by many publishing firms is internal innovation and new business development. Part of this neglect is related to the limited technological history of publishing. Graphic companies have recently developed a lot more knowledge of information and communication technology than publishers have. Printing, pre-press, and reprographics are technology-driven and innovative sectors. Already in an early stage, they have been affected by the technological developments, enabling now widely diffused innovations such as desktop publishing (DTP).[73] In contrast, publishing is a so-called supplier dominated industry. In the past, developments in printing, pre-press, and reprographics could easily spill over to publishing because of the strong interdependence between the various sectors. The current de-coupling may, however, cause an innovation dilemma for traditional publishing firms. Hence,

[73] Examples of case studies of innovations in the printing and graphics industry can be found in Veersma (1992).

these firms need to reconfigure their organisation in order to be better equipped to deal with the opportunities and threats of the emerging multimedia complex. The next section addresses how traditional publishing firms can do this.

5.4 New and mixed media

The emergence of a new industrial complex leads to the rise of new firms that aim to participate and explore the abundance of new opportunities. Still, the focus in this study is exclusively on incumbent firms. Since the central subject of this study is organisational reconfiguration of firms moving from a mature single industry to an emerging industrial complex, it is inevitable that the focus is on firms that already have a history. Although new firms are clearly a factor at least as important in the overall development of an industry or industrial complex, new firms do not have a background in a mature single industry.[74]

Specifically with regard to the publishing sector, traditional firms are firms that have a historical background in the business of information gathering, creation, processing, and dissemination. The choice for traditional publishing firms implies a far-reaching demarcation. Not only does it exclude new firms, it also means that the focus is not on firms that already have a tradition in a different business sector, but only recently became active in the information and communication business, such as conference organisers, branch organisations, fair and exhibition organisers, trade unions, consultancy firms, employers' confederations, and educational institutions. The firms focused on in this study see the control over content as part of their core business. In other words, the firms are the owner, organiser, and/or provider of information content. Moreover, the firm's core business is to commercially exploit this content. The above is summarised in the following definition.

> *Definition 5.2: Traditional publishing firms are firms who's core business it is to commercially exploit information content, and that have built up considerable experience in doing this.*

[74] This is not to say that new firms are completely excluded from the analysis. It is for instance conceivable that an established firm that is the focal unit of analysis has invested in an interorganisational relationship with a new firm. In that case, the interorganisational relationship, and therefore the new firm, is indeed included in the analysis.

5.4.1 New media

The emerging multimedia complex offers opportunities for traditional publishing firms to develop new media products and services. New media is a relative term that can refer to several contexts: an organisation, an industry, a geographic region, or a period in time. New in this study refers to two aspects: both a certain period in time, and a level of analysis. To start with the period in time, new media is a term that came into use in the 1970s. It generally referred to electronic rather than folio media as means for communicating information. Obviously, in previous periods of time new media may have referred to another phenomenon. Radio and television once where new media. And so were the clay tablet and paper. The distinguishing characteristic of today's new media is that the information it stores or distributes is digital. Hence, new media in this study refers to CD-ROMs, on-line databases, and the Internet. It is noted that new media in this sense does not have the same meaning as electronic media, which initially was a widely used term. Electronic media also include television, radio, video, and music cassettes. Although electronic, these are still predominantly analogue media. Therefore, the term digital media is used instead of electronic media.

With regard to the level of analysis, new media is related to the level of the organisation, or more specifically, the publishing firm. In this sense, a new medium is new to a particular firm, which has to learn how to incorporate it within its product-market portfolio. In the near future, new media will not be new to most firms anymore. Moreover, in the future new media are likely to refer to even newer and yet unknown media. The above is summarised in the following definition.

> *Definition 5.3: New media are digital information and communication means that are new to a traditional publishing firm aiming to incorporate these in its product-market portfolio.*

5.4.2 Mixed media publishing

The opportunity to develop new media products and services as described above needs further clarification. First, the terms products and services are used alternately. Although in general there are certain differences between products and services, in this study the difference between products and services is arbitrary. Obviously, a book is not the same as an Internet site, but the point is that neither the book nor the site is a publisher's real product or service. The underlying information is. Therefore, the management of mediamorphosis should not be aimed at developing individual new media products and services. The real challenge

is to establish a new business model that enables the simultaneous development of both traditional and new media. Some refer to this with the term 'multimedia publishing'. Multimedia, however, has become a rather ambiguous and confusing term. By now, the ordinary man in the street seems to have heard of the term, but only few know what it is, or could be about. Even within the academic world a wide range of different definitions is in circulation. This variety has caused considerable ambiguity and indistinctness. Hence, in this study not yet another definition of multimedia offered will be offered. Instead, a classification of the prevailing interpretations is presented in Figure 5.3.

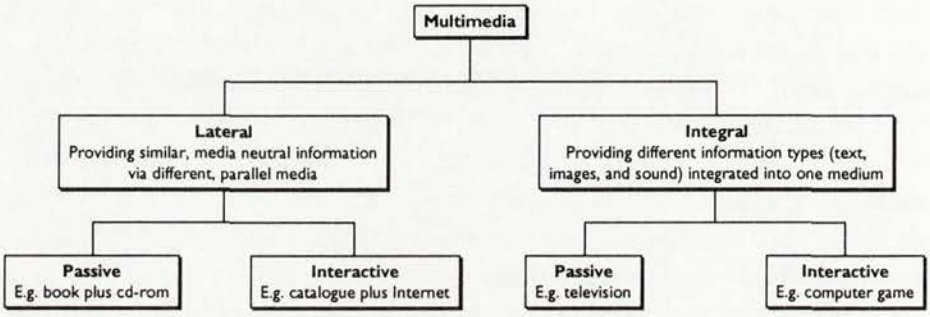


Figure 5.3 Classification of the multimedia concept (based on Kist, 1996).

The lateral interpretation of multimedia, as mentioned in Figure 5.3, is the one adhered to in this study.[75] Nonetheless, instead of the term lateral multimedia, the terms 'mixed media publishing' and 'mixed media portfolio' are used. A mixed media portfolio refers to a combination of traditional folio and new media PMCs. At first, traditional firms were more concerned about their existing portfolio of folio PMCs than about the development of new media PMCs. Over time, the attention devoted to new media changed. Most publishing firms, however, have such a strong and profitable set of old PMCs that it would be unwise to change from a pure folio to a pure new media firm. Instead, the challenge is to incorporate the new media into a portfolio that is becoming increasingly diversified. The above is summarised in the following definition.

[75] Without trying to confuse the terminology issue even more, it is noted that the division of multimedia into lateral and integral is not a matter of choosing either lateral or integral. An integral multimedia product can for instance be part of a lateral multimedia portfolio. A television programme and a magazine based on the same information content together are an example of lateral multimedia, while the television programme by itself is an example of integral multimedia.

Definition 5.4: A mixed media portfolio is a set of existing and new media product-market combinations that are related to the same information content.

In order to be capable of managing a mixed media portfolio, a publishing firm needs to adjust its organisational configuration. The firm needs to carry out an architectural innovation by adopting a mixed media publishing model. Related to the generic hierarchy of knowledge integration presented in Chapter 3, the new configuration that is required is effectuated by integrating the component knowledge related to products, production processes, and transactions in a new way. In publishing terms, these components are labelled information content, technology, and markets respectively. The individual tasks that form the basis for the component knowledge are for instance editing, database design, and account management. The PMCs that emanate from the mixed media model are for instance a journal, CD-ROM, newsletter, or on-line database. The knowledge hierarchy related to mixed media publishing is depicted in Figure 5.4.

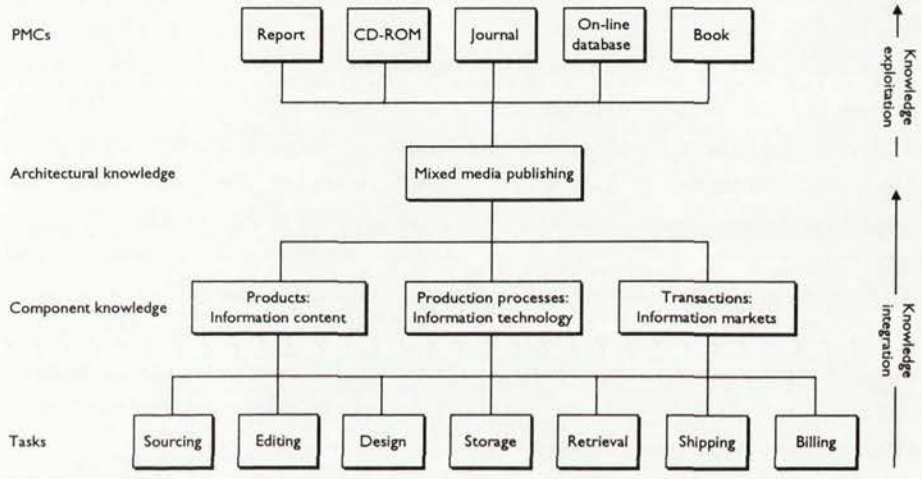


Figure 5.4 Mixed media publishing in terms of the hierarchy of organisational knowledge.

A few examples may further illustrate the mixed media concept and serve as appetiser for the case studies. The examples reflect different types of Dutch publishing firms, although not all of them can be identified as traditional publishing firms. Each firm is operating in a different segment of the information pyramid. The examples were chosen because they reflect typical opportunities and threats when trying to adopt a mixed media publishing strategy.

Elsevier Science

Elsevier Science, a subsidiary of the Anglo-Dutch publishing conglomerate Reed Elsevier, is the world's largest publisher of scientific information. Appearing under the imprints such as Elsevier, Pergamon, North-Holland, and Excerpta Medica, the publications provide research literature in the physical, life and social sciences.

In seeking to maximise the benefits of digital media, Elsevier Science has built an electronic infrastructure called Computer-Aided Production (CAP). CAP requires the retooling of journal production systems to create electronic databases that are highly structured and standardised. These databases enable the creation of electronic products and services. CAP delivers the full text of journal articles in a structured set of databases, standardised for electronic access as well as for production of paper journals.

In addition to the development of CAP, Elsevier Science is exploring a wide range of commercial initiatives. An example is Elsevier Electronic Subscriptions (EES), a service which offers all journals in electronic form on a licensed, subscription basis. Elsevier Science is working with libraries and technology providers to create the necessary infrastructures. This program is the commercial extension of TULIP (The University Licensing Program), a collaborative project between Elsevier Science and nine leading universities which ran from 1991-1995 and researched the technical, economic, and user behaviour issues in a digital library environment. The TULIP format and the experience gained during the TULIP experiment were translated into a commercial model in 1995. Available initially on a test-marketing basis, EES expanded to full implementation in 1996, offering libraries complete electronic editions of any titles from Elsevier Science's list of 1,200 journals, either in lieu of or in addition to paper journals. Recognising the need for flexibility, Elsevier Science delivers the information in open standards' formats, which makes it inherently possible to use the information in any system which adheres to open standards.

A second commercial example is ScienceDirect, which is a major on-line service developed with Lexis-Nexis, also a Reed Elsevier company. This on-line service makes Elsevier journals available as on-line full text through an integrated database. The first release of over 300 journals was tested in the first quarter of 1997 and became available by August 1997. Titles are steadily being added. Lexis-Nexis brings to ScienceDirect its experience in handling large systems and sophisticated files and in providing 24 hour, seven days a week customer support. Elsevier Science is the owner of this service and is responsible for the commercial relationships with other publishers and library services.

Gouden Gids

Gouden Gids, a former Dutch subsidiary of ITT World Directories which was bought by VNU in 1997, is leader in the Dutch market for rubricaded supplier information. Its main product is the *Gouden Gids* (cf. Yellow Pages), a paper telephone book which contains a comprehensive overview of suppliers in the Netherlands. This paper product is distributed in a total circulation of 7.2 million copies. Although the users of Gouden Gids are to a large extent located in the consumer information market, this case is listed as an example of the professional information market because the actual customers of Gouden Gids are located in the professional information market. Gouden Gids' main revenues are not generated by the book's circulation, but by selling advertisements in it. Gouden Gids claims that its paper product is consulted around 730,000 times a day, which results in around 500,000 transactions.

The same information that is available in the paper book is now available via other media as well. There is a telephone service, diskette, CD-ROM, and Internet site. The new media are clearly not consulted as frequently as the established folio version, nor do they generate significant revenues. Still, the new media create an innovative image, as well as strengthen Gouden Gids' brand name and position as undisputed market leader. Hence, Gouden Gids benefits substantially from adopting a mixed media publishing strategy.

An important element of Gouden Gids' ability to produce the mixed media portfolio is its database production system. PTT Post, the Dutch privatised postal services, experienced how difficult it is to manage such a complicated system. Similar to Gouden Gids, PTT Post issues regional telephone books. PTT Post did, however, not include advertisements in its books. Aiming to exploit the enormous commercial potential of the plain telephone book, PTT Post set up a partnership with TeleMedia to sell advertisements. At the same time, it changed to a different layout. However, the first issue of the new telephone book turned out to be a disaster. Due to problems with converting the data from the old to the new database system, the number of mistakes increased dramatically. As a consequence, the whole edition had to be redone and PTT suffered substantially.

ANWB

ANWB is the Dutch equivalent of the British RAC and the US AAA. Starting out as a bicycle association, it turned into a tourist organisation with more than three million members in 1997. Although road patrol is still one of the core activities, ANWB now provides a vast range of additional products and services. It provides

insurance, travel arrangements, technical inspections, money exchange, and magazines. A separate division, named ANWB Media, is responsible for the production of all the maps, guides, and dictionaries.

In the summer of 1997, ANWB introduced a new product named *Route-op-Maat*. The product was a tailor made information file for anyone going by car from anywhere in the Netherlands to anywhere in France, the most popular holiday destination in the Netherlands. The product provided detailed information regarding the route, as well as campsites, petrol stations, and hotels along the way. The objective was to offer the same type of product for trips to other countries in a later stage. Because all the information was stored in a computer, the product was very easy to produce. Interestingly enough, a similar type of product was also offered in the 1960s. Instead of an electronic database, however, a set of loose-leafs was used to assemble a semi-personalised file. Still, the great number of customer complaints about the product forced ANWB to stop the product already in the fall of 1997. Apparently, nearly half of the 30,000 users that had so far bought the product somehow got lost along the way to their destination in France. The reason for the information to be incorrect appeared to be related to ANWB's suppliers. A typical problem was caused by the fact that certain place-names, such as for instance Villefranche, occurred more than once. Hence, some travellers ended up in a different Villefranche than they expected.

The Dutch publishing sector has generated numerous other examples of new media developments that succeeded as well as failed. At first sight, there seems to be little clarity regarding the factors that foster or impede the likelihood of success. An important reason for this is that many examples have been studied in a too specific way to still be able to provide general implications. The majority of the examples focus on individual innovation or new business development projects without devoting equal attention to the organisational, industrial, or institutional context. This approach may lead to disputable conclusions regarding what has to be considered as best practice. On the other hand, large-scale studies often are too abstract and therefore lack managerial relevance. As indicated in Chapter 1, in this study the alternative of a 'middle-range' research methodology (Merton, 1968) is used to unravel the organisational aspects of developing a mixed media portfolio. Before presenting the empirical research in Chapter 6, 7, and 8, the next section outlines this research methodology.

5.5 Case study methodology

The next three chapters form the heart of the empirical research. They provide the results of a number of case studies of the management of mediamorphosis. In the case study research, the focus is on publishing firms that, at the time of the investigation, were in the midst of pursuing a mixed media strategy in response to the emerging multimedia complex. For a number of reasons addressed below, the focus is on Dutch traditional publishers of professional information. The aim of this demarcation is to select firms that are sufficiently homogeneous, thereby reducing the influence of factors that are not included in the conceptual framework.

Applying the conceptual framework and score card presented in Chapter 4 requires an in-depth study of the process of the management of mediamorphosis taking place in particular firms. As argued, many studies focus on general trends at the aggregate level of firms' behaviour. These studies often rely on aggregate, secondary, and quantitative information, such as annual reports and newspapers. In contrast, this study focuses on the change processes that takes place at the level of specific mixed media projects, i.e. deep inside a firm. This requires a close relationship between the researcher and the company over a longer period of time to develop a better understanding of these processes via access to particular, primary, and often qualitative information sources, such as in-company documents and interviews. The implication of conducting in-depth case studies is that the number of cases that can be investigated is limited. Below, the case study methodology is specified in further detail.

5.5.1 Case study design

Case study research can be conducted according to a number of different designs. Yin (1994) for instance makes a distinction between single-case and multiple-case design. In this study the choice is made to use a multiple-case design. This implies that a number of different publishing firms is selected as unit of analysis. In each publishing firm either only one, or a number of different mixed media projects are investigated. It is stressed in this respect that with the term publishing firm, the relevant context of the mixed media projects is meant. This does not necessarily have to be the level of the corporation, but can also be the level of a division or business unit within the corporation. In the situation where more than one mixed media project is investigated in a single publishing firm, the analysis of the firm is based on a combination of the different mixed media projects.

When using a multiple-case design, every case must be treated as an individual experiment, rather than a sample unit from a population. Therefore, the selection of cases (i.e. publishing firms) must rely on theoretical rather than statistical (i.e. random) sampling (Eisenhardt, 1989). This implies that every firm serves a specific purpose within the overall scope of inquiry and that one should follow a replication logic (Yin, 1994). Each firm must be carefully selected so that it either predicts similar results (a literal replication), or produces contrasting results for predictable reasons (a theoretical replication). In this study the choice is made for a literal replication. The publishing firms that served as subject for the case study research were selected on the premise that they would manage the process of mediamorphosis in accordance with the propositions formulated in Chapter 4.

In order to reduce the variety among the selected publishing firms, all firms operated in the professional segment of the information pyramid as depicted in Figure 5.1 and characterised in Table 5.8. The advantage of choosing this segment is that it is ahead of other information market segments with regard to the penetration of new media PMCs. In addition, it is a genuine commercial end-user information market. The scientific segment, with its odd relationships between researchers, libraries, and universities, is far less a commercial market. The consumer segment, is in many cases not really an information market, but an advertising market. For reasons of simplicity, publishers active in the professional information market segment are denoted as professional publishers.[76]

The variety among the selected publishing firms was further reduced by only looking at Dutch publishing firms.[77] The most important reason for focusing on Dutch publishing firms, however, was that the case study method chosen in this study requires close interaction with the participating firms over a substantial period of time. Hence, firms outside the Netherlands were impracticable for this type of research.

5.5.2 Selection of case study firms

When adopting the above criteria, a number of Dutch traditional publishing firms of professional information emerged. The most important of these firms are listed in alphabetical order and by their corporate name in Table 5.9. This does not

[76] The term professional publishers should, of course, not be interpreted as the antonym of amateur publishers.

[77] Examples of case studies of media firms in for instance Norway can be found in Roos & Von Krogh (1996). In addition, examples of case studies of book publishing firms in the UK can be found in Pettigrew & Whipp (1991).

necessarily mean that the firms in this list are only, or even predominately active in the professional information market. Some firms are conglomerates made up of a wide range of subsidiaries or business units active in different information markets. This especially holds for the large and international companies. VNU for instance, has strong interests in consumer information markets such as magazines, newspapers, and television. It also has a division called Business Publications. Still, the name that appears in this list is the corporation's name, rather than the division or business unit's name. When applicable, the presence of each company in the other two information market segments is also indicated.

	Scientific	Professional	Consumer
Het Financieele Dagblad		++	+/–
Reed Elsevier	++	++	+/–
Sdu	+/–	++	+/–
VNU		++	++
Wegener		++	++
Wolters Kluwer	+	++	

Table 5.9 *Most important Dutch traditional publishing firms of professional information and their presence in the different information market segments.*[78]

From the list in Table 5.9, three firms were selected. As indicated, this selection process should not be perceived as the drawing of a random sample. In addition, it is stressed that the firms were not selected to represent the state of the art in mixed media publishing. There very well may have been more advanced, sophisticated, or successful examples around. The purpose, however, was to select firms that expressed the problems of an ordinary traditional publishing firm struggling with the development of a mixed media portfolio.

The three selected firms are Het Financieele Dagblad BV (HFD), publisher of financial information, Sdu NV (SDU), publisher of government information, and Samsom H.D. Tjeenk Willink BV (SHDTW), publisher of education and

[78] ++ reflects the high end of a continuum, – – reflects the low end.

business information.[79] The positions of the three firms on the information pyramid are depicted in Figure 5.5.

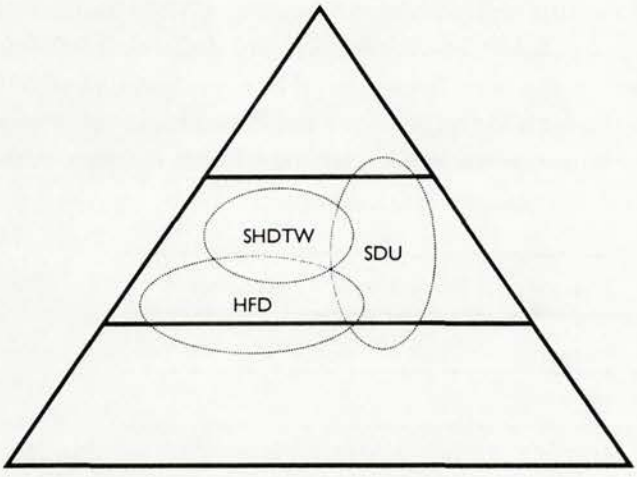


Figure 5.5 Position of the three case study firms on the information pyramid.[80]

As indicated above, within each of the three case study firms one or several mixed media projects were picked for studying the process of mediamorphosis. Based on the above discussion of mixed media publishing, there were three criteria for choosing the mixed media projects. First of all, the mixed media project had to focus on the development of a professional ('need to know') information PMC. Secondly, the mixed media project had to focus on the development of an information PMC provided via a new, digital medium. And finally, the new PMC had to be related to an already existing PMC that was based on (partly) the same information provided via a folio medium. In the case study of SDU, two mixed media projects were investigated. The two other firms, HFD and SHDTW, were investigated using only one mixed media projects. The particular mixed media project(s) chosen for each case study firm are discussed in the subsequent three chapters.

[79] The case studies of HFD, SDU, and SHDTW were also published in De Boer, Van den Bosch & Volberda (1999) and Van den Bosch, Volberda & De Boer (1999).

[80] The size of the ellipses does not refer to the size of the firms, but corresponds to their involvement in the different segments.

5.5.3 Data collection

In case study research, each individual case is a study in its own right. Convergent evidence is sought regarding the facts and conclusions for a particular case, after which each case's conclusions are considered to be the information needing replication by other individual cases (Yin, 1994). An overriding principle when doing case study research is the use of multiple sources of evidence in order to triangulate. Although the terms qualitative and case study are often used interchangeably, case study research can involve qualitative data, quantitative data, or both (Yin, 1994). The aim of this study was to use a combination of interviews, archival records and documentation to provide a (partly real-time) longitudinal description of a number of mixed media projects. These descriptions were analysed within their relevant organisational context in terms of the elements constituting the conceptual framework. Subsequently, the score card of fit for each of the publishing firms was filled out. The descriptions and analysis took place according to the following steps.

1. Within each publishing firm a specific person was appointed as central contact for the investigation of the mixed media projects. At first, the objective and design of the project were explained to this person. Together with this person a list of relevant documents and interviewees was generated. At SDU, the case study started with a presentation of the objective and design of the project to a group of managers. In this meeting the first of the two units of analysis was determined.
2. Public available sources such as academic and professional publications, journal and newspaper articles, and research and annual reports were used to gather data regarding the nature of the publishing firm and its relevant environment.
3. The selected internal documents were investigated to formulate a first longitudinal description of the mixed media projects. Based on this description, a semi-structured questionnaire was constructed to assess the various elements of the conceptual framework.
4. The selected employees were interviewed based on the semi-structured questionnaire. The interviews were held with persons (in)directly involved in the management of the firm's mediamorphosis. The interviewees were employed at multiple levels and had different functional backgrounds. Each interview was conducted face-to-face and took around 1,5 hours. Several employees were interviewed more than once. The interviews resulted in a specification of the longitudinal description as well as the assessment of the elements constituting the conceptual framework.

5. Additional observations of the firms were made during events such as meetings, conference presentations, and trade fairs.
6. Based on the documents, interviews, and additional observations, a management report was drafted. This report consisted of the longitudinal description of the mixed media project as well as the analysis of the project within its relevant organisational context in terms of the conceptual framework. The report was distributed among all the interviewees.
7. All interviewees were asked to provide feedback on the report. Depending on the amount and complexity of the comments, they were collected either in a face-to-face situation or over the telephone. The feedback was used for factual verification as well as validation of intersubjective impressions.
8. Based on the feedback, a final report was written down. This report was presented and discussed with the management of the firms. At SDU, this meeting resulted in the selection of the second mixed media project to investigate, after which this sequence of steps was followed once more.

As indicated above, individual case studies cannot be treated as sampling units. This implies that statistical generalisation is inappropriate. Instead, the method of analytical generalisation was employed. This means that the results of the case studies were not generalised to a population, but were generalised to the theory used (Yin, 1994). In order to do so, the empirical results from the different case studies are related to the conceptual framework and score card of fit in Chapter 6, 7, and 8. Accordingly, the case studies are compared and evaluated in Chapter 9.

6

Case A: HFD

6.1 Introduction

Het Financieele Dagblad BV (HFD) is a publisher of financial and business information based in Amsterdam. HFD has a long history in publishing, going back as far as 1796.[81] In that year printer, publisher, and bookseller Nicolaas Cotray founded the *Prys-Courant der Effecten*, the first regularly appearing Dutch stock price newspaper. The strong sense of tradition within HFD is illustrated by the fact that the first advertisement for Cotray's newspaper in 1796 contained a phrase that is still used as subtitle of today's newspaper. The phrase, which reads "Everything which in any way relates to finance",[82] in this respect has become a timeless mission statement of the company.

