ERIK P. VAN LEEUWEN

Recovered-Resource Dependent Industries and the Strategic Renewal of Incumbent Firms

A Multi-Level Study of Recovered-Resource Dependence Management and Strategic Renewal in the European Paper and Board Industry

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Recovered-resource dependent industries en
strategische vernieuwing van bestaande ondernemingen:
Een multi-level studie naar recovered-resource dependence management en strategische vernieuwing in de Europese papier en karton industrie

Proefschrift

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PREFACE

The book in front of you is the result of a journey of about four years. A journey during which I have learned a lot. The most central theme in Resource Dependence theory is that firms depend on their environment. I learned that not only do firms depend on their environment; people do as well. Resource dependence means being dependent on others. When writing a PhD thesis, you depend on many "others". I categorised the "others" in four groups: university, work, friends, and family. Without these four groups this book could not have been realised, therefore I will here address some words to them, starting with the group "university".

I want to thank Prof.dr. Frans A.J. van den Bosch and Prof.dr. Henk W. Volberda for their supervision. They spent many hours with me guiding me, helping me find the right direction, and motivating me to add just that little extra to the thesis. They taught me that it is important to continue exploring different possibilities before being satisfied with a result. They also taught me how to structure a manuscript and keep the overview of things yet to be done. Without their valuable insights, accomplishing this job would have been a lot more difficult. With regard to Carolien Heintjes and Patricia de Wilde, thank you for the pleasant hours we spent together and for your flexibility in always finding a place in the agenda of the Profs. so that I could have another appointment. To all the other colleagues at the RSM Erasmus University, thank you as well for providing a pleasant working atmosphere.

Special acknowledgements are also owed to many people at Kappa Packaging (a leading European Paper & Board company with 16.000 employees). I want to thank Frits Beurskens for giving me the opportunity to follow a PhD trajectory where I could divide my time between both Kappa Packaging and the RSM Erasmus University. I experienced being an external PhD candidate as being very fruitful for relating theory and practice. It gave me the opportunity to live in two different worlds: the world of Kappa Paper Recycling and the world of the Department of Strategy and Business Environment of the RSM Erasmus University. To illustrate this there have been several occasions where representatives of both worlds have been around the same table. The chapters of this thesis were presented on five meetings at Kappa Packaging, attended by Frits Beurskens (CEO Kappa Packaging) Henri Vermeulen (Manager Director Kappa Paper Recycling), and Steven Stoffer (Managing Director Sourcing Kappa Packaging) and both my supervisors. On these occasions theory and practice were aligned which has been beneficial for the development of this thesis. I thank Henri Vermeulen for the many, many things he taught me about recovered paper. I cannot imagine that anybody could have taught me more about this subject. Moreover, he has shown me how important networking is to achieve your

target. I thank Saskia Willemsen for all the things she organised for me, for her “sunshine” and for her moral support. With regard to my other colleagues, thank you for giving me such a great time at the company.

Furthermore, I thank my friends for their moral support, for their many e-mails and for their understanding when I was busy yet again. I want to thank my good friends and “paranimfen” Joy Kearney and Dennis Rietveld in particular. You were both great in both good and bad times.

Last but certainly not least, I want to thank my parents. You were the ones that experienced those four PhD thesis years most closely. I thank you for your understanding and your unconditional confidence in me. I want to thank you also for your support in many ways, for being there.

Bergambacht, juni 2007

Erik P. van Leeuwen

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CHAPTER 1
INTRODUCTION

INTRODUCTION

In recent decades, environmental awareness, waste accumulation, landfill problems, and depletion of natural resources (Aragón-Correa et al., 2004; Lertzman and Vredenburg, 2005; Sharma and Vredenburg, 1998) have influenced public opinion about what should be done with end-of-life products both at country and European level, and the way incumbent firms deal with these issues. The management of solid waste has become an urgent problem in nations with a large population density (Conrad 1999) and in a growing number of industries (e.g. aluminium, paper, and plastics), voluntarily or due to regulation (Vermeulen and Büch, 2005; Roome and Wijen, 2006), end-of-life products are recycled or reused again as a resource (cf. Conrad, 1999; Sterner and Bartelings, 1999; Prendergast *et al.*, 1997; Ayres, 1997). Ayres (1997: 170) phrases the developments as follows: 'We are in the transition between the 'cowboy economy' of the 19th century and the future 'spaceship economy' of the latter part of the 21st century. In the cowboy economy growth was largely driven by the exploitation of cheap and readily available extractive resources, and use (or misuse) of the environment was a free good. … The spaceship economy, by contrast, will be one in which all resources – including the environment – are scarce and must be treated as depreciable assets'.