In its more than two hundred years of existence, the ownership of Cotray's initial newspaper changed several times, and various financial publications were bundled. In 1843, the *Prys-Courant der Effecten* was changed into the *Amsterdamsch Effectenblad*. In 1943, during the Second World War, the *Amsterdamsch Effectenblad* was compelled by the German occupying forces to merge with the *Dagelijkse Beurscourant*, which at that time was the only other Dutch financial newspaper. From then on, both the newspaper and its publisher took their current name,

[81] A comprehensive account of HFD's history can be found in Hoes (1986) and HFD's bicentennial anniversary publication (1996).

[82] The original text in Dutch reads "... *al het geene tot het financieele eenige betrekking heeft...* ".

namely *Het Financieele Dagblad*.[83] Over the years, the company has managed to withstand the ongoing wave of mergers and acquisitions in the publishing sector. Accordingly, despite numerous take-over attempts, HFD's bicentennial anniversary in 1996 was still celebrated in independence.

HFD's independence is to a large extent due to the complex governance structure of the company. Until 1997, HFD was economically owned by Hendrik Sijthoff Holding, which represented a sprig of well-known Dutch printing and publishing family. The holding owned the certificates of HFD's shares. Since 1983, however, the shares themselves, and therefore the actual control over the company, lay with a board of supervisory directors. One of the positions on this board was held by a foundation representing the employees of HFD, who in this way had an important, and in publishing unprecedented say in the company's affairs. It was the employees' veto declared in this board of supervisory directors that finally torpedoed serious take-over negotiations between Pearson, publisher of the Financial Times, and HFD in the fall of 1996.

Not long after that, however, the next candidate in the take-over contest made itself known. In the spring of 1997 the Dutch newspaper publisher *De Telegraaf* made an offer to buy HFD from Hendrik Sijthoff Holding. Like Pearson, *De Telegraaf* did not just want the certificates but also wanted the control over HFD. On the other hand, HFD's management and personnel preferred a consortium headed by HAL Investments in order to keep HFD independent. This finally resulted in a deal closed in April 1997. The certificates were sold to HAL, Willem Sijthoff (a great-nephew of Hendrik Sijthoff), and HFD's personnel for around Dfl. 84 million. For the time being, the personnel's control over HFD had been saved.

So, HFD still holds a special position in the Dutch publishing industry. HFD is a BV (cf. private limited company), which means that its shares are not traded on a stock exchange. Moreover, HFD does not publish an annual report. Nonetheless, figures concerning its annual turnover and net income were obtained from the Dutch Chamber of Commerce. These figures, which are presented in Table 6.1, indicate that HFD is a relatively small player with varying financial results. It is generally believed that HFD has been far less profitable than it potentially could have been during the last couple of years. Still, within the market for financial and business information, HFD holds a very strong position. Its

[83] Because both the company and its most important product share the same name, it is stressed that in this text the abbreviation HFD refers to the company, while FD refers to the newspaper.

newspaper is the only of its kind and has a solid and steadily rising circulation of approximately 47,000 copies.[84]

	1996	1995	1994	1993	1992
Turnover (in Dfl. Million)	45.5	39.7	36.7	33.6	33.1
Net income (in Dfl. Thousand)	3	-1,412	14	917	2,022
Number of employees	160	158	159	162	162

Table 6.1 HFD's key figures (source: Dutch Chamber of Commerce).

This chapter describes and analyses the process of mediamorphosis at HFD for the period between 1982 and 1997. This period reasonably covers the transformation of HFD from a pure folio publisher to a publisher of both folio and electronic information products. As explained in the section on methodology in Chapter 5, this case is based on both interviews and documents. The interviews were conducted in the period between July 1995 and August 1997. The case study report was approved for publication by the company in April 1998.

First, a longitudinal description of the process of mediamorphosis on the basis of HFD's most important mixed media project is provided. Since HFD is only a small company, which heavily relies on its financial newspaper FD, the main focus is on the mixed media project related to the FD. Subsequently, an analysis of HFD's mediamorphosis is provided in terms of the conceptual framework and score card of fit put forward in Chapter 4. The final section wraps up the main characteristics of the HFD case and draws a number of conclusions.

6.2 Longitudinal description

The financial newspaper has always been, and still is HFD's most important product. The newspaper, which is comparable to the British Financial Times, appears six times a week. It is the leading financial and business publication in the Netherlands. Besides the newspaper, HFD is nowadays involved in a wide range of related information and communication activities as well. The following description provides a longitudinal picture of HFD's attempts to develop this mixed media portfolio.

[84] With an increase of 8.4% for the year 1996-97, HFD's newspaper was in fact the fastest growing newspaper in the Netherlands.

Over the years, HFD has kept a folio archive consisting of (parts of) its own newspaper, supplemented with annual reports of companies as well as other information sources. This archive functioned as an important information source for the company's journalists and editors. Starting in the early 1970s, HFD also used the archive to provide a commercial facsimile service to external customers. This facsimile service, although never substantial in terms of turnover or profit, in this respect was an early step towards the development of a mixed media portfolio.

6.2.1 Getting started

Although HFD had played with the idea to computerise the folio archive several times, the direct inducement for building an electronic database was the request by a customer for a particular article from the newspaper in the late 1970s. The value of this article to the customer made HFD realise that its archive held enormous commercial potential. In order to realise this potential, however, the archive had to be made more easily accessible than it was via the time-consuming facsimile service. Still, no concrete steps were taken to exploit these slumbering opportunities until 1982. In that year an external consulting firm was instructed to explore the market potential for database information. Hence, this event is chosen as starting point of HFD's analysis. Nonetheless, because the result of this study was judged too theoretical by HFD, the recommendations where never adopted.

Another important event that took place in 1982 was HFD's decision to change part of the newspaper's production process. Traditionally, pre-press activities such as typesetting and layout were carried out by manually setting leaden letters. In 1982 HFD was one of the last newspaper publishers in the Netherlands to abandon the leaden production process and adopt a photographic production process. In 1983, the introduction of the word processor led to a computerisation of the editorial process as well. Together, these two technological changes laid the foundations for the coupling of the editorial processes with the pre-press processes in 1985. Because the typesetting system was upgraded, the archives no longer had to be updated manually, but could simply be deducted from the production process in electronic form. From then on, all the articles appearing in the newspaper (60 to 80 per issue) were electronically stored in a database. In order to manage the database, HFD hired a person who also had to bridge the gap between the editorial staff and the documentalists. After all, the primary objective of developing the database was to support the editorial staff. Hence, the initial investments were not judged from a commercial perspective, but from a perspective of business process improvement. The money that could be earned by commercially exploiting the database was seen as merely supplementary.

The database's very first customer was registered in 1986, when the electronic archive covered a period of one year. Customers had to subscribe to the database, which gave them direct access via telephone cable and modem. In addition to the subscription rate, customers had to pay a certain rate per minute for actually accessing the information. Because the overall costs were quite high, only a relatively small group of large companies and consultancy firms subscribed to the database. Initially, the use of the database was unavailable to publishers, broadcasting organisations, information intermediaries, and other potential competitors. Early 1995 this restriction was lifted.

6.2.2 *Incremental improvements*

Throughout the years, HFD undertook several attempts to improve its policy towards the database and other potential mixed media projects. In line with this objective, in 1988 the person responsible for the database wrote a report stating that:

> "New media requires specialised knowledge that is not available in (all parts of) the organisation and can not be developed in the short run."

Accordingly, the report suggested the formation of a separate new business development department. This department had to have clear objectives and authority, plus sufficient human and financial resources to independently carry out new business development activities. Project management was seen as the preferred method for the new business development department. Only when new products would reach a more mature state, they would have to be incorporated in the existing portfolio of PMCs. A final important point addressed in the report was the need for co-operation with other information providers to reach more customers. Due to internal conflicts, however, none of the recommendations were followed through at that time. Only later, the recommendations proved to be very valuable.

A similar internal report appeared in 1990. The SWOT[85] analysis in this report highlighted as strengths that HFD had already built considerable database experience, and that the database content was unique and of high quality. Weaknesses, on the other hand, where mainly of organisational nature. The database was still ran by one person, which meant that not enough attention could be given to marketing and product development. Furthermore, it was noted that

[85] SWOT stands for strengths, weaknesses, opportunities, and threats. A SWOT analysis is an analytical tool to determine a company's strategy.

HFD's management devoted insufficient attention to the database, and the interaction between the database and the other activities in the company was limited.

Although it took quite some time, eventually the attempts to improve HFD's new media policy were effective. In 1990, a second employee who held a degree in business administration and had experience in marketing and information technology was hired for managing the database. Shortly after that, however, the first database employee left HFD. In order to still realise the intended expansion, yet another person was hired. The first major step taken by the two new employees was the formulation of a new strategic plan for the database. As input to this plan, a survey was conducted among the existing customers of the database. In addition, personal interviews were held with existing as well as potential customers, and other providers of new media products and services. As such, this was the first serious market research since the start of the database development. Based on this research, a market segmentation and product positioning of the existing as well as intended PMCs was developed. Consequently, the research formed an important stimulus for the eventual creation of a mixed media atmosphere.

6.2.3 New product-market combinations

In addition to the 1990 strategic plan, a detailed plan was written to develop a CD-ROM product. The idea was to store the entire archive of the newspaper on this CD-ROM, while only the last month of the newspaper would be available via the existing database. Eventually, however, this plan was never realised. HFD's mindset at that time was not ready yet to accept a plan like this. As a consequence, the final decision was postponed time after time, until the plan ended up in a drawer of a filing cabinet. This example clearly illustrates that the right intentions were present, but that the internal context was not amenable to these intentions yet.

By 1993, the database had been improved on a number of aspects. With regard to the database technology, new hard and software were installed and a new user interface was developed. With regard to the database content, two other folio publications were added, namely In Brief (IB: a summary of the FD in English) and The Netherlander (TNL: a business weekly in English launched in 1992). With regard to the marketing of the database, in 1993 a new campaign was started which attracted a lot of attention. At the same time, however, the market position of the database had come under growing pressure. More competitors had entered from different directions. In addition, the market demand had become more focused on actual (today's instead of yesterday's) information, clearer structuralisation, and higher media flexibility.

All told, the database as mere electronic variant of the newspaper was seen as no longer sufficient. The product offered not enough added value. HFD therefore wanted to set up an editorial research staff of its own. The idea was to hire additional people who would be capable of independently developing new products. With hindsight, this can be interpreted as a remarkable step considering the relationship between HFD and its partly owned subsidiary *Financiële Diensten Amsterdam* (FDA). FDA was the former investment research department of NMB (a Dutch bank which is now called ING) which later was co-owned by HFD and ING. As such, FDA carried out research and supplied raw information to HFD. Because there were big cultural differences between HFD's publishing activities and FDA's investment research activities, HFD sold its stake in FDA in the fall of 1995. After breaking up the ownership relationship, the two firms only had a relationship as buyer and supplier. In 1996, however, HFD broke up the entire relationship with FDA. The loss of control over FDA's information sources implied that HFD's initial choice to set up an internal editorial research staff turned out to be a very good one. From 1996, HFD's internal research and information group became its primary editorial research source.

6.2.4 Towards a mixed media strategy

The most important recognition in 1993, however, was that there had not been much of a coherent and comprehensive approach to the development of new media PMCs so far. Hence, HFD needed to adopt more of a true mixed media approach, or else run the risk that the entire business would come under growing pressure. Although it took another couple of years to live up to the various strategic intentions, HFD introduced a new organisational structure in 1996. Part of the new structure was the creation of a separate and independent new business development unit, as already suggested in 1988. The new business development unit became responsible for electronic products such as the database, English language products such as The Netherlander, as well as spin-off activities, such as organising congresses. With specific regard to electronic media, a new project team was established mid 1996 and plans were formulated regarding the development of an Internet site. In addition, HFD aimed at the development of a Lotus Notes application based on the database. Hence, the new unit started with a wide range of opportunities, which is reflected by the following comment from one of the members of the unit.

> "Our biggest problem is not so much creating new ideas or identifying opportunities, but finding the right priority of realising the seemingly endless range of options that lie ahead of us."

The major benefit of the new business development department was the bundled expertise and the focused attention on product-market combinations other than the traditional newspaper. As a consequence, the new business development department also became better equipped to deal with external partners. A good example of the realisation of opportunities via external partners was the agreement HFD reached with software company Jacobs in 1996. Jacobs was a developer of network software and services. HFD teamed up with Jacobs because Jacobs' Lotus Notes applications provided a good platform to distribute the database other than only via HFD's own dial-up service. In 1997, similar electronic content distribution agreements were signed with Reuters, FT Profile, MAID, and Newsedge. A third example of the realisation of opportunities via external partners was the joint venture HFD established with ANP, a Dutch press agency, in the beginning of 1997. The objective of this joint venture, named AFD, was to provide a real-time financial news service. And finally, in 1997 HFD reached an agreement with Microsoft to become one of the channels in Explorer, Microsoft's Internet browser.

Altogether, the positive impact of the new business development department led to a doubling of the new media turnover in 1996. It also became an explicit objective to reach a 10% stake of new media product-market combinations in HFD's overall turnover. The department's task was supported in this respect by the decision made in the spring of 1997 to build a fully integrated editorial, research, and graphical database system. This database system came very close to the idea of mixed media publishing.

Although the above longitudinal description of HFD's mixed media endeavours is inevitably only a snapshot, it still provides sufficient input for the analysis in the next section. To sum up, the main events put forward in the longitudinal description are presented in Figure 6.1.

1982	Exploration of the market potential for database information Replacement of the leaden pre-press production process by a photographic pre-press production process
83	Computerisation of the editorial production process due to the introduction of the word processor
85	Technical coupling of the editorial and the pre-press production processes All newspaper articles are electronically stored in the database Hiring of a person to further develop the database
86	Market introduction of the database
88	Attempt to improve the policy towards the database and other new media projects
90	Another attempt to improve the new media policy
91	Hiring of a second database employee Formulation of a strategic database plan including a market segmentation and product positioning
92	Launch of The Netherlander
93	Formulation of a new strategic plan with regard to electronic publishing
95	Database access becomes available to potential competitors Divestment of stake in investment research company FDA
96	Introduction of a new organisational structure, including a new business development department Partnership with Jacobs regarding Lotus Notes applications Agreement with IHT covering the joint distribution and marketing of The Netherlander Creation of an internal editorial research and information group Creation of a project team regarding the development of Internet activities
1997	Establishment of a real-time financial news service with ANP Partnerships with Reuters, FT Profile, MAID, and Newsedge regarding electronic content distribution Decision to install an integrated editorial, research, and graphical database system HAL Investment and Willem Sijthoff buy HFD from Hendrik Sijthoff HFD becomes one of the Dutch channels of Microsoft's Internet browser Explorer

Figure 6.1 Time scale of relevant events in HFD's longitudinal description.

6.3 Analysis

The above longitudinal description is now analysed in terms of the conceptual framework and score card of fit presented in Chapter 4. As a reminder, the two key elements of the framework are organisational forms and integration capabilities. Together, these elements determine the capacity of a firm to integrate component knowledge into architectural knowledge. Hence, first the different types of component knowledge are discussed.

6.3.1 Component knowledge

In order to master mixed media publishing, a firm needs to reconfigure its component knowledge. As indicated in Chapter 5, mixed media publishing can be effectuated by reconfiguring the component knowledge related to information content, technology, and markets respectively. Below, the changes taking place in these three types of component knowledge are elaborated on.

Information content

Information content has always served as the point of departure of HFD's strategy. HFD adhered to the idea that the trend of digitalisation will lead to an increasing abundance of information supply, which will be impossible to match with an equal increase in information demand. Hence, demand will tend towards high quality content, creating an interesting niche for providers capable of delivering the necessary added value. For this reason, the editorial staff was regarded as the core of the company. Both HFD's traditional folio media, as well as new (electronic) media such as the database, reports, and seminars were primarily being treated as vehicles for delivering the high quality editorial content to the market.

This content oriented approach can be seen as an important explanation why the company for long took an incremental, low profile approach to the development of new media products and services. Another explanation is that journalists are generally not very strong in marketing or new business development matters. Hence, although in 1985 HFD was relatively early with the development of its electronic database, as a product the database was merely an electronic copy of the FD and lacked a distinctive profile.

In order to create true complementarity between the FD and the database, it was necessary for both products to have stronger individual identities. That is why in a later stage the FD was positioned as an actual news source, while the database was more explicitly positioned as a retrospective information source. In this way, the characteristics of both media were better utilised, while at the same time their

mutual complementarity was stressed. This differentiation also applied to The Netherlander, which had an editorial staff independent of FD's editorial staff. In addition, HFD's decision to invest in a separate editorial research staff and the establishment of the news agency AFD also fitted very well within the idea of content improvement and differentiation. Moreover, HFD strengthened its relationship with its Belgian sister company De Tijd, publisher of the *Financieel Economische Tijd* (FET).

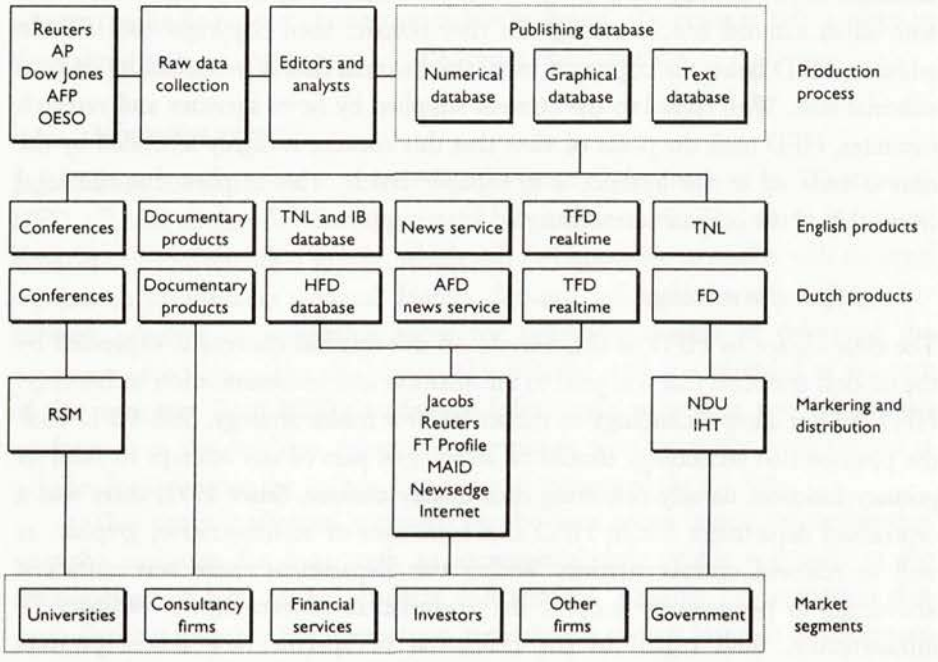
A final issue with regard to HFD's information content is of a legal matter. When adopting a mixed media perspective, it is essential for a publisher to be able to freely use and exploit its information sources. The Dutch copyright for instance states that an editor that is not employed by a firm is the holder of the copyright of the produced material. Hence, an FD article written by a freelancer cannot automatically be used by HFD for its database. That is why HFD signed contracts with all its external editors stating that they transfer their copyright to HFD. In addition, HFD holds the copyright of all the material that is produced by its own editorial staff. With regard to the content supplied by news agencies and research institutes, HFD took the point of view that this content is highly amended by the time it ends up in for instance a newspaper article. This implies that the legal ownership of the original source does no longer apply.

Information technology

The clear choice by HFD to concentrate on information content is expressed by the modest attention that was paid to information and communication technology. HFD did not allow technology to dictate its new media strategy. Still, HFD took the position that technology should be an integral part of any attempt to fulfil its primary function, namely delivering high quality content. Since 1991, there was a centralised department within HFD that took care of administrative, graphic, as well as editorial computerisation. Within this department there was sufficient knowledge to permanently support the organisation concerning the ordinary IT infrastructure. With regard to the realisation of specific new media projects requiring specialised IT knowledge, it seemed a logical choice to outsource these activities whenever possible to credible external parties. At first, HFD still undertook attempts to experiment with IT applications. An example of this was the attempt, together with software company BSO, to develop a tailor made indexing system for the database, which was never implemented. Difficult and costly projects like this were since then avoided by HFD. Instead, only standardised hard and software applications were chosen. A good example of HFD's use of complementary, external technological knowledge was its relationship with Jacobs.

By employing people with relevant education and experience, HFD at the same time ensured that there was a sufficient level of internal IT knowledge in order to effectively communicate with its suppliers and partners.

A crucial step forward for HFD was the implementation of a fully integrated editorial, research, and graphical database system. In its 1993 strategic plan, HFD provided the blueprint of this database system. In the spring of 1998, the new database system was largely realised. This system, which was developed by software company CMG, took a substantial financial investment. More important, it came very close to the idea of mixed media publishing as described in Chapter 5. It formed the content and production basis for all HFD's product-market combinations. The position of the database system within HFD's business system is depicted in Figure 6.2.



Legend

AFD	joint venture between HFD and ANP	NDU	Nederlandse Dagbladunie
FD	Het Financieele Dagblad (newspaper)	RSM	Rotterdam School of Management (MBA programme)
IB	In Brief (summary of the FD in English)	TFD	Tijd Financieele Dagblad (real-time service)
IHT	International Herald Tribune (company)	TNL	The Netherlander (weekly)

Figure 6.2 HFD's mixed media publishing model.

Information markets

In the past, marketing has been a function within HFD with little attention and continuity. Until 1988, HFD did not actively market the FD itself. Moreover, the advertising market of the FD was exploited by the external agency Plaats.[86] In 1987, HFD appointed its first marketing manager. Soon after that, however, this position became vacant again. Moreover, between 1990 and 1995 there were continually vacancies within the management of the marketing department. The implication of the lack of an active and consistent marketing policy was a commercially underexploited newspaper. In addition, the marketing of the database could for a long time not be championed by a person responsible for an overall and coherent marketing policy. Instead, the database marketing was geared to the editor-in-chief and the general management of HFD, who were more concerned with the database content. Only in 1995, a new and lasting commercial manager was appointed, who also became part of the newly formed management team. In addition, in 1997 a marketing manager was appointed at the operational level.

As stated before, in the beginning the database primarily had an internal objective, namely to support the editorial staff. Illustrative in this respect is the fact that the external exploitation of the database was not initiated internally, but was triggered by a request of a potential customer. For long, the marketing of the database remained very low profile. An important reason for this was the fact that there simply was not enough manpower assigned to the database. Until 1991, the operation of the database was more or less a one-man business. Issues such as the development of a customer database system or market research where neglected. Although there was recognition of the need for more of these activities, the first serious market research was conducted in 1991.

Along the way, HFD experienced that the knowledge required for marketing new media was fundamentally different than the knowledge required for marketing traditional folio products: the size of the market for new media was (and still is) largely unknown, there was a wide variety of new products being offered, price fixing was uncertain due to the lack of sufficient reference points, and it was unclear how new media products had to be positioned alongside their folio siblings. HFD especially had difficulty with determining the price of the database. The introduction in 1986 took place on a relatively high price level. Because of this, only large firms could afford the expensive subscription. Many smaller companies where

[86] In 1987 the relationship with Plaats was terminated. Plaats, however, considered this move as breach of contract and sued HFD for tens of millions. It took ten years for both parties to reach a final agreement, of which the content was not made public.

interested as well, but simply could not afford it. Only later, HFD started searching for possibilities to differentiate the database with regard to product and price.

An important aspect of new media is that it implies new forms of distribution. During the early stages of the database exploitation many initiatives and suggestions for possible co-operation came from parties outside HFD. In contrast to what was advised by these parties, HFD decided to keep both the production and distribution to itself. Customers had to directly access HFD's database via telephone cable and modem, without the interference of an intermediate host organisation. In this way HFD kept control over further product development, as well as its customer base. Last but not least, HFD did not have to share the returns of the database with others. In a later stage, however, new possibilities for distribution and changes within the distribution channel led HFD to amend its strategy.

Just like in the case of consumer goods, information customers more and more want to purchase products and services from a centralised information supermarket, instead of shopping around at various different suppliers. Specialised hosts are best at fulfilling this need. Hence, HFD started a co-operation with the software company Jacobs.[87] By teaming up with Jacobs, HFD gained access to an unknown but potentially attractive market of Lotus Notes applications. HFD had no knowledge of selling its database within such a network environment. HFD decided to co-operate with Jacobs because it believed that host distribution was becoming more and more a game for specialised players. At the same time, HFD could concentrate even more on its core business, namely creating high quality content. Other examples of co-operation with respect to marketing and distribution are the arrangements HFD made with Textline (since 1986) and McCarthy (since 1989). Both partners distribute In Brief, the summary of FD in English. In 1997, HFD extended the number of partners regarding the electronic distribution of content by teaming up with Reuters, FT Profile, MAID, and Newsedge.

Altogether, HFD has gone quite a way down the track of developing the knowledge necessary for marketing new media. A strong benefit for HFD in this respect was the renowned image of the company and the strong brand of the FD. Hence, the FD was and will be an indispensable vehicle for HFD to market new products.

[87] It is once again illustrative that this idea was triggered by the request of a customer of both Jacobs and HFD, namely KPMG.

The overall transformation of HFD's component knowledge is summarised in Table 6.2. A distinction is made between two stages. The event that marks the transition from Stage 1 to Stage 2 is the adoption of the new organisational form in 1996, which led to the creation of the new business development unit. Hence, Stage 1 refers to the situation prior to this event, while Stage 2 refers to the situation after this event.

	Stage 1 (1982-1996)	**Stage 2 (1996-1997)**
Information content	– Most important component knowledge – Internal editorial staff, use of external editorial suppliers and news agents – Focus on facts, strictly professional information source	– Most important component knowledge – Enlarged internal editorial staff, use of external news agents, co-operation with ANP, De Tijd, and management school – Move towards a general financial newspaper and factual database
Information technology	– Focus on folio production process, almost no information technology, some experiments	– Basic and standardised information technology internally organised, no experiments – Introduction of a fully integrated editorial, research, and graphical database system – External partnerships regarding specialised information technology
Information markets	– External advertising agency (until 1988) – Most underdeveloped component knowledge	– Internal marketing department – Further exploitation of high quality content and strong brand – External partnerships regarding marketing and (electronic) content distribution

Table 6.2 The transformation of HFD's component knowledge.

6.3.2 *Organisational form*

As argued in Chapter 4, an organisational form is the infrastructure which in a specific way enables the process of integrating the component knowledge related to information content, technology, and markets. Since each organisational form is different, each form is expected to stress different aspects of the knowledge integration process. The conceptual framework presented in Chapter 4 distinguished four organisational forms, namely functional, division, matrix, and innovative.

During the last two decades, most traditional publishers were characterised by a number of semi-independent business units supplemented with a number of centralised staff functions. Often, the business units were further divided into publishing groups that were linked to specific market segments. This organisational form, which strongly resembles the division form, is not the form that applied to HFD. For long, HFD was organised around the FD as its one and only product. Hence, a division into business units was never opportune. Instead, HFD adopted a simple functional organisational form. The most important division existed between the director on the one hand, and the editor-in-chief of the newspaper on the other hand. Although the director was ultimately responsible for the functioning of the entire organisation, including the editor-in-chief, there was a special type of relationship between the two. The editor-in-chief was appointed by the board of supervisory directors, and not by the director. HFD's organisational form during Stage 1 is depicted in Figure 6.3.

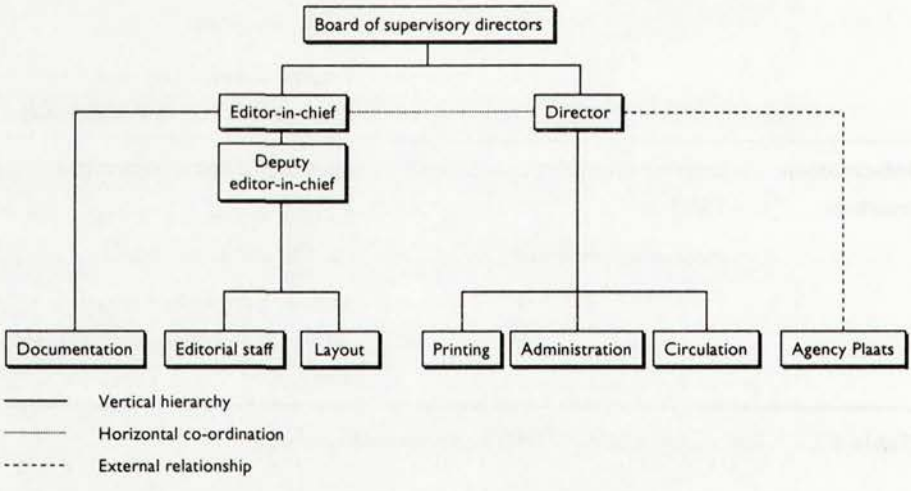


Figure 6.3 HFD's organisational form in Stage 1 (1982-1996).

In the beginning of the database development, HFD deliberately chose to position the database activities within the editorial staff. This was done to encourage the acceptance of the database among the newspaper editors. After all, the primary purpose was to stimulate the internal use of the database. With regard to the external exploitation of the database, the head of the database operated as a mediator between the documentation department and the market. Besides that, the head of the database was by many within HFD considered as the head of IT. However, there really was no IT department or even IT policy within HFD. Computerisation took place separately within the different departments and as such, was fairly unstructured. Soon after the start of the database development, the head of the database became very busy with running the day-to-day database business, plus all the IT bits and pieces. Still, he remained on its own until 1991. At that time, a central IT department was put up to create order in the emerged chaos. Since then, this department took care of all generic IT matters in HFD.

Early 1996, HFD decided to change its organisational form, which marks the transition between Stage 1 and Stage 2. The choice was made to divide responsibilities along three lines, reporting into the editor-in-chief, commercial manager, and new business development manager respectively. Together with the director, these three positions formed the management team of HFD since then. Both the director and the commercial manager were recruited from outside HFD. The board of supervisory directors, which consisted of three people, was also renewed with two members. The new situation is depicted in Figure 6.4.

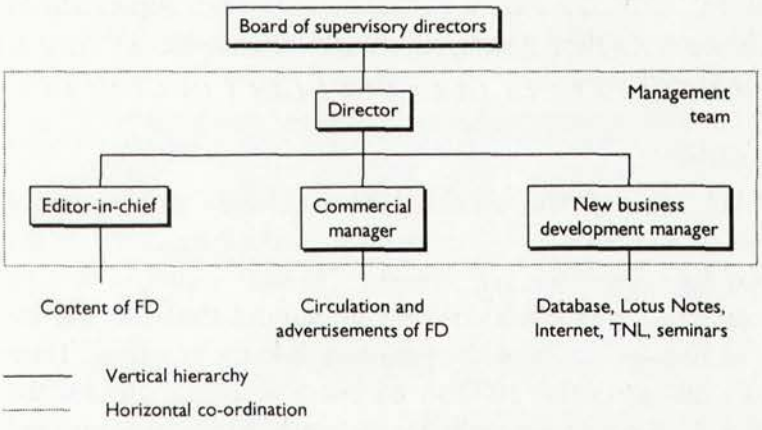


Figure 6.4 HFD's organisational form in Stage 2 (1996-1997).

HFD's choice to locate the database as well as other new business development activities in a separate unit seemed logical. In the new unit, the different types of component knowledge could be better integrated into architectural knowledge of mixed media publishing. Hence, the new organisational form seemed to be much better suited to deal with the mediamorphosis challenge. In the old situation, HFD could run the risk that the editorial staff would get itself involved in unknown and complicated projects, while the preservation of the FD was crucial for the continuity of the entire company. After all, the new PMCs still only made a minor contribution to the overall turnover and profit.

In terms of the typology presented in Chapter 4, the new organisational form can be qualified as a special type of innovative form. The subtle difference between the innovative form presented in Chapter 4 and the form adopted by HFD is that HFD's new business development unit not only took care of developing new PMCs, but also was responsible for their marketing and distribution. So, the transformation of HFD's organisational form can be labelled as a change from the functional form in Stage 1 to the innovative form in Stage 2.

6.3.3 Integration capabilities

The integration capacity offered by a certain organisational form can be strengthened by the use of integration capabilities that overlay the basic organisational form. In this way, integration capabilities may or may not enhance the capacity generated by a certain organisational form to integrate the component knowledge related to information content, technology, and markets respectively. As discussed in Chapter 4, the three investigated integration capabilities are systems, co-ordination, and socialisation.

Systems capabilities

In Stage 1, HFD employed few so-called hard mechanisms such as formal planning, budgeting, and procedures. Neither the hierarchical structure, nor the promotion policy for example was very stringent. The same applied to the new business development activities, which were fairly unstructured. Partly, this was due to the traditional routines that ruled the publishing industry in general. There simply was no inclination within HFD to do things differently. Besides, the company was so unfamiliar with new media that one simply did not know what and how to plan, budget, and control. A third reason is that HFD was a relatively small company, which by its nature required less formal mechanisms than a large firm does. Hence, except for the editorial articles that formalised the position of the

editorial staff, system capabilities were hardly present. Over time, HFD's new media involvement changed from a simple database product, to a complex mixed media publishing system. This change coincided with the employment of more systems capabilities. HFD standardised most of its IT, introduced clear project management guidelines, and set marketing targets. Hence, in Stage 2 HFD employed a more formalised approach than in Stage 1. Still, HFD tried to avoid that the organisation would become unnecessary rigid.

Co-ordination capabilities

An implication of HFD's choice to bundle the new business development activities in a semi-independent unit, together with the introduction of the mixed media structure as depicted in Figure 6.2, was the need for extensive communication and exchange between the different departments. In Stage 2, project management proved to be a suitable management instrument in this respect. The value of a project team is that it brings together people with different functional backgrounds, which encourages the integration of component knowledge. In Stage 1, however, project management was not used by HFD. Until 1991, there was basically only one person involved in the database development, and there were no clear external objectives. The danger of this situation was that the knowledge and experience built during the course of running the database only resided in the head of one person and were not integrated in the company. When that person left the company in 1991, all this knowledge and experience could have been lost. Fortunately, the new recruits managed to continue the development process without any major delay.

In Stage 2, the new media activities were much better embedded in the overall organisation. In 1996 HFD for instance formed a project team for the exploration of Internet as a potential medium for the database and other PMCs. The project team consisted of people from new business development, marketing, and the editorial staff. Moreover, the team was equipped with a clear objective, plan, and budget. As such, the project team reflected a positive change within HFD from solo behaviour, which was in fact a trait typical for most newspaper companies, to mutual co-operation. This change was also reflected in the newly formed management team. The tuning of content and marketing, which in the past had caused considerable friction, received a positive impulse because of this.

Besides project management, the recruitment, education, and motivation of qualified personnel are also important co-ordination capabilities to integrate knowledge. In fact, the expansion of the editorial research staff and the maintenance of the regular editorial staff implied that HFD paid considerable attention to these co-ordination capabilities. Already in Stage 1, HFD had

organised an internal training programme, which was built around a so-called class system. This implied that new employees, disregarding their age or experience, were being lectured in small groups by employees who had experience in working for HFD. In this way, newcomers were made familiar with HFD's culture and day-to-day operations. In Stage 2, HFD also started to make use of student trainees. In January 1996 for instance, HFD took on board a communication science student to become part of the project team investigating the Internet opportunities. Later, this student was hired as a regular employee.

Socialisation capabilities

Publishing has a long tradition. As indicated before, this has created smooth routines that are deeply embodied within any organisation with a history in this profession. This surely applied to HFD. Adaptation of the traditional publishing routines was therefore problematic. Over the years, positions and functions in the organisation had been fine-tuned, and were not easy to change. In addition, HFD suffered from the various disputes concerning its ownership.

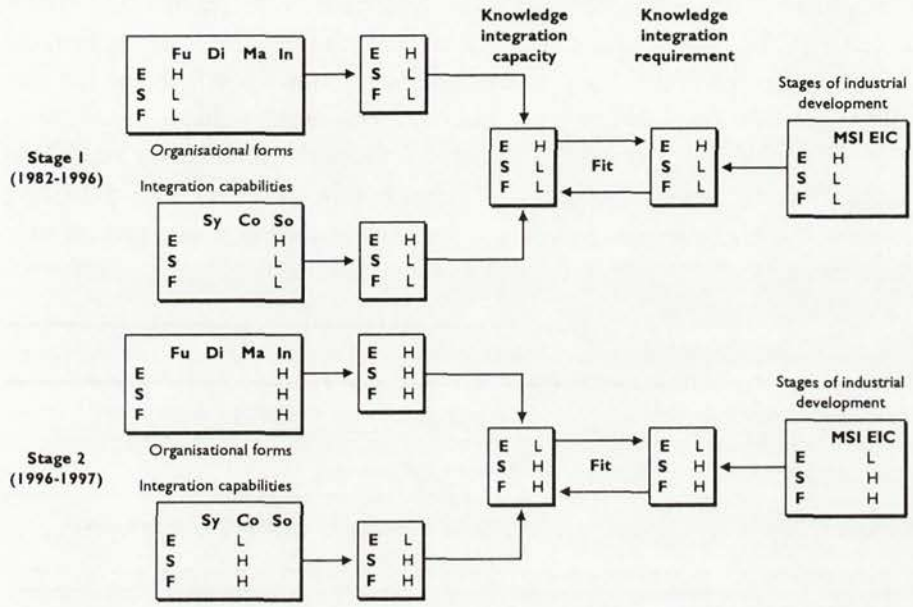
	Stage 1 (1982-1996)	Stage 2 (1996-1997)
Systems capabilities	– Except for editorial articles hardly present	– Standardised IT, project management guidelines, marketing targets
Co-ordination capabilities	– Except for editorial class system hardly present	– Dominant capability; editorial class system, project management, management team
Socialisation capabilities	– Dominant capability; strong reliance on traditional publishing routines	– Clear top-down direction, emergence of a new media mindset

Table 6.3 HFD's deployment of integration capabilities.

Together, the situation in Stage 1 can be characterised by a lack of a clear top-down direction, and a lack of willingness of the various departments to talk and listen to each other. The creation of the new organisational form and the settlement of the ownership disputes evoked important changes in this respect. The newly formed management team brought peace to the organisation by propagating a clear mission

and strategy. This led to the creation of an innovative and dedicated atmosphere, which facilitated the process of knowledge integration in Stage 2.

Overall, HFD's deployment of integration capabilities is summarised in Table 6.3. From this summary it can be concluded that the dominant integration capability in Stage 1 was socialisation, while the dominant integration capability in Stage 2 was co-ordination.



Legend

Fu	functional	Sy	systems	E	efficiency	H	high	MSI	mature single industry
Di	division	Co	co-ordination	S	scope	L	low	EIC	emerging industrial complex
Ma	matrix	So	socialisation	F	flexibility				
In	innovative								

Figure 6.5 The score card of fit applied to HFD.

6.3.4 Score card of fit

Taking the above analysis of HFD's mediamorphosis, the score card presented in Chapter 4 can now be filled in for Stage 1 and Stage 2. This scorecard is presented in Figure 6.5. Looking at the scorecard, it becomes clear that HFD has matched the change in its environment (i.e. the stage of industrial development) with a change in its organisation (i.e. knowledge configuration). During HFD's mediamorphosis,

both the organisational form and the integration capabilities were changed. Accordingly, in terms of the fit between HFD's organisation and environment, both stages showed a strong fit: on all three dimensions of knowledge integration, the integration capacity matched the integration requirement.

6.4 Summary

Over time, HFD has made the amendments to its organisational configuration that have generated the required capacity to integrate product, production, and market knowledge. Still, it took quite some time for HFD to reach that state. At first, the integration process was not very successful. Part of this was due to the fact that HFD's database development was initially not embedded within a mixed media strategy. In addition, the strong reliance on traditional socialisation capabilities implied that the organisation kept to its previously successful folio publishing routines. Hence, the required scope and flexibility of the integration process were not realised.

	FD
Traditional medium	Newspaper, issued five times a week
Information type	Finance and business
Content source	External press agencies, internal editors and researchers
Start of the mixed media project	1982
Initial objective	Improvement of the internal editorial process
First new media PMC	On-line database
Market introduction	1986
Additional new media PMCs	Intranet (Lotus Notes), Internet site and channel (Microsoft)

Table 6.4 Summary of the FD mixed media project.

It took a change of the organisational form in 1996 to realise the fit with the environment again. After that, HFD became better able to anticipate and respond to the volatile context in which it operated. By the end of 1997, HFD had become quite successful with mixed media publishing. The number of new media products

had increased and the percentage of new media in the overall turnover and profit had risen substantially.

The characteristics of the investigated mixed media project related to the FD and HFD in general are summarised in Table 6.4 and Table 6.5.

		HFD
Origin		1796
Employees		160
Ownership		Investment company HAL and private investors, including management and personnel
Strategy		HFD aims to be the primary information provider about and to the Dutch economy
Focus on the professional information market		Business
Stage 1	**Organisational form**	Functional
(1982-1996)	**Dominant integration capabilities**	Socialisation
	Fit	Strong
Stage 2	**Organisational form**	Innovative
(1996-1997)	**Dominant integration capabilities**	Co-ordination
	Fit	Strong

Table 6.5 Summary of HFD's management of mediamorphosis.

7

Case B: SHDTW

7.1 Introduction

Until the first of January 1998, Samsom H.D. Tjeenk Willink BV (SHDTW) was one of the many business units of Wolters Kluwer NV. Wolters Kluwer traces its origins to a number of publishing entrepreneurs and family firms active in the Netherlands during the second industrial revolution.[88] At year-end 1996 Wolters Kluwer was active in 25 countries, and had an annual turnover of about Dfl. 4.3 billion, a net income of about Dfl. 480 million, and a total number of employees of about 15,000.[89] Wolters Kluwer's key figures are presented in Table 7.1. Wolters Kluwer's recent jump in turnover and employees is largely due to the take-over of US publisher CHH early 1996. It was Wolters Kluwer's intention to make an even bigger jump in 1998 by merging with Elsevier. Nonetheless, as mentioned in Chapter 5, this plan was cancelled under pressure of the European Commission.

Late 1996, Wolters Kluwer grouped all its Dutch activities into an encompassing national company, just as it had previously done with its foreign businesses. Within this company, named Wolters Kluwer Nederland (WKNL), two previous Dutch divisions, namely Wolters Kluwer Business Publishing (WKBP) and Wolters Kluwer Law and Taxation (WKLT), were bundled. Within the old division structure SHDTW was part of WKBP, together with five other business units and a central facilitating company named Intermedia.

[88] Wolters Kluwer's and its predecessors' histories are described in several publications, including De Vries (1995), Enthoven (1985), and Kelholt (1964).

[89] Key figures are taken from Wolters Kluwer's 1996 annual report.

	1996	1995	1994	1993	1992
Turnover (in Dfl. billion)	4,315	2,944	2,736	2,616	2,355
Net income (in Dfl. million)	479	452	382	318	258
Number of employees	14,948	8,993	8,693	8,052	8,089

Table 7.1 Wolters Kluwer's key figures.

The structure of WKBP is depicted in Figure 7.1. The entire division employed around 1,200 employees, while SHDTW employed around 120 employees. Because SHDTW was a BV (cf. private limited company) being part of a conglomerate, specific figures concerning its annual turnover and net income were confidential and cannot be revealed here. During the course of this case study the new national company WKNL was not effectuated yet. Hence, the former WKBP division structure is treated as SHDTW's relevant context.

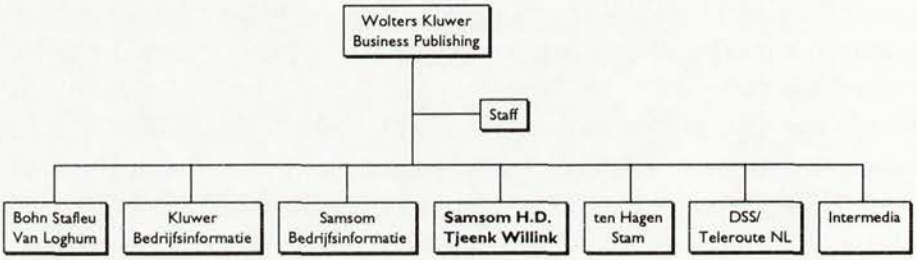


Figure 7.1 WKBP's basic organisational structure (1996).

The roots of SHDTW lie in the production and trade of office products. In 1882, Nicolaas Samsom[90], municipal secretary and tax collector of Alphen aan den Rijn, a small town 40 kilometres south of Amsterdam, took advantage of his experience gained working for the local government and started a private business in municipal administrative systems and forms. At first, Samsom combined this work with the official duties at the town hall. In 1886, however, he resigned as civil servant and devoted himself entirely to his growing business.

When existing almost a century, in 1972, Samsom merged with Wolters-Noordhoff to become the *Informatie en Communicatie Unie* (ICU), which was renamed the Wolters Samsom Groep only a year later. In 1987, soon after a hostile take-over

[90] A portrait of Nicolaas Samsom's (1844-1917) life and work is presented in De Vries (1995).

attempt by Elsevier, the Wolters Samsom Groep merged once more. Together with Kluwer it formed the basis of the present Wolters Kluwer. In the mean time, the original Samsom division had grown so big that the decision was made to split it up. As a consequence, the present SHDTW originated as one of Samsom's parts in 1989. It was created through the fusion of Samsom's activities in the domain of public administration and education management with H.D. Tjeenk Willink, which published works in the field of law. Environment policy was an area soon added to the initial domains. This was followed in 1990, by the integration of the activities of Samsom Kantoor Efficiency (SKE), supplier of forms and office organisation systems. Finally, in January 1998 SHDTW merged with one of the other business units constituting the former WKBL, namely Samsom Bedrijfsinformatie (SBI). Prior to this event, SHDTW published information primarily for the government, education, and business markets. The firm consisted of four publishing groups (PG), namely: Public administration, Education, Environment en Information management.

This case describes and analyses the process of mediamorphosis at SHDTW for the period between 1985 and 1997. This period reasonably covers the transformation of SHDTW from a pure folio publisher to a publisher of both folio and electronic information products. As explained in the section on methodology, this case is based on both interviews and documents. The interviews were conducted in the period between April 1996 and August 1997. The case study report was approved for publication by the company in August 1997.

First, a longitudinal description of the process of mediamorphosis on the basis of a typical mixed media project is provided. Subsequently, an analysis of SHDTW's mediamorphosis is provided in terms of the conceptual framework and score card of fit put forward in Chapter 4. The final section wraps up the main characteristics of the SHDTW case and draws a number of conclusions.

7.2 Longitudinal description

The new media development that was chosen for investigating the process of mediamorphosis at SHDTW was the *Opleidingen- en Beroepengids* (OBG).[91] The OBG was a reference guide that listed a wide range of educational institutions, the vocational training they offer, and the occupations they are aimed at. The OBG was for instance used by student counsellors. The OBG was part of one of the four publishing groups constituting SHDTW. In the past, the OBG had solely been

[91] *Opleidingen- en Beroepengids* literally means Education and Occupation Guide.

published as a loose-leaf folio product. Nine times a year a supplement was sent to all subscribers to the issue, which meant that about a third of the entire content changed every year. Subscribers had to manually insert the updates into the binders.

This type of loose-leaf product has always been a very popular and profitable way of selling information in the market for reference guides. Within SHDTW loose-leaf issues even accounted for more than half the turnover and nearly two thirds of its gross margin. During the last couple of years, loose-leaf issues in general have been hit by a declining circulation, indicating this medium is reaching the end of its product life cycle. This trend is to a large extent caused by the market, which is becoming more critical. Customers are more and more reluctant to the, in relation to their specific needs, large irrelevant parts of the bundle of information they buy. In addition, inserting the substantial amount of pages that come with each supplement is perceived an obtuse and time-consuming task. Because the declining number of subscriptions cannot endlessly be matched with price increases, there is a ubiquitous need for publishers to search for new ways to exploit their information. Electronic media offer strong potential in this respect. The OBG provided a good example of an information product offering such potential. Moreover, the OBG was one of the first new media developments within SHDWT that had to follow the generic guidelines for building media-neutral databases defined by SHDTW's management. These guidelines were formulated to steer the transformation of SHDTW into a genuine mixed media publisher.

7.2.1 Getting started

In 1985, when SHDTW was still a subset of Samsom, a first attempt was made to computerise the OBG data files. Hence, this year is taken as the starting point of the OBG's mixed media development. The primary objective was to improve the efficiency of the editorial and production process. The reason for SHDTW to choose the OBG in this respect was the clear structure of the data set. The notion that the OBG was a typical example of a data set that could generate a mixed media portfolio was, however, not a deliberate consideration at that time. This explains why, at first, no attempts were made to develop an electronic product on the basis of the electronic database.

The construction of a computerised OBG database harmonised with Samsom's decision to introduce a generic and company-wide IT infrastructure for both publishing and printing in 1985. At that time, Samsom was not divided into publishing groups yet. Moreover, it still included printing activities. The IT infrastructure, which was developed by Siemens, was built around a new type setting system. This system aimed at the computerisation of the graphical process.

At the same time, the system supported the building of editorial databases. Hence, it was capable of computerising publishing processes as well. The actual development of the OBG database was initiated by the publisher of the existing folio issue and outsourced to the printing department within Samsom. Later, this printing unit was disposed of and continued independently as Alpha Base (AB). Alpha Base took over the administration of the database, as well as the maintenance of the Siemens infrastructure.

After the OBG files were computerised within the Siemens environment, the production process had, however, not become more efficient. Instead, it had become very complex. This is illustrated by the following. At first, editors at Samsom were responsible for the collection and processing of data. Due to high internal costs, in 1987 these editorial activities were gradually outsourced to the external editorial office Arax in Amsterdam. Initially, the outsourcing only concerned data collection, but from 1991 onwards the entire editorial process. Alpha Base had formulated a code list that Arax had to use for importing the data. The files created by Arax for each OBG supplement were sent to SHDTW on floppies, after which the floppies where sent on to printing unit Alpha Base. At Alpha Base the files where converted to the Siemens system and converted once again to a typesetting file that could be used for printing. The first proofs where subsequently sent back to Arax, which took care of the final revisions. During these revisions the code list formulated by Alpha Base often proved to be very rigid and therefore susceptible to errors. After a while, Arax formulated its own code list. This both technically and organisationally complex situation meant that the first attempts to build the OBG database took substantial investments but never resulted in an efficiency improvement. Consequently, the profits generated by the folio OBG decreased considerably. In the mean time, competitors of SHDTW introduced new media products comparable to the OBG. The inferior quality of these first issues, combined with the lack of further updates later on, confused the market and made SHDTW reluctant to invest in a new media OBG based on the database. It would take some time before concrete initiatives in that direction were picked up again.

7.2.2 Second coming

In 1994, SHDTW investigated the possibilities for developing a CD-i version of the OBG. The choice for the CD-i medium was made because of its strong popularity in education. The plan was to also include advertisements in the product. The plan seemed feasible, but was eventually blown off because the financial risks where estimated too high. Hence, still no concrete electronic OBG emerged.