This study aims to contribute to resource dependence theory (Pfeffer and Salancik, 1978) and to extend it to the context of "recovered-resource dependent industries". These industries to a large extent depend on end-of-life-products for the continuation of production processes. It will be argued that firms that gradually start using end-of-life products – as opposed to natural or *virgin* resources – for their production processes, are confronted with challenges associated with resource dependence management of these 'new' kinds of resources. It will be argued that resource dependence management in the 'spaceship economy' where end-of-life products, like used paper, aluminium, and plastic products, are used as a raw material, is more complex than in traditional industries as will be explained below.

Furthermore, research on resource dependence theory (Pfeffer and Salancik, 1978) is extended by applying a multi-lens approach with five theoretical perspectives. A multi-lens approach offers the opportunity to investigate external and internal factors influencing firms' resource dependence at different levels of analysis. This study develops a conceptual managerial framework incorporating internal and external factors influencing strategic

renewal and recovered-resource dependence management. As mentioned before, this research focuses on theory building, not on testing. Therefore no hypotheses will be tested. However, a multi-level research design is applied encompassing eight research settings to illustrate the propositions developed in the theory part.

In the remainder of this chapter attention will be paid to recovered-resource dependent firms and recovered-resource dependence management, the research problem, and the structure of the manuscript.

RECOVERED-RESOURCE DEPENDENT FIRMS

Each industry has its own kind of vocabulary. *Recycling* and *recovery* play a major role in the focal industry of this research. In order to prevent ambiguity stemming from different interpretations of both terms, the distinction between these will be set out. After discussing this, the issues of *recovered-resource dependence management* and strategic renewal and factors influencing resource dependence will be discussed.

Recycling and Recovery

Generally speaking the term *recovery* is regarded as more encompassing than *recycling*. The EU Council Resolution on Community Strategy on Waste Management (09.12.96) defines *recovery* as the principle of waste-management policy including reuse, material recycling, composting, energy recovery, as well as export for similar purposes, see Table 1. This shows that *recycling* is just one of the ways to recover resources.

In the European parliament and council directive on packaging and packaging waste 94/62/EC (20.12.1994, Art 3. 7) *recycling* is defined as the reprocessing in a production process of the waste material for the original purpose or for other purposes including organic recycling but excluding energy recovery, see Table 1. However, the term 'recycling' is further differentiated; mechanical, chemical, and feedstock recycling can be distinguished. The differences between these lead back to the changes in the chemical structure of the original material, which is mainly of importance in the plastic industry. When applying *mechanical recycling*, the chemical structure of the processed material remains unchanged, see Table 1. Chemical and feedstock recycling changes the chemical structure of the waste material, see Table 1. *Chemical recycling* means that chemical constituents are recycled into the original material of the waste. In *feedstock recycling* the chemical constituents are recycled into material other than the original material of the waste.

Table 1 Definitions regarding recovery and recycling

Subject	Source	Description
Recovery	EU Council Resolution on Community Strategy on Waste Management, 09.12.96.	Principle of waste-management policy including re-use, material recycling, composting and energy recovery as well as export for similar purposes
Recycling	European parliament and council directive on packaging and packaging waste 94/62/EC (20.12.1994, Art 3. 7)	The reprocessing in a production process of the waste material for the original purpose or for other purposes including organic recycling but excluding energy recovery.
Mechanical recycling	Proposal for a Directive of the European parliament and of the Council amending Directive 94/62/EC on packaging and packaging waste. 30.4.2002. Art 3. 9a	Mechanical recycling shall mean the reprocessing of waste material, for the original purpose or for other purposes excluding energy recovery or disposal, without changing the chemical structure of the processed material.
Chemical recycling	Proposal for a Directive of the European parliament and of the Council amending Directive 94/62/EC on packaging and packaging waste. 30.4.2002. Art 3. 9b	Chemical recycling shall mean the reprocessing, other than organic recycling, of waste material, for the original purpose or for other purposes excluding energy recovery or disposal, by changing the chemical structure of the waste material and recycling the chemical constituents into the original material of the waste.
Feedstock recycling	Proposal for a Directive of the European parliament and of the Council amending Directive 94/62/EC on packaging and packaging waste. 30.4.2002. Art 3. 9c	Feedstock recycling shall mean the reprocessing, other than organic recycling, of waste material, for the original purpose or for other purposes excluding energy recovery or disposal, by changing the chemical structure of the waste material and recycling the chemical constituents into materials other than the original material of the waste.'
Organic recycling	European parliament and council directive on packaging and packaging waste 94/62/EC (20.12.1994, Art 3. 9)	Organic recycling shall mean the aerobic (composting) or anaerobic (biomethanization) treatment, under controlled conditions and using microorganisms, of the biodegradable parts of packaging waste, which produces stabilized organic residues or methane. Landfill shall not be considered a form of organic recycling;

This research attempts to avoid the term waste for end-of-life products that will be reused again as a resource, for when processed this way it is no longer waste but has become a *recovered resource*. A *recovered resource* is here defined as: An end-of-life product, semi-finished good, waste product, or by-product that is collected and is intended to be utilised in the production process for the original or similar purposes. Examples of *recovered resources* are aluminium reused for constructions again, paper and board products that become paper and board products, e.g. corrugated boxes, again, see Table 2.