In the summer of 1995, the onset of a second attempt to develop a database for the OBG took place. Again, the head of the publishing group held responsibility for the project, but the actual development was co-ordinated by the central Production department and executed by the department Editorial Computerisation (EC), which at that time was part of WKBP's central facilitating unit Intermedia. The development of the second database was, however, far from smooth. A first problem was the conversion of the original Siemens files to the new software platform. The Siemens files could not be converted, which meant that all data had to be typed in again. A second problem was that the EC department wanted to use a technically advanced software solution for building the database. On second thought, a standardised system with better guarantees for continuity was chosen. This proved to be a wise decision, considering that the supplier of the advanced system ran out of business only a little later. A third problem occurred when EC started building the database in the fall of 1995. An external developer was hired to carry out part of the work, but EC was discontented with the delivered job and switched to a different software developer. This failure involved the loss of quite some money. A fourth problem occurred when EC delivered the first version of the database to Arax in the end of 1995. At that time, the datamodel proved to be partly incorrect. This was due to insufficient communication between EC and Arax. EC had failed to consult Arax on a number of important matters concerning the design of the datamodel. Meanwhile, the EC department was decentralised. Its people were moved from Intermedia to SBI, where they formed a project group named Electronic Publishing (EP). Despite all the organisational changes, the second version of the database was handed over to Arax in the beginning of 1996. In the summer of 1996 the database became operational. The first supplement to the folio issue of the OBG that was deducted from the database appeared in the end of 1996.

7.2.3 New product-market combinations

When the database was effectively being used for improving the folio production process, the intention was to introduce a CD-ROM version of the OBG by the end of 1996. The publishing group responsible for the OBG had previously built some experience with new media. Since 1992 it had published other CD-ROMs in the field of education. Other new media products were floppy disks accompanying folio issues. The latter was an example of a quite successful mixed media approach: folio and new media were complementary and together formed a hybrid package. Still, the previous experiences apparently did not result in lasting expertise. The OBG CD-ROM planning was rather uncertain, which caused that the intended

date of issue was not reached. The first electronic OBG product finally was introduced on the market in the summer of 1997.

Although the above longitudinal description of SHDTW's mixed media endeavours is inevitably only a snapshot, it still provides sufficient input for the analysis in the next section. To sum up, the main events put forward in the longitudinal description are presented in Figure 7.2.

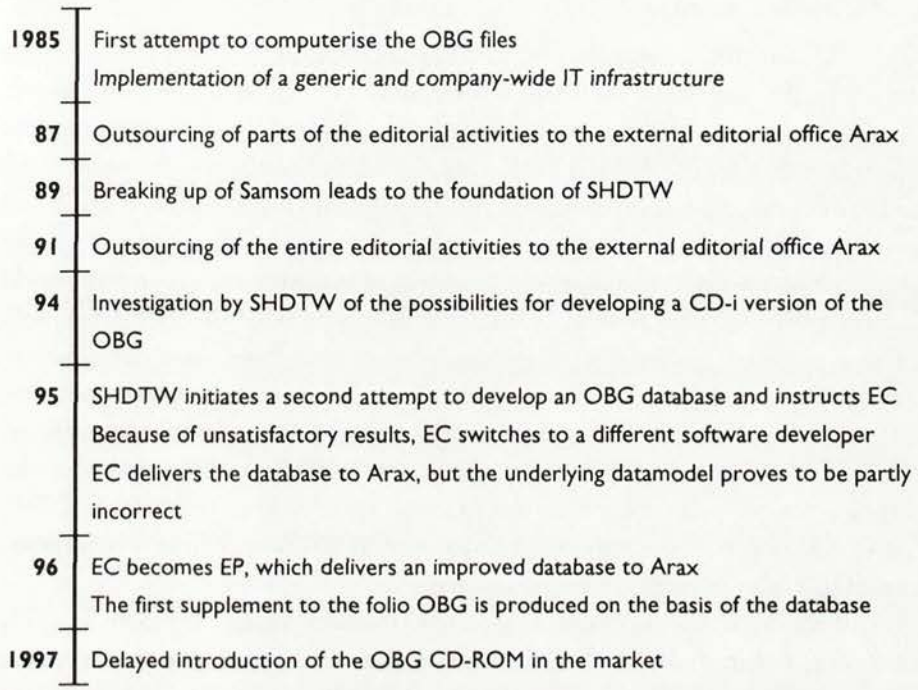


Figure 7.2 Time scale of relevant events in the SHDTW's longitudinal description.

7.3 Analysis

The above longitudinal description is now analysed in terms of the conceptual framework and score card of fit presented in Chapter 4. As a reminder, the two key elements of the framework are organisational forms and integration capabilities. Together, these elements determine the capacity of a firm to integrate component knowledge into architectural knowledge. Hence, first the different types of component knowledge are discussed.

7.3.1 *Component knowledge*

In order to master mixed media publishing, a firm needs to reconfigure its component knowledge. As indicated in Chapter 5, mixed media publishing can be effectuated by reconfiguring the component knowledge related to information content, technology, and markets respectively. Below, the changes taking place in these three types of component knowledge are elaborated on.

Information content

With the start of the electronic database development in 1985, the situation with regard to the content of the OBG did not drastically change. The OBG in fact already was a sort of database, albeit not computerised. In contrast, important changes took place in 1987 and 1991, when the editorial activities were outsourced to the external editorial office Arax in Amsterdam. This decision, which was based on a consideration of costs, led to a rather complex situation over which the publisher of the OGB had insufficient control. While Arax was made responsible for the entire editorial process, it was only in a later stage of the development process involved by SHDTW in the design of the database. As a consequence, Arax had specific knowledge regarding the content of the database that was under-utilised by SHDTW. This led to a lot of ill communication, delays, and the loss of labour and money. An additional problem for SHDTW was the fact that the database was physically located at Arax and was not directly accessible by SHDTW. There even was no formal arrangement between SHDTW and Arax, which meant that SHDTW's copyright position was vulnerable.

Still, there also were positive aspects to the database development. In 1995, the second version of the OBG database was one of the first new media developments within SHDWT that had to follow the company-wide established guidelines for building media-neutral databases. Most previous new media projects had been aimed at the mere computerisation of the production process of the already existing folio issue, or had been aimed at the development of electronic copies of existing folio products. In contrast, the development of the second OBG database was aimed at making the underlying information content media-neutral. This approach fitted well with SHDTW's strategy to become a mixed media publisher. Nonetheless, the control by SHDTW over the information content of the OBG during the second stage of the development process was still insufficient.

Information technology

At first, the development of the OBG database was primarily focused on the computerisation of the editorial and production process related to the folio product. This fitted within SHDTW's general approach, in which databases were developed to maintain and improve specific existing folio products. Accordingly, the development process was autonomously organised on the basis of the specific needs of the different publishing groups. The central Production department, responsible for the execution of all generic production processes, did for instance not get involved in the initial OGB project.

Later, in 1995, the development of the OBG database was aimed at a different track. The objective became to start from the perspective of the underlying information content, instead of the already existing folio product. Moreover, the technical development was co-ordinated by Production and executed by EC, which later became EP. Hence, the relationship between the publisher, Production and EP was very important. The effectiveness of this relationship was highly dependent on the position of Production within SHDTW. In the past, Production had only been a central facilitating unit. Over the years, however, Production had gained importance due to the need to master a generic digital production process. This implied that publishers, in order to stay on top and maintain their overall responsibility, needed to get themselves acquainted with the technological aspects of new media. In case of the OBG, the understanding of these technological aspects was insufficient, which was one of the reasons there was insufficient control over the development process.

Another problem with the initial attempt to develop the OBG database was that an external supplier was hired to take care of the development process, while SHDTW did not really know what was wanted. This caused the loss of a lot of money, and did not result into a satisfactory database. This points at the need to have a minimum of technological knowledge in order to effectively outsource and interact with external parties. When EC, and later EP, the central electronic publishing unit, took care of the external contacts from 1995 onwards, this problem was solved. Especially EP started developing more durable partnerships with preferred suppliers. EP simply could not keep track of all the IT developments and had insufficient capacity to do all the work itself.

Meanwhile, SHDTW decided to adopt a clear and unified policy towards the development and maintenance of media-neutral databases. The idea was to introduce a centrally controlled information infrastructure, in which each information domain, such as address information, jurisprudence, laws, and comments, was represented by a separate database. Each database in this respect

had to be fed from the various sources that previously fed specific products. In the new system, an information product would be a combination of selections made from the various databases. As such, the new system was truly media-neutral and could form the basis of a rich mixed media portfolio. The second OBG database was basically developed within this blueprint. As a consequence, the responsible publishing group was not completely autonomous anymore, which caused friction. Publishers experienced that their role of spider in the web was weakened at the expense of Production and EP, which had more technological knowledge.

Information markets

Initially, the involvement of marketing in the development of the OBG database was outright minimal. The reason for this was that the first database development was only aimed at the computerisation of the production process of the folio product, and not on the development of new PMCs. Later on, when there were concrete plans to also develop electronic products, marketing became more involved. Still, marketing in general was an underdeveloped function within most publishing groups of SHDTW. In fact, sales was the most important task of the marketing function. In addition, marketing was primarily focused on attracting new customers by means of direct mail, and not so much at maintaining the existing customer base. The reason for this was that customers were a lot less critical in the past than they are today. Moreover, there was less competition. Hence, this situation was not typical for SHDTW but applied to publishers in general.

Over the years, marketing became more important within SHDTW. Each publishing group later contained a marketing co-ordinator and a number of sales promoters. The marketing co-ordinators in this respect acted as a watchdog for the traditionally underdeveloped commercial attitude of most publishers. Still, there was considerable ambiguity in the relation between the publishers and marketing co-ordinators. Within a publishing group, the head of the group was on the one hand publisher and, as such, had a functional relationship with its marketing co-ordinator. On the other hand, the head of the group was boss and, as such, had a hierarchical relationship with its marketing co-ordinator. In addition, there were clear cultural differences between the marketing co-ordinators and publishers. Publishers were often less disciplined and structured in their work. Due to the need of a publisher to build and maintain sustainable networks of authors, there also was less job circulation among publishers. Finally, publishers had often received a higher educational degree and held more status in the organisation than marketing co-ordinators. During the last couple of years, however, there had been an emancipation of marketing within SHDTW.

Within SHDTW, different publishing groups were partly serving the same markets with a wide range of products. Especially among larger customers this was causing confusion. To counter this problem, in 1996 the central function of marketing manager was introduced and a centralised department responsible for account management was established. Still, another problem was the lack of consistency in the pricing and promotion of new media. One of the two marketing managers responsible for new media had to deal with this issue. Within the publishing group structure there was, however, no centralised marketing manager responsible for a uniform top-down marketing policy. Instead, the two marketing managers reported directly into the director of SHDTW, and the people from the various publishing groups involved in marketing had regular meetings to exchange knowledge.

The overall transformation of HFD's component knowledge is summarised in Table 6.2. A distinction is made between two stages. The event that marks the transition from Stage 1 to Stage 2 is the second attempt to develop the OBG database in 1995. Hence, Stage 1 refers to the situation prior to this event, while Stage 2 refers to the situation after this event.

	Stage 1 (1985-1995)	**Stage 2 (1995-1997)**
Information content	– Entirely outsourced to Arax, insufficient control	– Lack of control remained because the database was *physically* located at Arax without direct access from SHDTW and without a proper formal arrangement
Information technology	– Decentralised to the publishing groups and therefore rather unstructured, loss of money due to wrong outsourcing decisions	– Bundling of database expertise in EC and EP, operational activities mainly outsourced, plan to establish a generic media neutral information infrastructure
Information markets	– Primarily aimed at sales, often only involved in the final stages of new business development, heavily relying on direct mail	– Gaining importance with the introduction of marketing managers and the establishment of a marketing services department

Table 7.2 The transformation of SHDTW's component knowledge.

7.3.2 *Organisational form*

As argued in Chapter 4, an organisational form is the infrastructure which in a specific way enables the process of integrating the component knowledge related to information content, technology, and markets. Since each organisational form is different, each form is expected to stress different aspects of the knowledge integration process. The conceptual framework presented in Chapter 4 distinguished four organisational forms, namely functional, division, matrix, and innovative.

By 1989, Samsom had become a big and divers organisation within the Wolters Kluwer group. It was divided into several organisational sub-units, according to product types such as loose-leaf, books, and journals. The product-based structure lacked a clear market-focus. Hence, there was a need to divide the company into separate business units focused at particular PMCs. This resulted in the creation of SHDTW, focused on government publishing, and SBI, focused on business and management publishing. At its creation, SHDTW adopted a further division into publishing groups, which later became the dominant organisational form within the other business units of WKBP as well. Each publishing group can be viewed as a triad consisting of a publishing, editorial, and marketing function. The relationships between these three functions are depicted in Figure 7.3.

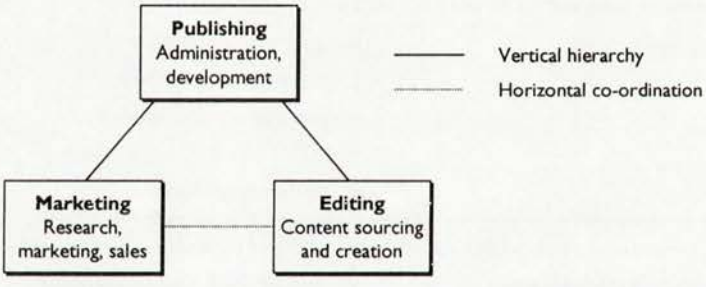


Figure 7.3 Structure of publishing groups within SHDTW.

In order to understand the implications of SHDTW's organisational form for the process of mediamorphosis, a more detailed picture of the prevailing way of developing new business projects is required. The course of events regarding new business development within SHDTW can be described as follows. A new business development project was initiated within a publishing group, which was responsible for a portfolio of PMCs. When it came down to the technical realisation of the new business development project, the central Production department came into play. Production was responsible for the technical aspects of a product development

process and, as such, was responsible for the relationships with external suppliers such as pre-press and printing companies. For long, Production was considered as a secondary function, subordinate to publishing. Especially within SHDTW, Production later took in a more equivalent position and got involved in nearly all the stages of new business development projects.

Mid 1996, one of the employees from the Production department was specifically assigned to co-ordinate all new media projects. Within the publishing groups of SHDTW this was perceived as an important stimulus. Still, Production subsequently passed the IT aspects of a new media project on to the EP department, which had the necessary expertise. This expertise was built up as follows. Until 1995, EC, the predecessor of EP, was located within the central facilitating unit Intermedia. EC was responsible for building databases and standardising client-server applications. Still before that, EC was preceded by Samsom Veltkamp (SV), a joint venture between Samsom and the marketing research company Veltkamp. SV's job was to develop and sell CD-ROMs. The sales of CD-ROMs however never reached the dimension Samsom had in mind, and most money was made with consultancy activities related to the experience gained in developing databases. In 1992, the sales of CD-ROMs moved from SV to SHDTW. In 1993, the remains of SV ceased to exist as an independent unit and got assigned to Intermedia as the EC department. From then on, the operations of EC changed to the building of databases, which was a previously unknown field. The activities of EC were subdivided in accordance with the demands of WKBP' business units. In 1996, EC was decentralised into the EP project group and became formally part of SBI.

Although it was part of SBI, EP carried out projects for both SBI and SHDTW. The communication between EP and the various publishing groups ran via the Production departments of both SBI and SHDTW. EP was not split up any further because of the synergy that could be reached by keeping it bundled. Hence, EP adopted a supporting role. EP focused on keeping track of the latest IT developments, while it did not try to do everything itself. This implied that specialised IT aspects of the development process were outsourced to external partners. The contacts with these partners were co-ordinated by EP because it had the IT knowledge to do so. Formally, however, Production remained responsible for the contacts with external partners. In the case of SHDTW, this was unavoidable because EP was formally part of SBI and could not represent SHDTW. Still, this example arouses the idea that EP and the Production departments of both SBI and SHDTW would have been best off when merged into one fully equipped Production unit. In 1994, an external consultancy company

also advised this option. Because the different characters of both Production departments this bundling was, however, never effectuated.

At the division of Samsom in SHDTW and SBI, Samsom's original activity, namely the production and sales of administrative systems, also became a separate business unit named Samsom Kantoorefficiency (SKE). SKE was different than the other business units constituting WKBP. Instead of focusing on publishing, SKE had a strong position in trading a wide range of office equipment. Hence, SKE also had an entirely different marketing approach than the other business units. Whereas the marketing departments of the other business units were focused on selling many copies of many different issues to many different customers via direct mail, SKE contained a field service that was focused on personal sales of one-off and much bigger orders. Due to WKBP's policy to concentrate on publishing, SKE merged with SHDTW in 1990. Accordingly, the office equipment activities were completely disposed of a while later. Still, the marketing expertise of SKE was continued in a centrally organised department called Marketing Services. This facilitating unit, which became operational in March 1997, further developed the account management concept for the other publishing groups within SHDTW.

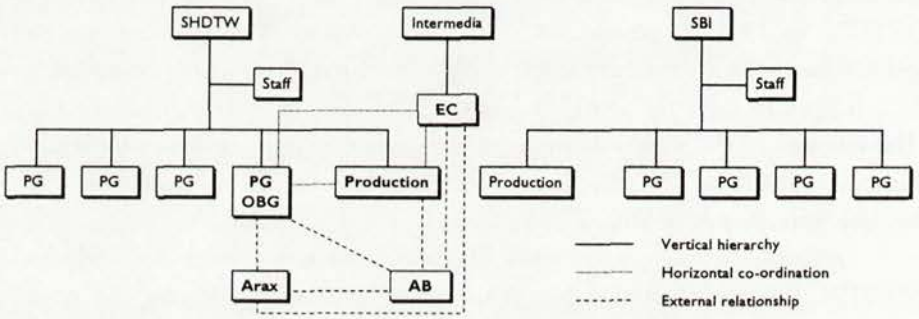


Figure 7.4 SHDTW's organisational form in Stage 1 (1985 - 1995).

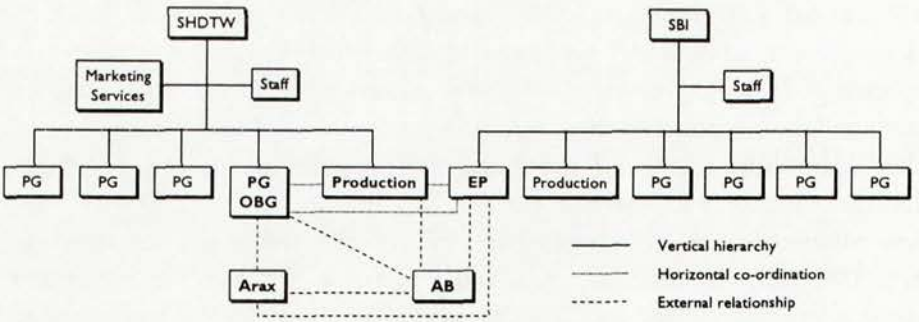


Figure 7.5 SHDTW's organisational form in Stage 2 (1995-1997).

Summing up, the changes in SHDTW's organisational form related to the development of the OBG mixed media project are presented in Figure 7.4 and Figure 7.5. As indicated, the event that marks the transition from Stage 1 to Stage 2 is the second attempt to develop the OBG database in 1995.

The change in SHDTW's organisational form can be characterised as follows. At the level of Wolters Kluwer as a whole, the division into semi-independent business units resembled the division form. The same held for SHDTW, with its division into semi-independent publishing groups (PGs). Facilitating activities such as Production, EP, and Marketing Services were centrally organised and supported the publishing groups. This organisational form worked fine in the folio era. The publishing groups all focused on a clear set of PMCs and their activities were highly routinised. With the emergence of new electronic media the situation became more complex. SHDTW reacted in the following way.

First of all, Samsom formed the separate joint venture SV for the development and sales of CD-ROMs. Via a number of moves, the remains of SV later became the project group EP located within SBI. Meanwhile, the importance of facilitating activities such as Production and EP increased. Production and EP became more and more involved in both the transformation of production processes and the development of new products. Still, the triad at the level of the publishing group, as depicted in Figure 7.3, retained its dominant position. SHDTW never formed a separate new business development unit responsible for the monitoring of all new business development projects in the business unit. Hence, SHDTW as a whole largely preserved its division form. So, the transformation of SHDTW's organisational form can be labelled as a continuation of the division form in both Stage 1 and Stage 2. This does of course not imply that SHDTW did not change at all. After all, changes were made to the firm's integration capabilities.

7.3.3 Integration capabilities

The integration capacity offered by a certain organisational form can be strengthened by the use of integration capabilities that overlay the basic organisational form. In this way, integration capabilities may or may not enhance the capacity generated by a certain organisational form to integrate the component knowledge related to information content, technology, and markets respectively. As discussed in Chapter 4, the three investigated integration capabilities are systems, co-ordination, and socialisation.

Systems capabilities

Wolters Kluwer, having its stocks traded on the stock exchange, traditionally exposed a strong orientation on its shareholders, and therefore its return on investment. Accordingly, there was a stratified governance structure within the organisation: financial control at the level of the corporation (Wolters Kluwer), strategic control at the level of the divisions (e.g. WKBP), and strategic management at the level of the business units (e.g. SHDTW). In Stage 1, the implication of the stringent financial policy was that new media projects were evaluated according to the same criteria as the traditional folio products. This made people reluctant to get involved in new media development, because the payback period was (and still is) usually a lot longer compared to traditional folio products. Hence, the financial criteria offered little incentives for new business development and did not lead to the reconfiguration of knowledge. In Stage 2, WKBP created more financial leeway to invest in the medium neutral storage of information. A problem, however, was that the financial systems were not equipped with the measurement instruments to evaluate the new media projects. The financial budgeting and controlling methods were still aimed at the specification of products instead of the underlying information. Besides the stringent financial criteria, SHDTW employed few systems capabilities in Stage 1. There were for instance hardly any procedures for dealing with new media projects. As a consequence, projects such as the OBG were rather unstructured. In Stage 2, SHDTW tried to improve this situation by aiming at the formulation of company-wide guidelines for building media-neutral databases. Although these guidelines did not result in the integration of knowledge yet, they had a stimulating effect on SHDTW's transformation process.

Co-ordination capabilities

With the division of Wolters Kluwer into semi-autonomous business units, the company adopted a far-reaching form of decentralisation. Business units had a lot of freedom regarding the management of their PMCs, and they were primarily judged on the yield that they delivered each year. Between the business units, there was little or no co-ordination. The same held for the publishing groups constituting each business unit. As a consequence, the opportunities to reach synergy between the publishing groups by means of for instance IT were hardly realised in Stage 1. In Stage 2, this situation changed with the introduction of a number of steering and project groups that went beyond the publishing group and business unit level. Within WKBP, the following co-ordination capabilities were employed. There was

a steering committee Electronic Publishing, which focused on the development of both electronic products and electronics in publishing (production processes). A subgroup of this steering committee was the Information Management group. This group contained a number of competence centres (CC's), which focused on the different aspect of electronics in publishing. Each CC was made up of people with different functional backgrounds and working in the different business units within WKBP. Each CC worked in accordance with clear project management guidelines. The purpose of these groups was to search for generic solutions, standards and norms at the level of the division. At the level of the individual business units, however, the impact of the WKBP groups was rather limited. Hence, within SHDTW there also were a number of cross-functional project groups, regarding for instance databases and on-line (Internet) projects.

Socialisation capabilities

SHDTW clearly exposed the characteristics of a traditional publishing firm. Its operations were guided by a typical publishing culture and deeply rooted routines. An important aspect of this culture was the strong decentralisation and departmentalisation into publishing groups. This led to a 'cottage industry' atmosphere in the organisation, which turned out to be hard to change. The heads of the various publishing groups remained the central figures in the management of both existing folio and new media PMCs. Although Marketing Services, Production, and EP became more important, they still were seen as facilitating functions. In addition, Wolters Kluwer's financial control strategy inhibited the creation of an innovative atmosphere, which could facilitate the process of knowledge integration. Instead, in both Stage 1 and Stage 2 SHDTW heavily relied on the traditional publishing routines which had made the company successful in the past.

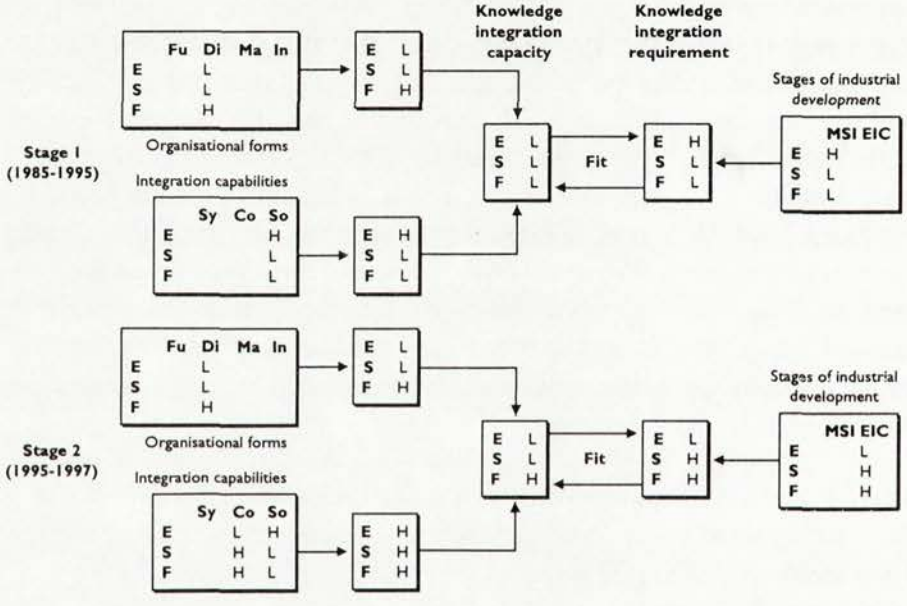
SHDTW's deployment of integration capabilities is summarised in Table 7.3. From this summary it can be concluded that the dominant integration capability in Stage 1 was socialisation, while the dominant integration capabilities in Stage 2 were co-ordination and socialisation.