Table 2 Definitions related to recycling used in this research

Subject	Source	Description
Recovered resource	This research	A recovered resource is an end-of-life product, semi-finished good, waste product, or by-product that is collected and is intended to be utilised in the production process for the original or similar purposes. Examples are aluminium reused for constructions again, paper and board products that become paper and board products, e.g. corrugated boxes, again
Recycling	This research	Recycling is the reprocessing of recovered resources in a production process for the original purpose or similar purposes.
Recovered-Resource Dependent Firm (RRDF)	This research	Firm which depends on recovered resources for the continuation of its production process
Recovered-Resource Dependent Industries (RRDI)	This research	Industries that depend on recovered resources for the continuation of their production process

Building on the aforementioned definitions of *recycling* and *recovered resources*, in this research *recycling* is regarded as: The reprocessing of recovered resources in a production process for the original purpose or similar purposes, see Table 2. A firm that processes recovered resources for the original or similar purposes is coined here as a *Recovered-Resource Dependent Firm* (RRDF), for this kind of firm depends on *recovered resources* for the continuation of its production process, see Table 2. The industry in which these RRDFs operate will be called *Recovered-Resource Dependent Industries* (RRDIs). In chapter 5, three RRDIs will be compared: Paper and Board, Aluminium, and Plastic.

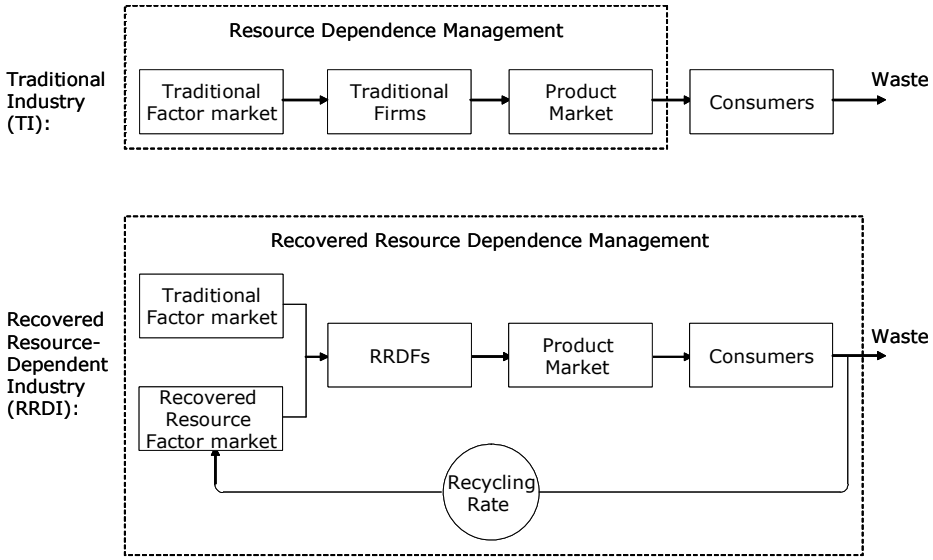
Recovered-Resource Dependence Management

From a resource dependence and management perspective, what makes a recovered-resource dependent industry different from what in this study will be called a traditional industry (TI)? This question will be investigated by focusing on three issues: (1) Resource dependence management versus recovered-resource dependence management, (2) The origin of the resources, and (3) the recycling rate as a performance indicator for RRDFs.

Resource Dependence Management versus Recovered-Resource Dependence Management

In a simplified production process of a TI, resources required for the production are bought at a factor market, are in one or more steps transformed into end products, subsequently sold on product markets, and after consumption these products are disposed of and become waste, see Figure 1.

Figure 1 Comparing resource dependence management in TIs and recovered-resource dependence management in RRDIs



The current Community legislation describes waste as "any substance or object … the holder discards or intends or is required to discard" (CEPI Strategy on Recycling, 2003: 13). In relation to resource dependence management Pfeffer and Salancik (1978: 2) point out: 'Organizations are embedded in an environment comprised of other organizations. They depend on those other organizations for the many resources they themselves require'. In traditional industries the dependencies that have to be managed concern the actors involved in the supply of resources at the input side of the production process and the customers at the output side. 'A seller is interdependent with a buyer because the outcome of concluding a sale depends on the activities contributed by each' (Pfeffer and Salancik, 1978: 40).