7.3.4 Score card of fit

Taking the above analysis of SHDTW's mediamorphosis, the score card presented in Chapter 4 can now be filled in for Stage 1 and Stage 2. This score card is presented in Figure 7.6.

	Stage 1 (1985-1995)	Stage 2 (1995-1997)
Systems capabilities	– Top down criteria aimed at the effectuation of specified profitability levels	– Emergence of guidelines aimed at standardisation of products and production processes, although still in its infancy
Co-ordination capabilities	– Limited to the level of the publishing groups	– Dominant capability; project groups at various levels in WKBP and SHDTW
Socialisation capabilities	– Dominant capability; strong traditional folio publishing routines	– Dominant capability; still largely aimed at folio publishing

Table 7.3 SHDTW's deployment of integration capabilities.



Legend

Fu	functional	Sy	systems	E	efficiency	H	high
Di	division	Co	co-ordination	S	scope	L	low
Ma	matrix	So	socialisation	F	flexibility		
In	innovative						

MSI	mature single industry
EIC	emerging industrial complex

Figure 7.6 The score card of fit applied to SHDTW.

Looking at the scorecard it becomes clear that SHDTW has matched the change in stage of industrial development with only a minor change in its organisational configuration. Especially the organisational form remained largely the same. In terms of the fit between the organisation and the environment, the first stage showed an insufficient fit. Although the integration capacity matched the integration requirement on two dimensions of knowledge integration (scope and flexibility), the required efficiency of knowledge integration was not realised. The second stage also showed an insufficient fit. Again, the integration capacity matched the integration requirement on two dimensions of knowledge integration. Still, the required scope of knowledge integration was not realised.

7.4 Summary

Summing up, SHDTW has made amendments to its organisational configuration, but it can be doubted whether these changes were drastic enough. In Stage 2 the organisation still heavily relied on its division form and traditional routines. Within this configuration, it turned out to be impossible to generate the required knowledge integration capacity just by employing additional co-ordination capabilities. For that purpose, the organisational form needed a more drastic change.

	OBG
Traditional medium	Loose-leaf reference guide, issued nine times a year
Information type	Education
Content source	External education contacts, external editorial office
Start of the mixed media project	1985
Initial objective	Improvement of internal production process
First new media PMC	CD-ROM
Market introduction	1997
Additional new media PMCs	-

Table 7.4 Summary of the OBG mixed media project.

Hence, in Stage 2 there was insufficient capacity to effectuate the required integration between product, production, and market knowledge. On the other hand, the observed lack of fit in Stage 1 raises questions regarding the validity of the conceptual framework. After all, SHDTW was very successful in Stage 1, while the score card indicates that there was insufficient fit. This issue is further addresses in the confrontation of the cases and the evaluation of the conceptual framework in Chapter 9.

The characteristics of the investigated mixed media project related to the OBG and SHDTW in general are summarised in Table 7.4 and Table 7.5.

		SHDTW
Origin		1882
Employees		120
Ownership		Wolters Kluwer (stockholders)
Strategy		SHDTW aims to publish for a number of selected segments of the professional information market at the required levels of turnover and profit
Focus on the professional information market		Local government, education, health care, business
Stage 1	**Organisational form**	Division
(1985-1995)	**Dominant integration capabilities**	Socialisation
	Fit	Moderate
Stage 2	**Organisational form**	Division
(1995-1997)	**Dominant integration capabilities**	Co-ordination and socialisation
	Fit	Moderate

Table 7.5 Summary of SHDTW's management of mediamorphosis.

8

Case C: SDU

8.1 Introduction

Sdu NV (SDU) is the former state publishing and printing office based in Den Haag, the Dutch administrative centre.[92] The very first, indirect roots of SDU go back as far as 1577.[93] In that year, the just independent *Staten van Holland*, the predecessor of the Kingdom of the Netherlands, appointed printer Willem Silvius from Antwerpen as the official state printer. The direct roots of SDU as a separate organisation, however, can be traced back to the year 1814. In that year, Willem I, the first King of the Netherlands, founded the *Algemeene Landsdrukkerij*.[94] In contrast with an institution like the postal services, the *Algemeene Landsdrukkerij* was not owned by the state.

Initially, the *Algemeene Landsdrukkerij* was only involved in printing. In 1906, it founded an independent department responsible for publishing the official state journal, which can be seen as the first sign of a move into publishing. Due to a change in the Dutch law, in 1915 the *Algemeene Landsdrukkerij* was turned into an official state company. During the subsequent couple of decades, politicians recurrently questioned the usefulness of a state-owned printing and publishing organisation. Many considered printing and publishing as activities that should be left to the market. Still, in 1926 the *Algemeene Landsdrukkerij* became an independent

[92] SDU initially stood for *Staatsdrukkerij en -uitgeverij*, which literally means state printer and publisher.

[93] The account of SDU's history is to a large extent based on Van Heijningen (1988), who for his part draws on Schneider (1939).

[94] *Algemeene Landsdrukkerij* literally means general government printing office.

organisation within the Ministry of the Interior, and in 1947 the name of the *Algemeene Landsdrukkerij* was changed into *Staatsdrukkerij- en Uitgeverijbedrijf*.[95]

In 1988, the position of SDU was changed back to its original situation. In that year, the government decided to separate SDU from the Ministry of the Interior and to make it a commercially independent firm. Accordingly, SDU was turned into an NV (cf. public limited company) and around 1100 people saw their status as civil servant change into the status of regular employees. Although the objective was to eventually have SDU's stocks either sold to another company, or traded at the stock exchange, SDU's stocks are still entirely owned by the Dutch government.

One of the first implications of the split off from the government was the need for SDU to concentrate and specialise. As an independent company it was simply impossible for SDU to stay involved in the breadth of activities it was involved in as a state company. A second major implication was the need to catch up with regard to marketing and sales capabilities. As a state company, these capabilities had hardly been developed, while as an independent company there was an immediate need for SDU to broaden its clientele. Thirdly, there was the transformation imposed by the contingency central to this study, namely the emergence of the multimedia complex. Before going into this third transformation process in further detail, first the characteristics of SDU are further specified.

SDU holds a special position in the Dutch publishing industry. It is a medium-sized player in the market for professional information products and services, while within the market for government information, SDU naturally still holds a very strong position. The company has approximately 850 employees, an annual turnover of Dfl. 260 million and a profit of Dfl. 25 million.[96] SDU's key figures are presented in Table 8.1.

This chapter describes and analyses the process of mediamorphosis at SDU for the period between 1986 and 1997. This period reasonably covers the transformation of SDU from a pure folio publisher to a publisher of both folio and electronic information products. As explained in the section on methodology, this case is based on both interviews and documents. The interviews were conducted in the period between July 1995 and July 1997. The case study report was approved for publication by the company in April 1998.

[95] *Staatsdrukkerij- en Uitgeverijbedrijf* literally means state printing and publishing company.

[96] Key figures are taken from SDU's 1996 annual report.

	1996	1995	1994	1993	1992
Turnover (in Dfl. million)	262	227	233	232	232
Net income (in Dfl. million)	25.0	19.0	16.3	17.6	7.9
Number of employees	845	767	826	926	971

Table 8.1 SDU's key figures.

First, a longitudinal description of the process of mediamorphosis is provided on the basis of two mixed media projects. Subsequently, an analysis of SDU's mediamorphosis is based on a combination of these two mixed media projects. The analysis is provided in terms of the conceptual framework and score card of fit put forward in Chapter 4. The final section wraps up the main characteristics of the SDU case and draws a number of conclusions.

8.2 Longitudinal description

Besides its traditional portfolio of folio products, SDU is nowadays involved in a wide range of other information and communication activities as well. The following description provides a longitudinal picture of SDU's attempts to adapt its portfolio of folio PMCs into a mixed media portfolio of both folio and new media PMCs. The focus is in particular on the mixed media projects related to two PMCs, namely the *Groene Boekje* and the *Staatsalmanak*. The choice for two rather than one mixed media project was made with regard to SDU's relatively larger size. While HFD and SHDTW could be investigated on the basis of one project, SDU required a broader scope to get insight into its transformation process. Hence, two projects in different parts of the organisation were selected and thoroughly investigated. In addition, other projects were observed in less detail to enrich the overall understanding.

8.2.1 Groene Boekje

The *Groene Boekje* (GB) is the publication of the official spelling list of the Dutch language.[97] This list, officially named *Woordenlijst Nederlandse Taal* (WNT)[98], is drawn

[97] *Groene Boekje* literally means little green book, which refers to its small size and green cover. The *Groene Boekje* is not an explanatory dictionary, but a plain list of words based on the official spelling rules.

[98] *Woordenlijst Nederlandse Taal* literally means wordlist of the Dutch language.

up under the responsibility of the *Nederlandse Taalunie* (NTU)[99], which is commissioned by the Dutch and Belgian government.[100] The task of drawing up the spelling list is carried out by the *Instituut voor Nederlandse Lexicologie* (INL)[101]. During this case study, the task of publishing the spelling list was carried out by *Uitgeverij Koningsmegracht* (UKG), one of the business units of SDU. The most important parties involved in the *Groene Boekje* are depicted in Figure 8.1.

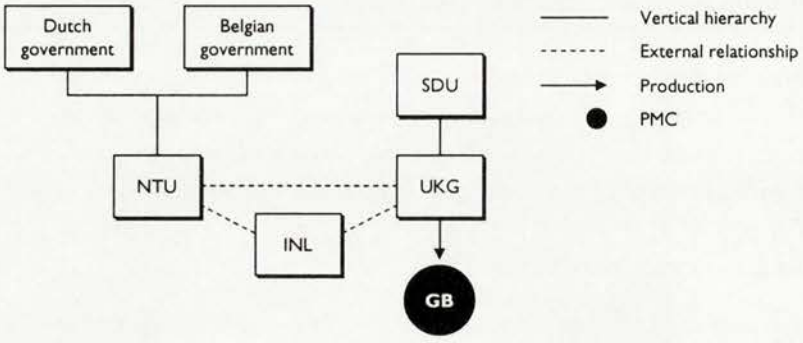


Figure 8.1 Most important parties involved in the *Groene Boekje*.

Recently, the *Groene Boekje* has attracted a lot of attention in Belgium and the Netherlands. In 1995, the spelling list saw its first revision since 1954. This implied that the official spelling of the Dutch language was drastically changed, which caused flaming debates between writers, teachers, linguists, and readers alike. The following longitudinal description does, however, not focus on the pros and cons of the 1995 spelling revision. Instead, this section describes SDU's process of mediamorphosis as it was related to the *Groene Boekje*. It covers the period between 1990 and 1997.

Getting started

The year 1990 is taken as starting point for the longitudinal description of the *Groene Boekje*, because in October of that year, INL initiated the project *Database Groene Boekje*. The aim of this project was to computerise the WNT files that were used for producing the *Groene Boekje*. For the realisation of this project, INL started

[99] *Nederlandse Taalunie* literally means Dutch language union.

[100] Dutch is one of the official languages of Belgium. It is spoken in *Vlaanderen*, the northern part of Belgium.

[101] *Instituut voor Nederlandse Lexicologie* literally means institute for Dutch lexicology.

a co-operation with the consultancy firm BVP/OFFIS. *Uitgeverij Koningingracht*, being the publisher of the *Groene Boekje*, also got involved in this co-operation. The great number of parties involved in the co-operation, however, led to diverging objectives. Hence, it was hard to determine who was doing what, and who was in control of the project. In January 1991 for instance, *Uitgeverij Koningingracht* commissioned BVP/OFFIS to conduct a feasibility study of an electronic issue of the *Groene Boekje*. On the other hand, INL's interest was to develop an electronic database for improving the production process of the existing folio issue.

In October 1991, things became even more complicated. At that time, SDU's newly formed concern staff Electronic Publishing (EP) got involved. In reaction to the initiative by *Uitgeverij Koningingracht* to develop an electronic *Groene Boekje*, EP made a number of suggestions. In addition, in February 1992 EP sent *Uitgeverij Koningingracht* a request to instruct BVP/OFFIS to formulate a functional design for the electronic *Groene Boekje*. The aim was to have the design supported by AND and Linguistic Systems, two software companies. The request ended with the following sentence. The intention reflected in this sentence, however, took a lot longer to realise.

> "This letter has been corrected with WordPerfect. I hope that next year the electronic *Groene Boekje* will do this for me."

BVP/OFFIS presented the requested functional design in March 1992. The plan was to start producing the electronic *Groene Boekje* before the end of that year. BVP/OFFIS even proposed to invest a substantial amount of money in the project, and aimed to support the entire project, including the phases of marketing and distribution. In June 1994, however, *Uitgeverij Koningingracht* broke up the relationship with BVP/OFFIS. The position claimed by BVP/OFFIS was considered to be too dominant. In addition, they were seen as too expensive.

Parallel development tracks

Independent of the above developments, NTU initiated a project to computerise the generation and administration of the WNT in 1992. The aim was to create a platform for the development of a portfolio of PMCs, including a folio and electronic *Groene Boekje*, and a spelling checker. As such, this project clearly resembled the idea of mixed media publishing. NTU's reason for independently developing the WNT database was that it wanted to stay in control of the *Groene Boekje*. Only with regard to the development of different PMCs based on the WNT database, NTU wanted to co-operate with commercial partners, who could be

publishers, software developers, or other types of firms. This plan clearly undermined the position of SDU as the designated publisher of the *Groene Boekje*. Fortunately for SDU, however, NTU later decided to abort the whole plan due to an internal restructuring. The alternative plan became to create a separate company to develop an electronic WNT. In this joint venture, three partners would have to participate. NTU would be responsible for the official spelling rules, INL would be responsible for the generation of the spelling list (WNT), and SDU, the owner of the brand *Groene Boekje*, would be responsible for the commercial exploitation of the WNT. The separate company was, however, never formed. Instead, NTU presented a renewed feasibility study for the development of the electronic *Groene Boekje* by a consortium consisting of NTU, INL, and SDU in March 1994. Accordingly, the three parties formulated a declaration of intent. The idea was to formally arrange the co-operation in two bilateral contracts (UKG-NTU and UKG-INL), which had to be signed later that year. These contracts were, however, never signed. Instead, only contracts with regard to the new edition of the folio *Groene Boekje* were signed (NTU-INL and NTU-UKG).

Meanwhile, NTU was negotiating with WordPerfect in Belgium the co-development of the WNT database, and the incorporation of an electronic *Groene Boekje* in WordPerfect's software packages. NTU believed that WordPerfect had better language technology capabilities than SDU and its partners. Clearly, these negotiations once again posed an enormous threat to SDU. WordPerfect already was co-operating with Wolters Kluwer's subsidiary *Van Dale*, a major competitor of SDU on the market for dictionaries and derivative products. Under strong pressure of SDU, NTU decided to stop the negotiations with WordPerfect and to continue working with SDU. Subsequently, *Uitgeverij Koningsinnegracht* formulated yet another functional design of the electronic *Groene Boekje* in July 1994. On the basis of this functional design, software company AND formulated a plan to carry out the development the electronic *Groene Boekje*. AND's role would be to develop the search and retrieval engine, while Cognitech, another software company, would take care of the spelling checker.

New product-market combinations

Finally, the development of the electronic *Groene Boekje* was progressing. In July 1995, *Uitgeverij Koningsinnegracht* instructed SDU's Digital Data Production (DDP), the department within SDU responsible for IT, to convert the INL files. At the same time, a number of external freelancers was hired to carry out the necessary editorial work. *Uitgeverij Koningsinnegracht* also negotiated a possible co-operation with Microsoft with regard to the distribution of the electronic *Groene Boekje*. Microsoft

was planning to create an 'electronic bookshelf' for the Dutch language and the electronic *Groene Boekje* would fit perfectly into this plan. In March 1996, all the efforts resulted in the introduction of the electronic *Groene Boekje* in the market. It was sold separately on a diskette, as well as part of the Microsoft's Word software package. In June 1996 a CD-ROM version was issued.

Although the above longitudinal description of the GB mixed media project is inevitably only a snapshot, it still provides sufficient input for the analysis in the next section. To sum up, the main events put forward in the longitudinal description are presented in Figure 8.2.

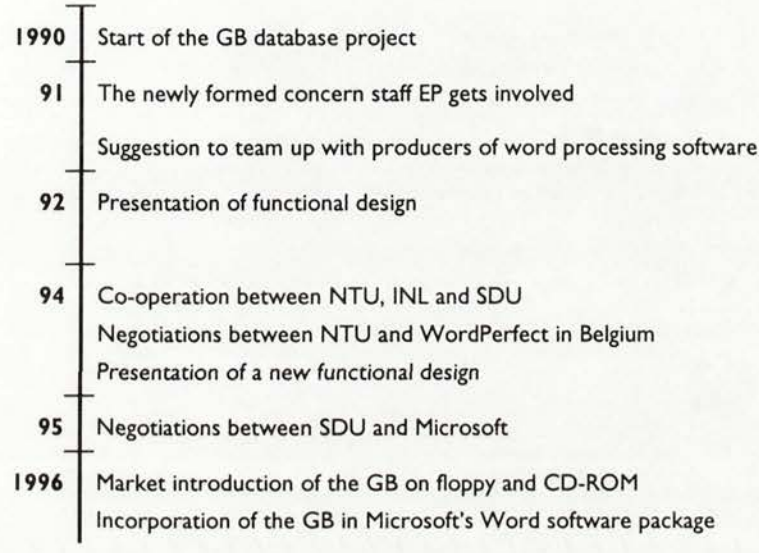


Figure 8.2 Time scale of relevant events in SDU's longitudinal description related to the *Groene Boekje* (GB).

8.2.2 Staatsalmanak

The *Staatsalmanak voor het Koninkrijk der Nederlanden* (SA) is the official yearbook of the Dutch government. The SA was founded on July 16, 1859. Except for a few occasions, the SA has been published every year from 1860 onwards. During this case study, the SA was published by *Uitgeverij Plantijnstraat* (UPL), one of the publishing business units of SDU. The formal responsibility for the *Staatsalmanak*, however, lies with the Ministry of the Interior, which is legally compelled to get the *Staatsalmanak* published once a year. As indicated above, SDU was formally part of the Ministry of the Interior until 1988. This section describes the process of

mediamorphosis related to the *Staatsalmanak* for the period between 1986 and 1997.

Before 1986, there only was a folio version of the *Staatsalmanak*, which was published by *Uitgeverij Plantijnstraat*. Most of the operational tasks related to the folio *Staatsalmanak* were, however, carried out by PUBO. PUBO was part of CAS, the central governmental records department. PUBO was located in Winschoten, a small town 250 kilometres to the Northeast of Den Haag, the home base of SDU. In 1994, PUBO became part of SDU. Before that, SDU and PUBO were mutually independent organisations. The most important parties involved in the *Staatsalmanak* are depicted in Figure 8.3.

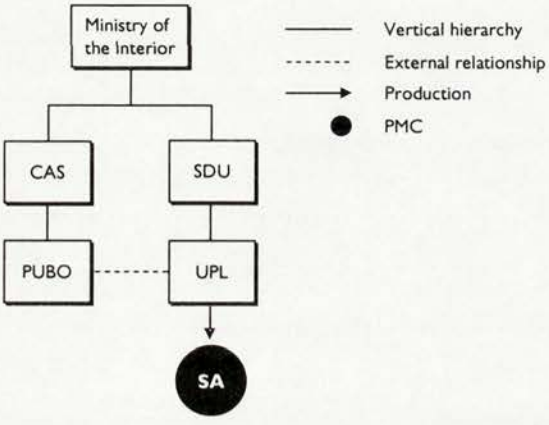


Figure 8.3 Most important parties involved in the *Staatsalmanak* (1986).

Getting started

The year 1986 is taken as starting point of the longitudinal description because it marks the start of the development of an electronic version of the *Staatsalmanak*. In 1986, SDU got involved in a project initiated by the Ministry of Economic Affairs to develop governmental information databases. Within this project, SDU co-operated with the Ministry of the Interior in a demonstration project aimed at the electronic exploitation of governmental meta-information. Specifically with regard to this demonstration project, SDU created a project group Electronic Publishing (EP). In addition, SDU instructed software company CMG to carry out an exploratory study.

CMG advised SDU to aim at the development of an electronic *Staatsalmanak* that was more than a plain governmental address book. First of all, the information content had to be expanded. In addition, more frequent updates were required because the going information collection method was insufficient to enhance the required topicality. Within each Ministry, SDU had a contact person who provided the information for the *Staatsalmanak*. Each year, all the contacts informed SDU about possible amendments. CMG proposed to set up a pilot project with one Ministry to investigate the organisational implications of a different information collection system. CMG proposed a limited pilot project because SDU operated in a rather complex context. SDU was in the middle of a separation process, which led to changes in its relationship with especially the Ministry of the Interior. Hence, the project needed to be carefully managed.

In August 1987 CMG presented a report titled 'Think big, act small'. This report formulated the conditions of the development of a specific electronic product related to the *Staatsalmanak*. Among these conditions was the idea that the product had to be the result of a design that also enabled other products, such as the folio *Staatsalmanak*. This idea closely resembled a mixed media approach. In addition, CMG proposed to set up a clear project management structure that fitted with the actual organisational form. Nonetheless, the involvement of CMG turned out to be a wasted effort. The fear within *Uitgeverij Plantijnstraat* was that an electronic *Staatsalmanak* would cannibalise the existing folio publication. Because the Ministry of the Interior was also rather reluctant, CMG's plans to develop an electronic *Staatsalmanak* did not result in any concrete products.

Parallel to the events taking place in SDU, PUBO independently started developing an electronic database containing information related to the *Staatsalmanak* in 1986. This database was merely built to support the folio production process of a number of products. Hence, PUBO never undertook any attempts to develop electronic products on the basis of this database. Because of the success of this database, PUBO explored the opportunities of also developing an electronic database specifically aimed at the production of the folio edition of the *Staatsalmanak*. The Ministry of the Interior did, however, not support this initiative. Hence, PUBO did not receive the financial means needed to build the database.

Starting all over

When SDU was split off from the government in 1988, it had to secure the relationship with the Ministry of the Interior for the period following SDU's separation. Accordingly, SDU signed a contract with the Ministry of the Interior

regarding the future publication of the *Staatsalmanak*. This contract only concerned the folio issue and did not mention any related electronic publications. Hence, neither *Uitgeverij Plantijnstraat* nor PUBO undertook attempts to develop an electronic *Staatsalmanak*. The separation did, however, change the mutual relationships between the various parties involved. A new editorial board was established, which became responsible for the content and form of the *Staatsalmanak*. SDU (UPL) was appointed as publisher and PUBO was appointed as executive body. An additional implication of the separation was that SDU broke up the relationship with printing company *Van de Garde*. Until then, *Van de Garde* had been responsible for typesetting and printing the *Staatsalmanak*. Nonetheless, SDU wanted to assign these activities to its own printing business unit, which happened in 1993. A problem with this move was that PUBO at that time did not have its own type files. Therefore, the information for the first fully in-house produced *Staatsalmanak* needed to be completely retyped. Another problem was that the experience PUBO had gained with developing its databases was lost because SDU did not use the same database software.

It took quite a while before another attempt was made to develop an electronic *Staatsalmanak*. Meanwhile, the organisational context had changed. In February 1994, PUBO officially became part of SDU and had its name changed into SDU Groningen (SG). SG was split up into two groups. The editorial operations became part of UPL, while the information technology operations became part of SDU's *Grafisch Bedrijf* (SGB), a business unit responsible for pre-press and printing. The renewed attempt to develop electronic PMCs related to the *Staatsalmanak* took place along two paths: on-line and CD-ROM.

New product-market combinations

In October 1994 there was a meeting of SDU, RCC and the *Informatiebank* (IB) with the aim to explore the on-line opportunities. RCC was the former government computer centre, while IB was created by breaking up the SDU's initial project group EP. In fact, IB was a joint venture partly owned by SDU and partly owned by RCC. IB took care of most of the CD-ROM productions for SDU. Later, however, IB was fully incorporated within SDU again. It became part of the project group Database Publishing (DP), the successor of EP. In the fall of 1995, IB started developing a *Staatsalmanak* Internet site. This initiative was experimental. IB wanted to gain experience and started the development independently of *Uitgeverij Plantijnstraat*, which was still the formal publisher. IB's strategy was to incorporate the Internet site in a real mixed media portfolio in a later stage. This strategy was, however, never accomplished. In April 1996, *Uitgeverij Plantijnstraat* decided to stop

the Internet site at IB. Lack of co-ordination, however, meant that the site was still active for another couple of months.

Meanwhile, the development of the CD-ROM followed a different track. A crucial event was a decision by the board of directors in 1995. The board wanted to increase the speed of SDU's transformation process and made the top-down decision to supplement the 1995 edition of the folio *Staatsalmanak* with a CD-ROM. *Uitgeverij Plantijnstraat* was appointed as the central actor, while SG (which at that time was part of GB) and IB were also involved. SG had to generate the necessary database files, while it was IB's task to convert the files and add a search and retrieval engine. A third company, named Twinfo, eventually took care of producing the CD-ROM. In October 1995, the first version of the CD-ROM was published. This product, however, only contained a selection of the folio *Staatsalmanak* and was more an experiment than a serious attempt to start a new PMC. From a commercial perspective, the introduction of the 1995 CD-ROM came too early. There was for instance no time to undertake market research. In addition, the sales support was very limited. Hence, SDU sold only a small number of copies.

Towards a mixed media strategy

Later, the situation regarding the development of electronic issues of the *Staatsalmanak* became clearer. In April 1996, SG entirely became part of the project group Database Publishing (DP). *Uitgeverij Plantijnstraat* remained the formal publisher and became responsible for packaging, sales, distribution and after-sales. DP(SG) became responsible for the development of both the folio and electronic issues. Accordingly, in January 1996, the project manager responsible for the new media PMCs moved from *Uitgeverij Plantijnstraat* to DP. Moreover, the development of the mixed media portfolio based on the *Staatsalmanak* got related to a number of company wide and very complex projects within SDU. One of these projects was *Themis*, which was initiated by DP in the beginning of 1996. *Themis* was a sort of business process reengineering (BPR) project aimed at the design and adaptation of SDU's entire information and production infrastructure. The purpose was to drastically improve the storage, administration, and maintenance of all information by breaking it up in small information types. As such, *Themis* had to form the heart of SDU's overall mixed media strategy. As a consequence, the *Staatsalmanak* was meant to be incorporated in *Themis* in the near future.

Although the above longitudinal description of the SA mixed media project is inevitably only a snapshot, it still provides sufficient input for the analysis in the

next section. To sum up, the main events put forward in the longitudinal description are presented in Figure 8.4.

1986	SDU gets involved in demonstration project subsidised by the Ministry of Economic Affairs and creates the project group EP External software company CMG gets involved PUBO develops a production oriented database related to the SA
87	Formulation of reports by CMG
88	Separation of SDU from the Dutch government SDU signs a new contract with the Ministry of the Interior regarding the publication of a folio *Staatsalmanak* PUBO explores the opportunities for a production oriented database for the SA
93	SDU breaks up the relationship with printing company Van de Garde
94	First internally produced SA IB starts developing an on-line SA
95	Introduction of Internet SA by IB Top-down decision to develop CD-ROM SA Introduction of CD-ROM *Staatsalmanak*
96	Removal of Internet SA Project manager SA moves from UPL to DP DP initiates the company-wide information technology project Themis
1997	SG becomes part of DP

Figure 8.4 Time scale of relevant events in SDU's longitudinal description related to the *Staatsalmanak* (SA).

8.3 Analysis

The above longitudinal descriptions of the mixed media projects related to the *Groene Boekje* and *Staatsalmanak* are now analysed in terms of the conceptual framework presented score card of fit in Chapter 4. As a reminder, the two key elements of the framework are organisational forms and integration capabilities. Together, these elements determine the capacity of a firm to integrate component knowledge into architectural knowledge. Hence, first the different types of component knowledge are discussed.

8.3.1 Component knowledge

In order to master of mixed media publishing, a firm needs to reconfigure its component knowledge. As indicated in Chapter 5, mixed media publishing can be effectuated by reconfiguring the component knowledge related to information content, technology, and markets respectively. Below, the changes taking place in these three types of component knowledge are elaborated on.

Information content

Knowledge of information content has always been SDU's main expertise. This knowledge is stored as tacit routines in the heads of publishers and editors of the different publishing groups. In general, for many new media projects the required content knowledge is not very different compared to the content knowledge required for producing traditional media. This especially holds for one-off new media PMCs. Still, when adopting a mixed media strategy the required changes are much greater. An important element of SDU's content knowledge was related to the formulation of functional designs. A functional design lists the product specifications and can serve as an effective communication instrument in the development of a new media product. In order to formulate a functional design, knowledge of information technology is needed. With regard to the *Groene Boekje*, the following occurred. Due to lack of internal knowledge of functional designs, *Uitgeverij Koningsinnegracht* initially outsourced the formulation of the functional design to the external consultancy firm BVP/OFFIS. After a while, the project group DP had gained the functional design knowledge itself, and the functional design was formulated internally. Nevertheless, the understanding of the functional design at the operational level of *Uitgeverij Koningsinnegracht* was still lacking, which hindered the communication with DP. Hence, there was insufficient integration of knowledge, which slowed down the development process.

Overall, the development process of the *Groene Boekje* was very lengthy. This was partly caused by the complex relationships between the various parties involved in the content generation. Because *Uitgeverij Koningsinnegracht* was not the owner of the content, it was vulnerable. NTU and INL could easily switch to a different publisher or other producer, which was illustrated by the negotiations between NTU and WordPerfect in 1994. By adding features to the electronic *Groene Boekje* (e.g. a spelling checker), *Uitgeverij Koningsinnegracht* added more value and strengthened its position *vis-à-vis* NTU. Accordingly, it regained its role as spider in the web.

The major challenge during the development of the electronic versions of the *Staatsalmanak* was to add value in line with the specific features of the different new media. An important opportunity (as well as an important problem) was the task of updating the information content. Initially PUBO, and later *Uitgeverij Plantijnstraat* and DP were dependent on the governmental organisations for the collection of the information. This issue was already pointed out to SDU by CMG in 1987. Although attempts were made to co-ordinate the various contacts, the problem of updating still was not solved when both the CD-ROM and Internet site were introduced in 1995. Hence, the two products did not fully exploit their media potential.

An important conclusion that can be drawn from both the *Groene Boekje* and the *Staatsalmanak* is that publishers who have little control over the content of their products find themselves in a very vulnerable situation. Because of its original role as state publisher, SDU was still highly dependent upon the government as owner and decision-maker of the information it published. Hence, SDU needed to add value to remain the inescapable spider in the web and not loose its business to other parties.

Information technology

The control over information technology knowledge within SDU differed per business unit. *Uitgeverij Plantijnstraat* seemed better equipped in this respect than *Uitgeverij Koningginnegracht* was. The products of *Uitgeverij Plantijnstraat* in general had a higher frequency of publication (e.g. newsletters, newspapers, daily official publications) than the products of *Uitgeverij Koningginnegracht* (e.g. books). This meant that *Uitgeverij Plantijnstraat* had more production runs, and was ahead of *Uitgeverij Koningginnegracht* in applying information technology to its production process.

In the initial stages of the development of the electronic *Groene Boekje* in 1990, *Uitgeverij Koningginnegracht* clearly did not have sufficient new media knowledge. This became clear in the relationship with BVP/OFFIS. Due to its knowledge lead, BVP/OFFIS took over part of the central co-ordination. Only later, when the project was moved from *Uitgeverij Koningginnegracht* to the project group EP, SDU regained its position and BVP/OFFIS' role became obsolete. During the entire development process of the electronic *Groene Boekje*, the knowledge required to function as a partner of external parties was only located within DP. Hence, DP appointed someone as project manager, who moved to *Uitgeverij Koningginnegracht*. The danger of this move, however, was that after the project was finished, the project manager took the new media knowledge back to DP again, without letting it reside at *Uitgeverij Koningginnegracht*. This made the management of the electronic

Groene Boekje, after its development and implementation, a difficult task. Problems with the electronic *Groene Boekje* were consequently passed on to DP, while *Uitgeverij Koningingracht* was the responsible actor. This resulted in a split between the management of the folio and the electronic issues, which conflicted with the idea of mixed media publishing.

With regard to the *Staatsalmanak*, the initial reports by CMG pointed out that especially the publishing units of SDU lacked the information technology expertise to develop new media PMCs. In the past, the central IT department of SDU had primarily focused on the computerisation of the administrative processes related to publishing, and not the publishing production process itself. The graphic business units of SDU, on the other hand, had gained new media knowledge by having to adopt digital technologies in the pre-press and printing operations. Hence, the first new media initiatives took place within SGB and its predecessor DDP. By establishing the project group EP, which later became DP, the leading role of SGB and DDP was gradually taken over. As a consequence, it took quite some time to develop the necessary knowledge of information technology and project management at DP. Part of the reason for this slow pace was the fact that there was little transfer of experience from SGB and DDP to DP. In addition, initially a lot of information technology related tasks were outsourced. In this way there was little new knowledge that precipitated at DP. But perhaps the most important reason was the fact that there was only limited manpower and, therefore, little clarity about functions, positions, and roles.

Information markets

With regard to the *Groene Boekje*, many suggestions regarding the marketing and distribution of the electronic issue initially came from outside *Uitgeverij Koningingracht*. In 1991, BVP/OFFIS suggested that co-operation with word-processing firms could be an interesting option to reduce the uncertainty regarding the sales of the electronic *Groene Boekje*. WordPerfect, which at that time provided the dominant word-processor in the Netherlands, was not interested. Microsoft, whose word-processor Word at that time only had a moderate market share, could instead become a partner. Hence, in December 1992, EP suggested to team up with Microsoft and link the electronic *Groene Boekje* to Word. *Uitgeverij Koningingracht* itself, however, was rather reluctant. It took the courage of a single individual to close the deal. The partnership with Microsoft turned out to be a great success. It opened up a huge market and offered *Uitgeverij Koningingracht* the opportunity to learn from Microsoft's knowledge of electronic information markets. Its official status and strong brand name were important reasons why the

electronic *Groene Boekje* was attractive to external parties. Hence, most potential parties approached *Uitgeverij Koninginnegracht* rather than the other way around.

More in general, the marketing function was not very well developed within *Uitgeverij Koninginnegracht*. The involvement of marketing with folio products was often limited to the final stages of the development process. There was sales support at the moment of a product introduction, and in some cases a special offer was organised later on. Market research was hardly being undertaken. Marketing was the last step in a sequential process controlled by the various publishers. The involvement of marketing people in the development of the electronic *Groene Boekje* was also limited. There was great uncertainty regarding the appropriate price and potential sales. Overall, the efforts of the marketing people were predominantly focused on the new folio issue. One simply did not know how to handle the electronic issue. Lack of an innovative atmosphere kept *Uitgeverij Koninginnegracht* from picking up new media experience by means of trial and error.

With regard to the *Staatsalmanak*, the first analysis by CMG in 1987 already indicated that *Uitgeverij Plantijnstraat* had little expertise in marketing in general, and marketing of electronic products in particular. This was one of the reasons why the first CD-ROM issue was not a commercial success. Another reason for this was the fact that the CD-ROM was initiated by a top-down decision. As a consequence, internal learning rather than market success was the primary objective. Still, the CD-ROM lacked sufficient sales support. The main reason why the development of the electronic *Staatsalmanak* took such a long time, however, was the fact the various units involved in the development and introduction of the CD-ROM were uncertain regarding their role in the project. The problem with *Uitgeverij Plantijnstraat* was that the dominant mentality was still oriented on products, rather than customers. There was no central marketing manager responsible for a coherent marketing policy. Different parts of *Uitgeverij Plantijnstraat* all had contacts with customers without knowing this of each other. Later, part of the problem was resolved by creating the unit Fulfilment, a separate service centre responsible for all primary customer support.

The overall transformation of SDU's component knowledge is summarised in Table 6.2. A distinction is made between two stages. The event that marks the transition from Stage 1 to Stage 2 is the creation of the project group Database Publishing (DP), the successor of EP, in 1994. Hence, Stage 1 refers to the situation prior to this event, while Stage 2 refers to the situation after this event.

	Stage 1 (1986-1994)	Stage 2 (1994-1997)
Information content	– GB: dependent on NTU and INL; vulnerable position – SA: dependent on government contacts; vulnerable position	– GB: value added by means of developing product features – SA: attempts to improve position and topicality by strengthening relationships with information suppliers
Information technology	– GB: lack of internal knowledge due to various external parties involved – SA: widely dispersed due to complex organisational structure	– GB: bundling of expertise in DP – SA: bundling of expertise in EP, and later DP
Information markets	– GB: hardly present, and primarily aimed at sales promotion during product introduction – SA: hardly present and badly structured	– GB: success due to distribution co-operation with Microsoft – SA: bundling of customer services expertise in Fulfilment

Table 8.2 The transformation of SDU's component knowledge related to the *Groene Boekje* (GB) and the *Staatsalmanak* (SA).

8.3.2 Organisational form

As argued in Chapter 4, an organisational form is the infrastructure which in a specific way enables the process of integrating the component knowledge related to information content, technology, and markets. Since each organisational form is different, each form is expected to stress different aspects of the knowledge integration process. The conceptual framework presented in Chapter 4 distinguished four organisational forms, namely functional, division, matrix, and innovative.

After SDU became independent from the Dutch government in 1988, it consisted of a wide range of printing, publishing, and related business units. In addition, a number of facilitating units, such as Fulfilment and Electronic Publishing, were created a while later. Within this structure, which is depicted in Figure 8.5, *Uitgeverij Koninginnegracht* and *Uitgeverij Plantijnstraat* were two of the business units focused on publishing. The *Groene Boekje* and the *Staatsalmanak* were

published by one of the publishing groups within these business units. Publishing groups in general were responsible for both the maintenance of existing PMCs and the development of new PMCs. Hence, this form can be interpreted as the division form.

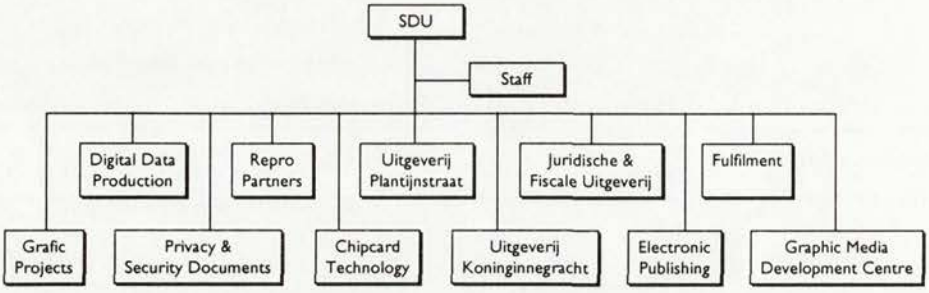


Figure 8.5 SDU's basic organisational form in Stage I (1988).

When folio was still the dominant medium within SDU, the division form functioned very well. It provided the business units and publishing groups with the freedom to run their own portfolio of PMCs. With the introduction of new media, however, the division form proved to be inappropriate. Below, the changes in organisational form related to the *Groene Boekje* and *Staatsalmanak* are discussed. Subsequently, the changes in SDU's overall organisational form are addressed.

At first, the development of the electronic *Groene Boekje* took place within *Uitgeverij Koninginnegracht*. Because *Uitgeverij Koninginnegracht* was not equipped with the knowledge to manage this project itself, the responsibility moved to the concern staff EP, which later became the project group DP. This move expressed SDU's strategy to separate the new business development projects from the daily operations. The separate group could concentrate on building the knowledge required for new media developments, while the publishing groups could maintain their regular portfolio. After all, the majority of turnover and profit were still generated by the traditional PMCs. A potential danger, however, was that the folio and electronic issue of basically the same information content were separated. In the initial stage, DP became responsible for the whole process of development, production, marketing, and distribution. Later, DP only took care of the project management aspects of the development process. When a new media PMC had been developed, the responsibility over its exploitation and maintenance was passed over to the publishing groups again. With regard to the electronic *Groene Boekje* this meant that in 1995 the project moved back from DP to *Uitgeverij Koninginnegracht* and was accompanied by a project manager from DP. This turned

out to be a successful move. First of all, the development project took place within the business unit that eventually was going to be responsible. Secondly, there was no separation of the folio and electronic issues anymore. In 1996, after finishing the development project, the project manager of the moved back to DP again and got involved in another new media project within a different business unit.

The start of the electronic *Staatsalmanak* project coincided with the foundation of the concern staff EP. Although this initially did not lead to an immediate change of the organisational form, it marked the change away from a pure division form. Over the years, the structural aspects of the electronic *Staatsalmanak* initiatives were quite complicated. Important events were the moment in 1993 when SDU broke up the relationship with printer *Van de Garde* and the incorporation of PUBO within SDU in 1994. The subsequent dividing up of SG in two parts (editors to *Uitgeverij Plantijnstraat* and automation to SGB) led to confusion. When SG became entirely part of DP, the situation became much clearer. SG was less focused on product-market issues and more on general production skills. Hence, it fitted very well within the facilitating activities of DP.

The situation with regard to the Internet issue of the *Staatsalmanak* was also confusing. In 1994 a great number of parties got involved in the Internet project (e.g. SDU, RCC, and IB). This made things rather complicated. In 1995 the board of SDU decided to reduce the number of participants and appointed *Uitgeverij Plantijnstraat* as the responsible publisher. *Uitgeverij Plantijnstraat* outsourced parts of the development tasks to SG (at that time partly part of GB) and IB. Still, the eventual Internet site was built by IB on its own initiative and functioned relatively independent of the other *Staatsalmanak* affairs. IB basically wanted to gain experience with building sites and, hence, there was no direct commercial objective. The changes in the relationships between the various parties involved in the development of the electronic SA are depicted in Figure 8.6.

Because the focus in this chapter is on SDU as a whole, the changes with regard to the *Groene Boekje* and the *Staatsalmanak* need to be related to the changes taking place at the level of SDU. As indicated in the introduction of this chapter, SDU has faced a multiple change process since its split from the Dutch government. Below, a number of important events in this changes process are elaborated on.

In 1994, the business units DDP en GP merged into one big graphic and printing business unit named SDU *Grafisch Bedrijf* (SGB). In the same year, SGB formed a joint venture with printing company Joh. Enschedé regarding the production of privacy and security documents and cards. Prior to this joint venture, SDU and Joh. Enschedé had been co-operating for a long time already. The joint

venture did, however, not prove to be successful. In 1995 there were major problems with the production of the new Dutch passport and in the same year, the chipcard activities were completely disposed of. Later, SGB formed an alliance with the *Plantijn Groep*, another graphic firm. Since then, SGB was still involved in printing, but also contained a multimedia department responsible for the production of new media.

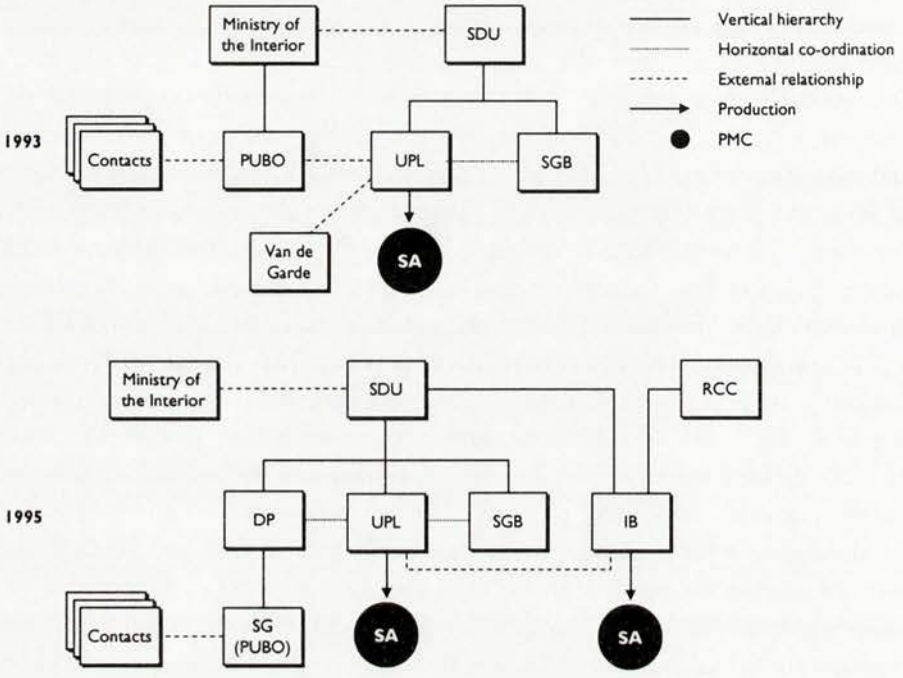


Figure 8.6 SDU's organisational form related to the SA (1993 and 1995).

With regard to the demonstration project leading up to the development of the electronic *Staatsalmanak*, SDU created the project group Electronic Publishing (EP) in 1986. In 1991, EP changed from a project group into a concern staff and in 1992, all product and market development activities with regard to new media were bundled in EP. Because in a later stage the development of databases became EP's primary role, it was split up in 1994. The development of database and new publishing concepts remained within SDU and became the responsibility of the project group Database Publishing (DP), the successor of EP. On the other hand, the marketing, sales, and distribution activities related to all of SDU's existing new media PMCs (mostly CD-ROMs) were bundled in a joint venture named *Informatiebank* (IB). At that time, IB claimed to be the biggest publisher of new

media in the Netherlands. Because later, IB served primarily as a distribution centre, it was discontinued in 1996 and the activities became part of DP. SDU's organisational form at that time is depicted in Figure 8.7.

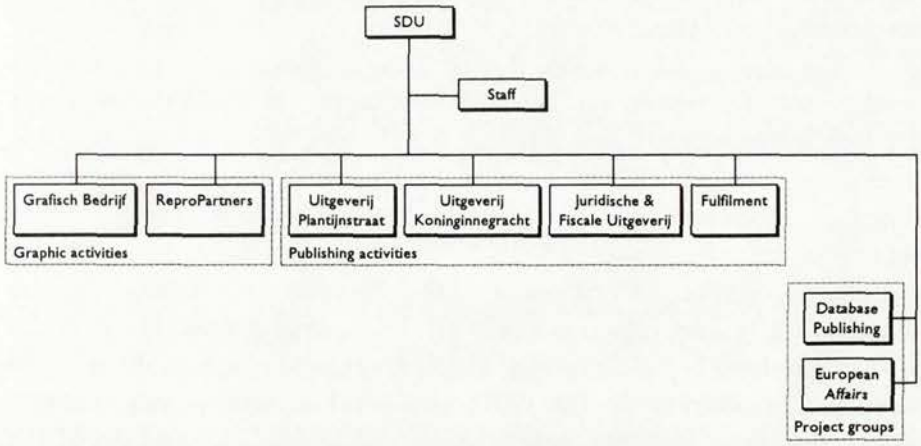


Figure 8.7 SDU's basic organisational form in Stage 2 (early 1996).

Over time, SDU's traditional focus on printing changed into a focus on publishing. The publishing activities were simply much more profitable than its printing activities. In fact, SDU's printing activities were incurring losses for many years, which forced SDU's management to lay off a substantial part of the workforce. In 1990, publishing activities generated only around 30% of SDU's turnover. In 1997, after SDU had acquired Koninklijke Vermande, a publishing company with a strong position in the Dutch market for legal and fiscal information, the stake had grown to around 60%. So, publishing became the core of SDU's activities. The publishing business units *Uitgeverij Koninginnegracht* and *Juridische & Fiscale Uitgeverij* (JFU) merged into one business unit, keeping the named *Uitgeverij Koninginnegracht*. In 1997 the two remaining publishing business units were grouped into one big publishing business unit named *SDU Uitgevers*, meaning SDU Publishers. Since then, SDU Publishers consisted of eleven publishing groups.

Overall, the most important changes to SDU's organisational form have been the shift in focus, namely from printing to publishing, the bundling of the various publishing business units, and the increased importance of the project group DP. Due to these simultaneous transformation processes, it is hard to label the organisational forms adopted in Stage 1 and 2 in terms of the typology used in this study. When SDU was still formally part of the Dutch government, it was centrally organised. At the start of the longitudinal research, when SDU had only

just been split off, it exposed the functional form. Over time, this form was changed into a division form. Nonetheless, the creation of project group EP, which was later succeeded by DP, marked a trend away from a division form with decentralised business units, towards a more centrally co-ordinated innovation and new business development strategy.

The role of DP was not that of a pure innovation or new business development department as described in Chapter 4. Besides new media development projects requiring initiation, development, or supervision, there also were projects within SDU that required the continuous support of new media knowledge. This especially held for pure database products. These products became the full responsibility of DP, which therefore also had its own marketing and sales department. An example of a DP publication was *OPmaat*, a database accessible via Internet. The reason why DP held overall responsibility over this product was that it lied at the heart of SDU's strategy of becoming a mixed media publisher. In addition to DP, SDU established a separate new business development department that performed a central co-ordinating role. So, SDU's organisational form in 1996 could be seen as a special case of the innovative form depicted in Figure 4.6. In simple terms, this form is depicted in Figure 8.8.

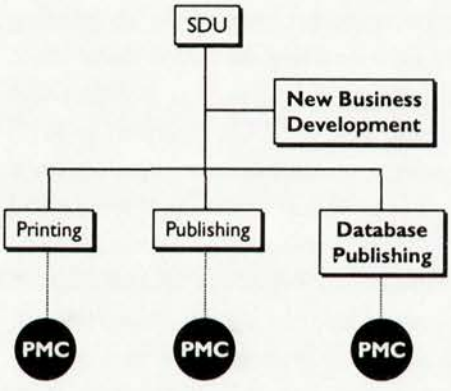


Figure 8.8 SDU's basic organisational form in Stage 2 (late 1996).

In 1997, SDU once again amended its organisational form. It decided to integrate DP and the new business development department in the publishing activities. An important reason for this decision was the desire to improve the integration of new business development and database publishing knowledge within the publishing groups that most needed it. To compensate for the loss of centrally organised new business development and database publishing knowledge, various employees of

SDU Publishers were organised along three functional lines that cut across the eleven publishing groups. Hence, the eventual organisational form of SDU Publishers can be seen as a matrix form.

So, on the corporate level, the change from Stage 1 to Stage 2 can be labelled with a change from a division form to a matrix form, via an intermediate innovative form. Next, the way in which SDU has employed integration capabilities is analysed.

8.3.3 Integration capabilities

The integration capacity offered by a certain organisational form can be strengthened by the use of integration capabilities that overlay the basic organisational form. In this way, integration capabilities may or may not enhance the capacity generated by a certain organisational form to integrate the component knowledge related to information content, technology, and markets respectively. As discussed in Chapter 4, the three investigated integration capabilities are systems, co-ordination, and socialisation.

Systems capabilities

During Stage 1 of SDU's transformation, the use of formal capabilities such as planning, budgeting, and procedures was limited. Because the people involved in the development of the electronic *Groene Boekje* and *Staatsalmanak* were very inexperienced, trial and error best describes the course followed. There were no plans available and what also lacked was a formal definition of the various parties' role and their contribution to the project. This was partly insufficient, because at that time the CD-ROM development process in general had for instance already been largely standardised. So, the lengthy and chaotic course of both developments suggests that the projects required more formal structuring than applied. The challenge in this respect is to find the right balance. Systems capabilities, on the one hand, are needed to define the roles of the various partners involved, and to create a clear project structure. On the other hand, system capabilities can make the development process unnecessary rigid, which may lead to delays or avoidance behaviour.

The use of financial guidelines was exemplary in this respect. In Stage 1, stringent profitability requirements discouraged *Uitgeverij Koningsinnegracht* and *Uitgeverij Plantijnstraat* to initiate new media projects. In Stage 2, SDU's management decided that the company's overall transformation was more important than the issue of allocating the costs to specific new media projects. The idea behind this

decision was that applying stringent budgeting and accounting rules would frustrate the transformation process. Hence, in 1996 DP did not charge the publishing business units for work carried out with regard to new media projects. Still, DP and the finance staff were aiming to implement a sort of activity-based costing (ABC) system in the future.

Because the number of new media projects increased over time, DP started using procedures to monitor the projects in their mutual coherence in 1995. The aim of these procedures was to prevent the business units and publishing groups from reinventing the wheel. Because these criteria were clearly communicated and understood in the organisation, they were very helpful in improving the success of new media projects in general. Still, during the development of the electronic issues of both the *Groene Boekje* and the *Staatsalmanak*, these procedures did not apply yet.

Co-ordination capabilities

In Stage 1, SDU was characterised by a policy of strong decentralisation. This implied that there was little co-ordination between the various semi-independent business units and publishing groups. With the decision to bundle the development of new media PMCs in a separate innovation and new business development group such as DP (and its predecessor EP) in Stage 2, the need arose for co-ordination between DP and the publishing business units. In case of the *Groene Boekje*, this co-ordination was difficult because DP and *Uitgeverij Koningingracht* were located in different buildings. Hence, in 1995 the decision was made to appoint a project manager within DP and physically locate this person within *Uitgeverij Koningingracht*. Already in 1991, this idea was suggested in one of the feasibility studies of electronic *Groene Boekje*. The following is one of the remarkable quotes from this study.

> "The development project of the EGB is very complicated. We therefore advise to appoint an experienced project manager."

After the project manager was assigned, there was close interaction between DP and the people in *Uitgeverij Koningingracht* that were involved in the development of the electronic *Groene Boekje*. This move increased the speed of the development process. The project team brought together people with various functional backgrounds, which improved the integration of knowledge. Still, the project team did not perform optimally. The project manager from DP clearly was the 'project champion', but the other roles in the project team were not clearly defined and carried out. As a consequence, the knowledge integration was insufficient and did

not reside within *Uitgeverij Koninginnegracht* after the development was finished. *Uitgeverij Koninginnegracht* simply lacked sufficient knowledge regarding the technology and marketing of new media PMCs. Hence, after the project manager was moved back to DP, *Uitgeverij Koninginnegracht* was not capable of taking over the management of subsequent electronic issues of the *Groene Boekje*. Training of personnel, as well as externally hiring experienced people could have solved this problem.

A similar situation applied to the use of co-ordination capabilities during the development of the electronic *Staatsalmanak*. Already in 1987, software company CMG suggested to use a form of project management to develop the electronic issue. In addition, CMG suggested to recruit, train, and inform people to facilitate the transformation process. Still, these suggestions were put into practice only a couple of years later. Until then, the development of the electronic *Staatsalmanak* took place on an ad-hoc basis and was quite chaotic. Integration of knowledge was, therefore, minimal. In 1996, a project manager from DP was appointed and it was planned to introduce a first, comprehensive issue of the *Staatsalmanak* on CD-ROM in August of that year. Because there still was no project plan, this deadline was not realised.

Recognising the need for deploying co-ordination capabilities on a company-wide level, SDU established a management development programme. Accordingly, a so-called young potential group (YoPo) was created, which consisted of people considered to be capable of forming SDU's top-management in the future. In addition, SDU organised several training and conference sessions to shape the strategy at the level of the business units and the company as a whole. Hence, during Stage 2 SDU undertook serious attempts to foster the required knowledge integration process by employing various co-ordination capabilities.

Socialisation capabilities

SDU's process of mediamorphosis is not a selfstanding phenomenon. It has been running parallel to two other major transformation processes. First and most important has been the transformation from a governmental organisation to a commercially independent, albeit still governmentally owned company. The second important transformation has been the change from a focus on printing activities to a focus on publishing activities. These two transformation processes were very demanding in terms of cultural, organisational and management adaptation. Still, these processes created a familiarity with change in every corner of the organisation. Hence, when the third important change process was initiated, the organisation new what it was to adapt to new circumstances.

Important in the case of SDU was the top-down interference in the change process. At crucial moments, SDU's forced important decisions that indicated that new media were taken seriously and that specific targets had to be met. These decisions were important stimuli in the process of mediamorphosis. In addition, SDU has attracted various people from outside the company. Both SDU's CEO and director of DP for instance have previously worked for Wolters Kluwer. So, although not every new business development project was very successful, SDU has built up a long and active history in new media and has learned along the way. Hence, later new business development projects seemed to have benefited from previous projects.

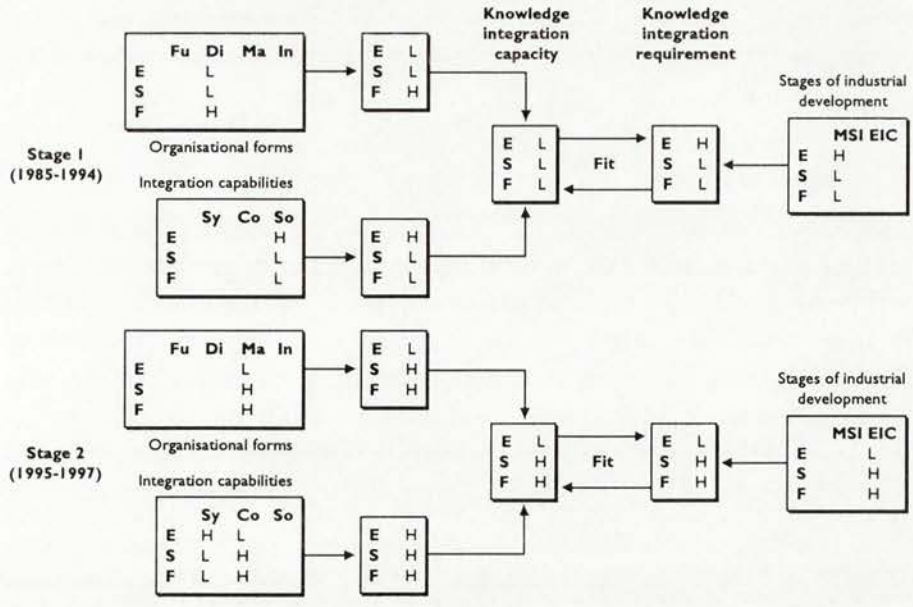
SDU's deployment of integration capabilities is summarised in Table 8.3. From this summary it can be concluded that the dominant integration capability in Stage 1 was socialisation, while the dominant integration capabilities in Stage 2 were systems and co-ordination.

	Stage 1 (1985-1994)	Stage 2 (1994-1997)
Systems capabilities	– Besides financial control hardly present	– Dominant capability; DP and NBD monitor all new media developments
Co-ordination capabilities	– Hardly present	– Dominant capability; project management, training, YoPo programme
Socialisation capabilities	– Dominant capability; strong traditional folio publishing routines	– Several initiatives to shape an innovative atmosphere have helped to overcome the traditional publishing routines

Table 8.3 SDU's deployment of integration capabilities.

8.3.4 Score card of fit

Taking the above analysis of SDU's mediamorphosis, the score card presented in Chapter 4 can now be filled in for Stage 1 and Stage 2. This score card is presented in Figure 8.9.



Legend

Fu	functional	Sy	systems	E	efficiency	H	high
Di	division	Co	co-ordination	S	scope	L	low
Ma	matrix	So	socialisation	F	flexibility		
In	innovative						

MSI	mature single industry						
EIC	emerging industrial complex						

Figure 8.9 The score card of fit applied to SDU.

Looking at the scorecard, it becomes clear that SDU has seen a great number of changes to its organisational configuration. Not all of these changes were made, however, in response to the change in the stage of industrial development. After all, during the last decade SDU has not only been involved in a mediamorphosis, but in two other transformation processes as well. Nonetheless, in terms of the fit between the organisation and the environment, the first stage showed insufficient fit. Although the integration capacity matched the integration requirement on two dimensions of knowledge integration, the required efficiency of knowledge integration was not realised. In contrast, the second stage showed a strong fit. With the matrix form presented as SDU's eventual organisational form, the integration capacity equalled the integration requirement on all three dimensions of knowledge integration. Moreover, when substituting the eventual matrix form with the intermediate innovate form (which holds a high capacity for efficiency of knowledge integration), the integration capacity equalled or exceeded the

integration requirement on all three dimensions of knowledge integration. Hence, the required scope and flexibility scores were effectuated in Stage 2 of SDU's mediamorphosis.

8.4 Summary

Altogether it can be concluded that SDU effectively changed its organisational configuration and realised the required capacity to integrate product, production, and market knowledge. An important turning point was the moment when the company proactively started following a mixed media strategy. This strategy provided top-down direction that made it relatively easy to adopt the right organisational form and integration capabilities. Especially the use of a separate new business development unit, which bundled SDU's new media expertise and enforced cross-functional project management, had a positive effect on the speed of the company's mediamorphosis.

	GB	SA
Traditional medium	Wordbook, issued at official spelling revision	Reference guide, issued once a year
Information type	Language	Government
Content source	External institute for lexicology, internal editors	External government contacts, internal editors
Start of the mixed media project	1990	1986
Initial objective	Improvement of internal production process as well as the development of a mixed media portfolio	Pilot study of electronic exploitation of governmental meta-information
First new media PMC	Floppy disk	CD-ROM
Market introduction	1996	1995
Additional new media PMCs	CD-ROM	Internet site (stopped)

Table 8.4 Summary of the GB and SA mixed media projects.

Nonetheless, the two mixed media projects that were studied showed that SDU went through a long and thorny process before realising tangible results at the level of individual PMCs. An important reason for this was that SDU is highly dependent upon the government as owner and decision-maker of the information it published. Hence, SDU had little control over the content of its products and found itself in a vulnerable situation. Another important reason is that mixed media projects for a very long time were not being managed as proper projects. The lack of clear objectives, planning, and roles meant that much was done on an ad-hoc basis.

The characteristics of the investigated mixed media projects related to the GB and SA and SDU in general are summarised in Table 8.4 and Table 8.5.

		SDU
Origin		1814
Employees		750
Ownership		Dutch government
Strategy		SDU aims to be the most important and complete publisher of government information for the government itself and the professional information market
Focus on the professional information market		Government and related professional segments
Stage 1	**Organisational form**	Division
(1986-1994)	**Dominant integration capabilities**	Socialisation
	Fit	Moderate
Stage 2	**Organisational form**	First innovative, later matrix
(1994-1997)	**Dominant integration capabilities**	Systems and co-ordination
	Fit	Strong

Table 8.5 Summary of SDU's management of mediamorphosis.

9

Confrontation and evaluation

9.1 Introduction

The previous three chapters contained a longitudinal description and analysis of the process of mediamorphosis in three Dutch traditional publishing firms. Accordingly, this chapter compares the results of the three case studies. The comparison of the case studies is followed by an evaluation of the conceptual framework, as well as an evaluation of the case study methodology.

9.2 Case study comparison

The case study firms were extensively discussed in Chapter 6, 7, and 8. Here only the characteristics of the three investigated case study firms that are relevant from the perspective of the conceptual framework are looked upon. Hence, for both Stages 1 and 2 of the process of mediamorphosis, the three firms' organisational form, integration capabilities, and ensuing fit is depicted. These characteristics are summarised in Table 9.1.

When comparing the analyses of the three case study firms, two issues immediately become clear. First of all, the three firms followed a different path during the process of managing mediamorphosis. Secondly, from the perspective of the conceptual framework, not all three firms did reach a strong fit in both stages of mediamorphosis. Only HFD managed to create and maintain a strong fit between its knowledge integration capacity and knowledge integration requirement. SHDTW did not expose a strong fit in Stage 1 and 2, while SDU started off with a moderate fit in Stage 1, and improved to a strong fit in Stage 2.

Stage	Characteristics	HFD	SHDTW	SDU
1	**Organisational form**	Functional	Division	Division
	Dominant integration capabilities	Socialisation	Socialisation	Socialisation
	Fit	Strong	Moderate	Moderate
2	**Organisational form**	Innovative	Division	First innovative, later matrix
	Dominant integration capabilities	Co-ordination	Co-ordination, socialisation	Systems, co-ordination
	Fit	Strong	Moderate	Strong

Table 9.1 Comparison of the three investigated firms.

But what does this mean? Does it mean that the firms that failed to reach a strong fit were badly managed? Not necessarily. It is stressed that the meaning of a firm's fit, as indicated in Table 9.1, should be interpreted from the perspective of the conceptual framework and its underlying assumptions. After all, in a multiple-case design every case must be treated as an individual experiment, rather than a sample unit from a population. Hence, statistical generalisation to the entire population of Dutch professional publishing firms is inappropriate. Instead, the method of analytical generalisation is employed. This means that the results of the case studies are generalised to the theory used. This is done in the following section.

9.3 Evaluation of the conceptual framework

The conceptual framework presented in Chapter 4 was based on the central assumption that there needs to be a fit between a firm's knowledge integration requirement, which is generated by the stage of industrial development it is operating in, and its knowledge integration capacity, which is generated by the combination of its organisational form and integration capabilities. Based on this conceptual framework, two propositions were formulated regarding the fit between the two sides of the knowledge integration balance. For ease of use these propositions are summarised in Table 9.2.

Proposition 4.1 stated that firms operating in a mature single industry generally need to employ a functional form, and either systems or socialisation capabilities in order to generate the required knowledge integration capacity.

Proposition 4.2 stated that firms operating in an emerging industrial complex generally need to employ either a matrix or innovative form, and co-ordination capabilities in order to generate the required knowledge integration capacity. Now that the framework has been applied to Dutch traditional publishing firms moving from a mature single industry to an emerging industrial complex, the two propositions can be evaluated.

Proposition 4.1: Firms operating in a mature single industry generally need to employ a functional form, and either systems or socialisation capabilities in order to generate the required knowledge integration capacity.
Proposition 4.2: Firms operating in an emerging industrial complex generally need to employ either a matrix or innovative form, and co-ordination capabilities in order to generate the required knowledge integration capacity.

Table 9.2 Overview of propositions related to the conceptual framework.

Looking back at Table 9.1, it is clear that Proposition 4.1 was only supported by HFD, while Proposition 4.2 was only supported by HFD and SDU. Two explanations can be brought forward for this. Either the firms that did not comply with the propositions did not reach an appropriate fit with their environment, or the propositions were incorrect. In the latter case, the propositions, or even the assumptions underlying the propositions need to be reconsidered. Since both propositions were based on a combination of assumptions regarding the stages of industrial development, organisational forms, and integration capabilities, a closer look at the interplay between these three elements of the conceptual framework is needed. For ease of use, the assumptions underlying the conceptual framework are summarised in Table 9.3.

9.3.1 Stages of industrial development

The idea that there needs to be a fit between industrial and organisational development is based on the evolutionary perspectives discussed in Chapter 2. In that chapter, especially the link between industrial life cycles and organisational innovation was stressed. This relationship was explored to comprehend the change processes taking place in firms faced with the situation of previously single and mature industries merging into a larger industrial complex. It was explained that in an emerging industrial complex different organisational characteristics are considered to be appropriate, when compared to the context of a single industry.

Stages of industrial development	Assumption 4.1: In a mature single industry the dominant requirement of the knowledge integration process is efficiency.
	Assumption 4.2: In an emerging industrial complex the dominant requirements of the knowledge integration process are scope and flexibility.
Organisational forms	Assumption 4.3: The functional form has a high capacity for efficiency, but a low capacity for both scope and flexibility of knowledge integration.
	Assumption 4.4: The division form has a low capacity for both scope and efficiency, but a high capacity for flexibility of knowledge integration.
	Assumption 4.5: The matrix form has a low capacity for efficiency, but a high capacity for both scope and flexibility of knowledge integration.
	Assumption 4.6: The innovative form has a high capacity for efficiency, scope and flexibility of knowledge integration.
Integration capabilities	Assumption 4.7: Systems capabilities have a high potential for enhancing the capacity for efficiency, but a low potential for enhancing the capacity for both scope and flexibility of knowledge integration.
	Assumption 4.8: Co-ordination capabilities have a low potential for enhancing the capacity for efficiency, but a high potential for enhancing the capacity for both scope and flexibility of knowledge integration.
	Assumption 4.9: Socialisation capabilities have a high potential for enhancing the capacity for efficiency, but a low potential for enhancing the capacity for both scope and flexibility of knowledge integration.

Table 9.3 Overview of assumptions related to the conceptual framework.

In an emerging industrial complex there is an abundance of new business opportunities, lack of standardisation of for instance technology, and a high level of overall uncertainty. The most important characteristic of an emerging industrial complex, however, is that there are opportunities for combining different technologies into an organisational innovation. Accordingly, the appropriate innovation and entrepreneurial mode is assumed to be neither radical nor incremental, but architectural: in an emerging industrial complex, innovation is

about using the industrial complex' existing knowledge to carry out reconfigurations (i.e. architectural innovations) that spawn new product-market combinations. As reflected in Assumption 4.2, scope and flexibility of the knowledge integration process are of importance in an emerging industrial context. As reflected in Assumption 4.1, efficiency of knowledge integration, which is key in the context of a mature single industry, becomes of minor importance.

Mature single industry

The above assumptions were partly supported in the case studies. In all three cases, the situation in Stage 1 reflected the characteristics of a mature single industry. Accordingly, the dominant knowledge integration requirement was assumed to be efficiency. Still, two of the case study firms exposed the division form (SHDTW and SDU), rather than the functional form as suggested by Proposition 4.1.[102] This resulted in a moderate fit in terms of the conceptual framework, while both firms seemed to be in close fit with their environment in actual terms. A possible explanation for this is related to the size of the firms' portfolio of PMCs. Both SHDTW and SDU covered a greater number of PMCs than HFD, which meant that they required greater flexibility of knowledge integration. This flexibility was generated by adopting the division form. At the same time, the required efficiency of knowledge integration was realised by smooth publishing routines at the level of the various business units and publishing groups. Hence, Proposition 4.1 regarding the knowledge integration requirement of a mature single industry could be further specified to take into account the effect of a firm's PMC portfolio, which is often related to a firm's size.

Emerging industrial complex

At some point in time, the changing industrial context began to put its pressure on the three case firms. The assumed demand for more scope and flexibility made the traditional routines and incremental innovation mode less applicable or even obsolete. In Stage 2, the case firms had to look for new ways to combine existing knowledge within and outside the organisation into architectural knowledge that would enable mixed media publishing. Two case study firms changed their organisational configuration in line with Proposition 4.2. Both HFD and SDU

[102] As indicated in Chapter 8, SDU initially was characterised by the functional form but changed to the division form when it was still operating in the context of a mature single industry.

assumed the innovative form and actively deployed co-ordination capabilities.[103] Doing so, they seemed to be successful with adopting the mixed media strategy. On the other hand, SHDTW did not change its organisational configuration in line with Proposition 4.2 and seemed less successful with adopting the mixed media strategy. Hence, Proposition 4.2 regarding the knowledge integration requirement of an emerging industrial complex seemed to be supported by the case studies. Nonetheless, there are more factors than just the stage of industrial development that need to be considered in evaluating the conceptual framework and the related propositions.

9.3.2 Organisational forms

The conceptual framework distinguished various organisational forms as design variables influencing knowledge integration. An organisational form, which is the division of tasks and activities into functions, units, and divisions, is viewed in this respect as the infrastructure that in a specific way enables the process of integrating knowledge. The central argument used in the conceptual framework is that each organisational form is different, and accordingly, is expected to have an impact on different aspects of the knowledge integration process. Each organisational form holds a certain capacity to bring about efficiency, scope, and flexibility of the knowledge integration process. In other words, a firm's choice for a particular organisational form has important implications for its ability to generate the type of knowledge integration required by the context. To illustrate this, the focus was limited to four classic types of organisational forms, namely the functional, division, matrix, and innovative form.

In the cases study research, all four types of organisational form were identified. In Stage 1, the functional form was identified at HFD, and at first also at SDU, while the division form was identified at SHDTW, and later also at SDU. In Stage 2, SHDTW retained its division form, while HFD and initially also SDU adopted the innovative form. A little later, SDU changed its form once again, and assumed the matrix form. Consequently, the case studies provide interesting input for judging the assumptions regarding the knowledge integration capacity of the various types of organisational forms.

[103] Again as indicated in Chapter 8, SDU later changed from the innovative to the matrix form. Nonetheless, this move leads to the same analysis when viewed from the perspective of the propositions.

HFD

From the perspective of the conceptual framework, HFD's move from the functional form to the innovative form seemed logical. As reflected in Assumption 4.3, the principal advantage of the functional form is its efficiency attained from economies of scale, overhead, and skills. At the same time, the capacity of the functional form to bring about scope and flexibility of the knowledge integration process is rather limited. Hence, only when HFD operated in the stable and homogeneous environment of the mature publishing industry, this form was appropriate. When HFD became faced with the emergence of the multimedia complex, it eventually adopted the innovative form. The placement of the development of new PMCs into a team-based innovation or new business development group independent of the established newspaper increased the scope and flexibility of the knowledge integration process and enhanced HFD's success. Hence, Assumption 4.3 and Assumption 4.6 seem to be supported.

SHDTW

The situation at SHDTW was completely different. Because SHDTW managed a portfolio consisting of lot more PMCs than for instance HFD, it had already adopted the division form in an early stage of its development. SHDTW consisted of several semi-independent publishing groups, which all targeted their own market segment with a number of specific PMCs. The reason for adopting this division form was historically determined. Publishing firms have traditionally been organised around a number of individual publishers, who all were responsible for their own collection of publications. The same idea lied behind Wolters Kluwer's overall growth strategy that had made it successful in the past. Numerous publishing firms were acquired, which were left virtually untouched and functioned as independent business units. When SHDTW was formed, a number of existing PMCs was clustered into several publishing groups. These publishing groups were built on the triad publishing-editing-marketing depicted in Figure 7.3. As argued in the previous section, SHDTW's choice for the division form in Stage 1 does not correspond with Proposition 4.1. After all, Assumption 4.4 states that the division form does not provide the efficiency capacity required by a mature single industry. Still, SHDTW was a successful firm in Stage 1, which suggests there actually was a better fit between the firm and its environment than proposed by the conceptual framework. A possible explanation is that the assumed logic behind the interplay between a firm's organisational form and integration capabilities as presented in Chapter 4 is (partly) incorrect. In Chapter 4 it was stated that the way in which a

firm's organisational form and integration capabilities determine its overall knowledge integration capacity is such that the capacity for knowledge integration offered by a particular type of organisational form can only be enhanced by means of deploying the right integration capabilities. In other words, when an organisational form does not offer capacity for knowledge integration, it cannot be still created by means of deploying integration capabilities. Instead, it may very well have been the case that SHDTW managed to achieve the efficiency capacity required in Stage 1 largely due to socialisation capabilities in the form of its strong traditional publishing routines. Hence, the formulation of Assumption 4.7, Assumption 4.8, and Assumption 4.9 needs to be reconsidered.

In Stage 2, SHDTW retained its division form. According to the conceptual framework, however, it would have been better to switch to either the matrix or innovative form. As reflected in Assumption 4.4, the division form does not provide the required scope of knowledge integration. Because SHDTW was relatively slow with adopting the mixed media strategy, Assumption 4.4 seems to be supported.

SDU

Finally, the situation for SDU is evaluated. In Stage 1, SDU first adopted the functional form, and later the division form. Although the adoption of the division form was not in line with Proposition 4.1, it still seemed logical. Just like SHDTW, SDU had to manage a great number of activities, which required a division into separate business units. In Stage 2, SDU first adopted the innovative form, and later changed to the matrix form. Both forms were suggested by Proposition 4.2. The establishment of the new business development group (cf. innovative form) increased the capacity to bring about scope and flexibility of knowledge integration, while the existing business superiority generated the capacity to bring about efficiency of knowledge integration. Hence, SDU's innovative form offered a high capacity for efficiency, scope, and flexibility of knowledge integration. When it later changed from the innovative to the matrix form, SDU retained this capacity. Because SDU at the same time was relatively successful with adopting the mixed media strategy, Assumption 4.5 and Assumption 4.6 seem to be supported.

9.3.3 Integration capabilities

As indicated in Chapter 3 and 4, the idea behind integration capabilities is that it is integration of knowledge, rather than knowledge itself that forms the basis of a firm's competitive advantage. The conceptual framework suggested three types of

integration capabilities, namely systems, co-ordination, and socialisation. Systems capabilities enable the creation of new architectural knowledge through formal systems such as codes, plans, and procedures. Co-ordination capabilities enable the creation of new architectural knowledge through managerial instruments such as training, liaison devices, and participation. Socialisation capabilities, finally, enable the creation of new architectural knowledge through cultural institutions such as values and norms. Just like the different types of organisational forms, each integration capability offers a different capacity for knowledge integration. However, as exposed in the previous section, the assumed logic behind the interplay between a firm's organisational form and integration capabilities as presented in Chapter 4 seems (partly) incorrect.

In the case studies, all three integration capabilities were identified. In Stage 1, the three firms all heavily relied on socialisation capabilities. Each firm had a long and successful history in traditional publishing, which had created deeply embedded routines, such as shared beliefs. This reliance on socialisation capabilities is in line with Assumption 4.9, since it provides the efficiency of knowledge integration required in a mature single industry. The problem with socialisation capabilities, however, is that they can be very hard to change. This proved to be the case in all three firms, despite attempts to deploy co-ordination and systems capabilities. In Stage 2, all firms deployed co-ordination capabilities, as reflected in Assumption 4.8. In addition, HFD and SHDTW largely refrained from deploying systems capabilities, as reflected in Assumption 4.7. Still, all three firms to some extent had difficulty with changing their socialisation capabilities.

SHDTW seemed to have the biggest difficulty in this respect. A number of explanations can be thought of in this respect. First of all, HFD and SDU were not as strongly influenced by an overall corporate culture as SHDTW. SHDTW was part of the overall Wolters Kluwer culture, which was heavily focused on realising turnover and profit growth by means of external acquisition, rather than internal innovation and new business development. Accordingly, the business units within Wolters Kluwer operated independent of each other and were only judged on their performance relative to targets for turnover and profit growth. There was no corporate strategy towards new media or mixed media publishing. In addition, most business units did not have such a strategy either. It took quite some time before plans were formulated to develop an overall mixed media infrastructure at SHDTW. To make things worse, the realisation of these plans was made uncertain again by the merger of SHDTW with SBI and the creation of one Dutch division.

In contrast, both HFD and SDU proved to have less difficulty with their traditional publishing routines. In the case of HFD, this was probably due to the

small size of the firm and the modest, but still early on experience with database publishing. In addition, and despite of the forces in the company that for long inhibited initiatives to change, the spirit within HFD was quite entrepreneurial. In the case of SDU, the dramatic changes taking place due to SDU's split off from the Dutch government provided yet another situation. From the mid 1980s, when it became clear that SDU would become independent, the company had been continuously changing. Despite a possible fatigue in the organisation to change even further, the company had already made a move away from the traditional publishing routines. In addition, the SDU's management had learned to make drastic decisions that forced the organisation to move quickly in a certain direction. SDU also hired a number of experienced people who provided new blood to the organisation. In all, SDU managed to brake down its old socialisation capabilities and replace them with systems and co-ordination capabilities.

9.3.4 Alternative explanations

Altogether, the investigation of the three Dutch traditional publishing firms revealed a moderate to strong plausibility of the assumptions underlying the conceptual framework. The empirical analysis, however, exposed additional information that was not covered by the conceptual framework.

An interesting example of a point not suggested by the framework, is that SDU's use of systems capabilities in Stage 2 did not seem to frustrate the knowledge integration process, as suggested in Assumption 4.7. On the contrary, in the analysis of SDU, the use of systems capabilities indirectly enabled the required integration of SDU's information content, technology, and market knowledge. The benefit of the use of clear and strict directions for knowledge integration, as exposed in the investigation of SDU, proved to be that it can facilitate the process of breaking down the old socialisation capabilities. After all, having a relative long and stable history in folio publishing, new media did not fit comfortably or closely into the established frameworks and concepts of the three publishing firms. HFD, SHDTW and SDU were entering uncharted territories. Fortunately, the stickiness of the old socialisation capabilities to a large extent was matched by the firms' customers. Most markets were still far from ready to be penetrated with new media PMCs. Nonetheless, especially SHDTW encountered difficulty to overcome its old socialisation capabilities, which frustrated the attempts to generate the required knowledge integration capacity.

The stickiness of these old socialisation capabilities is related to the fact that publishing has always been a relatively profitable industry, especially regarding scientific and professional information. This has created a very strong and

successful culture to please stockholders with ever increasing profits. From the 1990s onward, however, this culture for many firms clearly inhibited the making of the heavy and uncertain investments that are required to become a mixed media publisher. In fact, firms that are not faced with the pressure of the stock exchange, such as HFD and SDU, seem to be in the lucky position to have less difficulty with this.

In summary, it would be wrong to conclude that a firm's score of fit can predict or fully explain its degree of mixed media success. Numerous other factors can be identified that may have influenced the correspondence between fit and success. Among these factors are organisational size and age, type of ownership, market segment, and several path dependencies. The three investigated firms differed on one or more of these factors. Nonetheless, there seems to be correspondence between the score of fit and the degree of mixed media success, which supports the assumption that there needs to be a fit between the organisational knowledge integration capacity and the environmental knowledge integration requirement in order to be successful.

9.4 Evaluation of the case study methodology

Now that the results of the three case studies have been compared and evaluated in accordance with the conceptual framework, it is time to evaluate the methodology that led to the case study results. The evaluation of the case study methodology takes place along three lines: the selection of case study firms, the selection of mixed media projects, and the collection of data.

An important implication of the choice to use a multiple-case design is that the selection of firms must rely on theoretical rather than statistical sampling. There are different ways of theoretical sampling in this respect. In this study the choice was made to follow a literal replication. The publishing firms that served as subject for the case study research were selected on the premise that they would manage the process of mediamorphosis in accordance with the propositions formulated in Chapter 4. For this reason, a relatively homogeneous group of firms was selected. All three case study firms were Dutch traditional publishers of professional information. By reducing the variety among the case study firms, the aim was to increase the explanatory power of the conceptual framework. However, as indicated in the above evaluation, the premise underlying the choice for literal replication turned out to be partly incorrect. The way in which the firms managed the process of mediamorphosis did not allways comply with the propositions. Still,

this does not mean that the choice for literal replication was incorrect. Instead, the conceptual framework and its underlying assumptions need reconsideration.

Three firms were found willing to co-operate by providing access to their organisations. It is clearly recognised that when conducting case study research, gaining access to firms is very much a process of trial and error. Various potential case study firms did not want to participate for all sorts of reasons. Some because they did not think they were very successful with the process of managing mediamorphosis, some because they believed the issue was too sensitive to be observed by an outsider. Even with regard to one of the firms that did eventually participate, it took over a year to get access. Nonetheless, once the research projects were underway, the three firms proved to be very co-operative. Access to people and archives was hardly a problem.

The case studies were based on the description and analysis of one or more mixed media projects. By studying these projects, the underlying change in the organisational configuration could be revealed. The choice between one or more mixed media projects was based on practical considerations. In the case of HFD for instance, the investigation of the newspaper (FD) provided sufficient input to be able to judge the process of mediamorphosis. HFD was a relatively small company and the newspaper was its most important PMC. In the case of SHDTW, the reference guide related to educational institutions (OBG) was of relatively less importance to the overall business. Nonetheless, the analysis of the reference guide spanned sufficient time and breadth to be able to judge the overall process of mediamorphosis. Hence, only in the case of SDU more than one mixed media project was selected. SDU was a bigger company, which at the start of the research project still consisted of three publishing business units. Hence, the aim was to cover at least the most important of these business units, namely UKG and UPL. Within these business units, the spelling list (GB) and government yearbook (SA) were typical examples of mixed media projects. In addition to the investigation of the spelling list and government yearbook, other developments within SDU were also investigated. These developments were, however, not presented as separate mixed media projects but were indirectly taken into account when drawing up the overall picture for SDU.

In all of the three firms, the conduct of the case study research proved to be very time-consuming. First, and as indicated above, access had to be granted to the firms. Secondly, the collection of qualitative data was a long and thorny process. After all, the overriding principle when doing case study research is the use of multiple sources of evidence in order to triangulate. Accordingly, the aim of this study was to use a combination of interviews, archival records and documentation

to provide a (partly real-time) longitudinal description of the mixed media projects in each of the firms. This involved the collection of both qualitative and quantitative data.

The sequence of steps which was followed during the case study research (as described in Chapter 5), proved to be very useful. The use of multiple sources of evidence, as well as various individual and conjoint feedback sessions provided sufficient input to describe the essential events in the firms' mixed media projects and overall process of mediamorphosis. These descriptions were then analysed in terms of the elements constituting the conceptual framework. Subsequently, the score card of fit for each of the cases was filled out.

Overall, the adopted case study methodology proved to be appropriate for the objective of this study. The critical issue that remains, however, is how an investigation at the level of a project can be used to draw conclusions at the level of the firm in which the project is managed. After all, the unit of analysis in this study was the firm, and not just the project. This issue was partly covered by the fact that the three publishing firms that were studied were all relatively small. In combination with the strategic and cross-functional nature of the mixed media projects, the firms' small size meant that the investigation of the projects inevitably covered all relevant aspects of the overall process of mediamorphosis.

10

Conclusions and implications

10.1 Introduction

Despite the dramatic changes that have already taken place in the emerging multimedia complex, for most traditional publishing firms the management of mediamorphosis has only just set off. Hence, it is acknowledged that the coverage of this tumultuous subject in this study is far from conclusive. Given the seemingly continuous developments within the field of information and communication technology, it can in fact be doubted whether the process of mediamorphosis will ever lead to a relatively stable situation for publishers again. Still, on the basis of this research project some valuable conclusions and implications can be drawn. First of all, some conclusions regarding the management of mediamorphosis in traditional publishing firms are drawn. Secondly, the focus turns to organisational knowledge integration as central element of the conceptual framework. For both practice and theory, the implications of this study for further research are identified.

10.2 Management of mediamorphosis

What became clear in the case studies is that the management of mediamorphosis is a long and difficult process that requires traditional publishing firms to rethink their strategy, organisation, and PMC portfolio. More than a decade ago, Kist (1987: preface) formulated the following question in this respect.

> "... electronic publishing does not fit comfortably or closely into the established framework and concepts of traditional folio publishing and reading. Instead, both publishers and readers are entering unchartered territories. Should they nevertheless try to adapt the old frameworks and repeat the process of gradual transition or should they make a quantum leap into the new technologies in their bewildering diversity of forms and modes?" (Kist, 1987: preface).

It is interesting to see that the question posed by Kist offers only two options. The choice firms supposedly have to make is between 'gradual transition' (i.e. incrementalism) and 'quantum leap' (radicalism). This study has demonstrated that Kist's choice does not reflect all the available options. Inbetween incremental and radical innovation lies a third option of architectural innovation, which very well applies to the situation of traditional publishing firms.

Despite its intellectual and creative nature, publishing as a business is very traditional and conservative. Boldly stated, the publishing industry has not witnessed any major technological breakthrough since the invention of mechanical printing in 1456. On top of that, its basic organisational and cultural features have also remained more or less unchanged. Hence, publishing has basically kept its characteristics of a 'cottage industry': a large number of relatively small firms or business units. Firms with a long history in publishing, such as the case study firms HFD, SHDTW, and SDU, have developed persistent organisational routines related to what they have always been good at, namely single media folio publishing. These folio-publishing routines have become embedded in every corner of such a firm's organisation: its structure, business processes, people, and culture.

A publisher of, for example, a number of professional journals would typically be organised by journal. The semi-independent publishing groups would each be responsible for a specific journal, which would be targeted at a specific market segment. Each publishing group would be staffed with a publisher, a number of editors, someone in charge of marketing and sales, and perhaps a production co-ordinator. In addition, the firm would have some centrally organised functions such as production, distribution, and customer services, besides the usual central functions such as finance and control and human resources.

The advantage of decentralisation and being organised according to product-market combinations is a firm's ability to quickly adapt products to changes in each particular market segment. If readers of a journal for instance want more background articles than up-to-the-minute news coverage, the responsible publishing group can make changes to the journal without having to consult the firm's other publishing groups or even its general management. After all, the

publishing group knows its market segment best. Hence, the opportunities for incremental innovations at the operational level of the firm are abundant.

The disadvantage of having a highly decentralised organisation, however, is a firm's inability to centrally co-ordinate and implement more complex changes. In a mature single industry, this does not have to be a problem. Faced with the emergence of an industrial complex, however, incremental innovation at the operational level is no longer sufficient. With no central budget to invest in ICT for instance, each publishing group will have to develop new electronic PMCs like a CD-ROM or Internet site all by itself. As a result, most publishing groups will re-invent the wheel in one-off and therefore costly development projects. The firm as a whole will not be able to leverage the learnings.

In such a situation, firms should pursue a different approach to innovation in order to reinstate the fit with their environment. In this study the different approach was referred to as architectural innovation. As important architectural innovation for traditional publishing firms, the design of a mixed media publishing model was identified.

10.2.1 Mixed media publishing

The challenge of mixed media publishing is to recognise that media, whether folio or electronic, are not a publisher's real product or service. Media are only vehicles for transporting the real product or service, which is the underlying information. Therefore, the management of mediamorphosis should not be aimed at developing individual new media products and services, but at simultaneously developing a mix of both old and new media. Some refer to this with the term multimedia publishing. Multimedia, however, has become a rather ambiguous and confusing term. Hence, the term mixed media publishing is used instead. A mixed media portfolio refers to a combination of traditional folio and new media product-market combinations that are related to the same information content.

The keys to a mixed media publishing model are digitisation and an industrial approach to information processing. When kept in digital form, information is in its most fluid and manipulable form. This implies that information flows that were previously related to a great number of parallel but separate publishing processes can be linked when there are similarities between the flows. The detection of these similarities requires both a holistic and systematic analysis of the various information flows that run through the entire publishing company. Such an analysis is comparable to business process re-engineering methodologies applied in for instance manufacturing industries. In other words, a strategy aimed at establishing a mixed media publishing model should start with the

development of an integrated, digital and media neutral information and communication infrastructure.

Ever since the emergence of the multimedia complex, traditional publishing firms, including the three case firms presented in this study, exposed reluctance in adopting the mixed media publishing model. Most traditional firms initially were more concerned about their portfolio of existing folio PMCs, than about investing in the development of new media PMCs, let alone the pursuit of a mixed media strategy. After all, especially scientific and professional information products have always been dearly paid for and were only moderately affected by price elasticity. Hence, for long publishers got away with selling largely superfluous information, such as handbooks and loose-leafs, forever increasing prices. With such a strong and profitable set of PMCs, there clearly was no incentive to change from a pure folio media, to a mixed media firm. This era, however, is over.

Driven by the rapid penetration of PCs, faxes, Internet, and other ICT infrastructure, customers are increasingly demanding high quality as well as individually tailored information products. Hence, besides pushing generic information products, such as newspapers, into groups of customers that constitute a market segment, publishers more and more have to build capabilities to publish on individual demand. The mixed media model is perfectly suited for this and publishing firms can in this respect learn a lot from industries and firms that have adopted a similar strategy of mass customisation already years ago.[104]

10.2.2 Growing pains in the emerging multimedia complex

So, it is believed that establishing a mixed media publishing model has to be a clear objective of any publishing firm, which has the opportunities to develop a portfolio of both traditional and new media. The problem with many publishing firms, however, is that they do not have a clear strategy in this respect. In all of the case study firms for instance, the development of a mixed media model was initially not a deliberate plan. The mixed media strategy emerged incrementally. For too long, firms have experimented on a one-off basis. Although experimentation as such can be very useful, at a particular point in time a more structured approach is required.

[104] Heavy competition in, among other, the car and computer industry has led firms to simultaneously focus on the efficiency of mass production and flexibility of product customisation. Computer company Dell for instance is a perfect example of a firm offering almost total flexibility to its customers in designing their specific hardware configuration, while at the same time keeping its prices down by avoiding retailers and selling directly to customers.

Besides the internal struggle of establishing a mixed media publishing model, traditional publishing firms are at the same time increasingly faced by fierce competition from companies in the multimedia complex which may lack experience in creating content, but are light-years ahead with building digital information and communication infrastructures similar to the mixed media publishing model.

Whereas publishers like Wolters Kluwer and Reed Elsevier were the stock exchange's favourites in the 1980s and even early 1990s, more recently their heads have been on the chopping block.[105] Despite the usual share of unaccountable sentiments and the hype around Internet companies, the main reason for their failure has been the perceived lack of a clear mixed media strategy. The recent take-over of the 'old' publisher Time Warner by the 'new' Internet Service Provider America Online is in this respect a clear indication that the multimedia landscape looks quite different than only a few years ago.

Altogether, managing the process of mediamorphosis is a complicated and uncertain endeavour. Still, it is without any doubt that it takes at least the will to change, a clear strategy, lots of money, and prolonged persistence to make the endeavour a success. Clearly no easy task.

10.2.3 Research implications

Traditional publishing firms are not the only firms being affected by the developments in information and communication technology and the emergence of the multimedia complex. Telecom operators, computing equipment manufacturers, technical and business consultants, software developers; all have to assess the implications of the digital era that are relevant to their particular situation. These firms were only indirectly addressed in this study. This means there is an abundance of opportunities to further investigate the management of mediamorphosis in other companies than traditional publishing firms.

The emerging multimedia complex is an illustration of a broader phenomenon, namely the emergence of industrial complexes around so-called 'core technologies'. Another example is the biotechnology complex, in which firms with a background in chemical, pharmaceutical, and agricultural sectors are becoming increasingly intertwined. Once again, this means there is an abundance of

[105] Early 2000 Wolters Kluwer's stock price at the Amsterdam Exchanges was at the same level that it was early 1998. Even worse, Elsevier's stock price equalled the level of early 1996.

opportunities to further investigate the management of metamorphosis in other emerging industrial complexes than multimedia.

Even more fundamental, and therefore requiring a lot more further research, is the recent discussion around the potential difference between the 'new' and the 'old' economy (Kelly, 1998; Shapiro & Varian, 1998). Is there really a difference between the 'new' and the 'old' economy? What does that mean for 'old' economy firms operating in a 'new' economy environment? Apart from receiving a lot of popular media attention, questions like this have hardly been addressed through academic research yet.

10.3 Organisational knowledge integration

To better understand the nature of the management of mediamorphosis in particular and metamorphosis in general, three domains of the management literature were explored in particular, namely evolutionary economics, knowledge management, and organisation design. Concepts and ideas from these three domains were used to formulate definitions and assumptions, and to develop a conceptual framework of organisational knowledge integration that served as a bridge between theory and practice.

The core of the conceptual framework was the evolutionary principle of dynamic fit between a firm's organisational configuration and the industrial context in which it operates. This context determines the type of process, which is required to integrate component knowledge into architectural knowledge. To do so, a firm has two important design variables at its disposal, namely its organisational form and its integration capabilities. A firm's objective is to turn the right knobs, or design parameters, in order to alter the organisational conditions that foster knowledge integration.

Viewed from the perspective of the conceptual framework, the mixed media publishing model is an architectural innovation. The realisation of this architectural innovation is a process of integrating various types of component knowledge in a new way. The required types of component knowledge were labelled information content, information technology, and information markets respectively. Through the case studies it was investigated whether the assumptions and propositions related to the conceptual framework could explain the management of mediamorphosis in real-life. The evaluation in the previous chapter indicated that there seemed to be correspondence between the degree of fit and the degree of mixed media success for the three investigated firms.

10.3.1 Research implications

A conceptual framework logically is a simplification of reality. The conceptual framework of organisational knowledge integration covered only three dimensions, on which only two stages of industrial development, four organisational forms, and three integration capabilities were distinguished. Completely different dimensions of the phenomenon, such as organisational size and age, type of ownership, market segment, and path dependencies can be identified and further researched.

An example of such further research is the more explicit focus on the use of external knowledge in the integration process. In an emerging industrial complex a large share of the knowledge which is relevant for a firm to integrate lies outside its organisational boundaries. Cohen & Levinthal (1990) therefore introduced the term absorptive capacity. Van den Bosch, Volberda & De Boer (1999) built on this by investigating how organisational forms and integration capabilities influence a firm's capacity to absorb external knowledge.

Another example of further research is the incorporation of new types of organisational forms in the conceptual framework. Besides the four classic types used in this study, numerous attempts have been made to come up with new types of organisational forms. These new types of organisational forms have, however, not yet been explored in sufficient detail to assess their implications for the three dimensions of knowledge integration, namely efficiency, scope and flexibility. Still, the conceptual framework is in principle suited to incorporate these new organisational forms.

Further research is also needed into the dynamics of the fit between a firm's organisational configuration and context in which it operates. Because a lot of research is limited to the fit between an organisational and environmental state at a particular point in time, there is substantial knowledge regarding the static aspects of contingency thinking, but much less regarding the dynamic aspects. The problem is, however, that our conventional neo-classical research models do not support the investigating of these dynamics aspects very well.

10.4 Finally

The emergence of industrial complexes is an important and topical phenomenon. Accordingly, the objective of this study was to provide both practitioners and academics with an enriched understanding of its particularities at various levels of analysis. Most importantly, this study has addressed the implications this industry change has for the management of organisational knowledge integration at the level of the individual firm. A conceptual framework of organisational knowledge

integration was presented and a number of propositions was formulated accordingly.

Although the propositions were not statistically tested, the investigation of the Dutch traditional publishing firms moving into the emerging multimedia complex illustrated that the conceptual framework has potential for explaining and understanding how different types of organisational forms can be matched with different types of integration capabilities in order to create the knowledge integration capacity that is required by the industrial context.

Such insights may benefit various audiences. It may contribute to the development of a dynamic theory of the firm at the intersection of economic, organisation design, and strategic management theories. It may also improve the reconfiguration of knowledge in practice, which is a long and thorny process. One of the lessons learned from this study is that firms often need a considerable amount of time to realise that reconfiguration is needed. Secondly, the process of realising the required reconfiguration is often badly managed because there is insufficient understanding of where to go and how to get there. By focusing on traditional publishing firms aiming to establish new architectural knowledge, this study can be used to investigate whether a firm in such a situation is following the right track.

It was argued that a firm needs to reach and maintain a close fit with its environment. It is stressed that the focus on fit does not indisputably explain whether a firm will be successful. Success is determined by many different factors, and fit is one of them. Hence, this research does not and can not provide a comprehensive answer to the question when the management of mediamorphosis will be successful or not. There are simply too many factors that were not observed, but which do play a role.

Hence, the initial step has been taken, but much work still needs to be done so that enriched understanding of the management of organisational knowledge integration in an emerging industrial complex ultimately will be useful to various other types of firms operating in such a context. With regard to the situation of traditional publishing firms, this study demonstrated that this segment of the emerging multimedia complex is characterised by a lot of conservatism and lack of entrepreneurial spirit. For over a decade it has been forecast that the demise of publishing was near as the emergence of the multimedia complex gathered speed. Still, there was, is, and will be a rationale for the existence of publishers. This rationale is rooted in the paradox that less information is often more.

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Name index

Curriculum vitae

Michiel de Boer (Amsterdam, 1968) studied Business Administration at the University of Groningen (the Netherlands) and University of Uppsala (Sweden). He conducted his major in Technology and Innovation Management, and executed his final project at the department of Strategic Purchasing and Supply Chain Development of the pharmaceutical company Glaxo in London. From 1993 to 1998 he worked as a research associate with the Rotterdam School of Management, Erasmus University Rotterdam. In various (international) academic and business media, he published and lectured on topics related to the management of innovation and new business development, with particular reference to publishing and multimedia. From 1998 to 2000 he worked with Gemini Consulting, a global management consultancy firm helping clients to design and implement strategic change. Currently he is Managing Director of the Techn-O-Tape Group, a multinational supplier of photofinishing and imaging products.

Stellingen behorende bij het proefschrift

Management of Mediamorphosis

Organisational innovation in Dutch publishing firms

van Michiel de Boer

1 Het binnen de traditionele uitgeverssector heersende idee dat uitgeven een handelsactiviteit in plaats van een industriële activiteit is, is in het huidige digitale tijdperk achterhaald en vormt daarmee voor veel ondernemingen in deze sector de voornaamste belemmering voor het succes van het proces van '*mediamorfose*'.

2 Het streven van uitgevers naar medium-neutraal uitgeven logenstraft Marshall McLuhan's fameuze stelling "*The medium is the message*".

3 Dat de sociaal-psychologische aspecten van nieuwe en interactieve media minstens zo belangrijk zijn als de technologische aspecten blijkt uit het feit dat Yomanda uit Tiel een groter succes was dan de CD-i uit Eindhoven.

4 De aanbevelingen in dit proefschrift ten aanzien van het '*mixed media*' productieproces van uitgeefproducten staan ironisch genoeg in schril contrast tot het daadwerkelijke productieproces van dit proefschrift zelf.

5 Het toenemende belang van kennis als productiefactor – bij uitstek in een sterk op menselijk kapitaal gestoelde diensteneconomie zoals de Nederlandse – wordt niet gepareerd door een evenredige toename van kennis over deze productiefactor.

6 De waarde van de bedrijfskundige wetenschap is voor een groot deel gebaseerd op het feit dat het geloof in het bestaan van generieke bronnen van concurrentievoordeel sterker is dan het besef van de logische onmogelijkheid van dit idee.

7 Dat procesinnovaties niet altijd tot productinnovaties leiden blijkt uit het feit dat de adoptie van nieuwe hard- en softwareversies in het productieproces van een proefschrift veelal geen inhoudelijke verbetering van het uiteindelijke product tot gevolg heeft.

8 Het verschil tussen sport en wetenschap bedrijven is dat in de laatstgenoemde discipline de mogelijkheid tot promoveren verspeend is van het gevaar vervolgens weer te kunnen degraderen.

9 De belastingdienst is vriendelijker voor werknemers die met de trein reizen dan de Nederlandse Spoorwegen.

10 De hoge productiviteit van Kamagurka's stripserie '*Writer's Block*' maakte de strekking ervan bijkomend wrang.

11 De verwolling van het moderne communiceren als service naar de mensen toe is in principe een stukje verschraling dat past binnen het plaatje van de achteruitgang van het algehele taalgebeuren, dus.

12 De menselijke drang naar individueel onderscheid zal in tijden van grootschalige toepassing van kloontechnologie leiden tot een booming business voor de plastische chirurgie.

13 Zappen is als eten zonder te kauwen: het werkt alleen bij pulp.


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