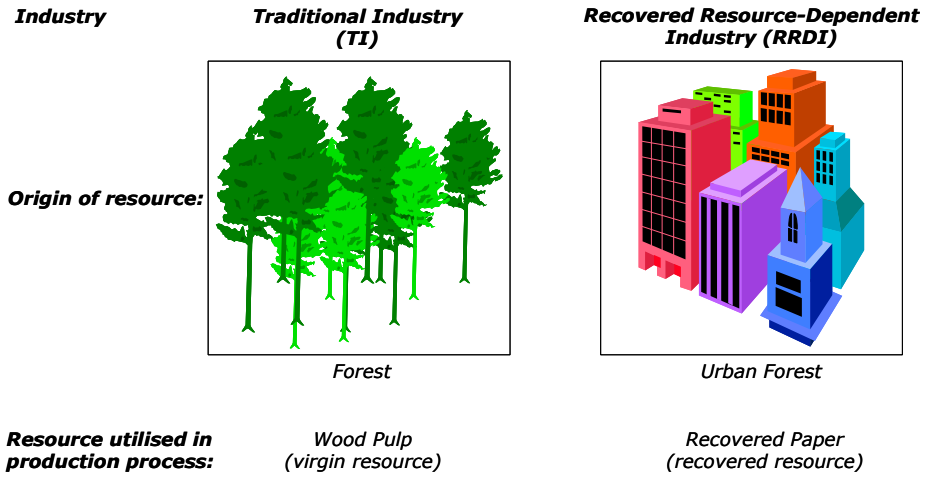
The same is true for RRDIs, however, an extra dimension is added; end-of-life products – and waste products that might arise during the production process (not depicted in Figure 1) – are collected, cleaned or reprocessed and become *recovered resources*, or *secondary raw materials*. These additional steps will lead to an involvement of more actors; a different setting in which additional dependencies have to be managed. In other words, resource dependence management in RRDIs is more demanding than in TIs and poses the management of incumbent firms with new challenges. In the remainder of this study the term *recovered-resource dependence* will be reserved for RRDIs, for these are dependent on recovered resources. Managing the supply of recovered resources will be referred to as *recovered-resource dependence management*.

Origin of virgin versus recovered resources

As indicated in Figure 1 in RRDIs the return of end-of-life products has to be managed, which results in a difference of availability between *virgin* and *recovered resources*. Kono et al, (1998) mention the importance of place, or geography, of physical location on inter-organisational relations. Traditional industries depend on the natural endowments of which the availability differs per region; here called *regional scope*. Regional scope can be examined at different levels, e.g. global, European, country. In certain regions the availability of virgin resources is high and other regions might have no virgin resources at all, examples are oil, steel ore, and forestry. As a matter of fact, limited availability of earth's reserves is one of the main inducements for industries to consider *recovered resources* (Ibenholt and Lindhjem, 2003).

Like virgin resources *recovered resources* are not available in the same quantities everywhere, but the differences in availability are more moderate and, moreover, *manageable*. Contrary to virgin resources, *recovered resources* are not produced but 'arise'. The availability depends on the size and the efficiency of what in the paper and board industry is sometimes referred to as the 'urban forest', as opposed to the real forestry, see Figure 2.

Figure 2 Traditional versus recovered-resource dependent industries: Origin of resources and resources utilised in the production process, the case of the paper and board industry.



A few decades ago, the trees from the forest were the main raw material for the paper and board industry. More recently the end-of-life paper and board products discarded in the urban area have become ever more important as a raw material, which is why it is sometimes referred to as *urban forest*. The urban "trees" consist of used magazines, corrugated boxes, and other discarded paper and board products. The size of the urban forest reflects the number of inhabitants in an area. In regions that are densely populated it is likely that more *recovered resources* will 'arise' because the consumption of products is higher and therefore the disposal of end-of-life products too. Whether this potential leads to a higher availability of *recovered resources* depends on the performance of the actors involved in the chain.

Recycling rate: The performance indicator of recovered-resource dependent industries

In this research the *recycling rate* is used as a performance indicator for RRDFs, see Figure 1. An adequate recovered-resource dependence management is likely to result in a high recycling rate. Building on the CEPI (2003) definition on recovered paper: 'the ratio between recovered paper utilisation and paper and paperboard consumption', the *recycling rate* is here defined as the ratio between recovered resources utilised for the production process, and the consumption of end-products. Firms that are better able to manage the recycling rate will be less vulnerable for uncertain resource supply and will positively influence the recycling rate of the industry as a whole.

Theoretically an RRDF can reach a recycling rate above 100%; this is inherent in the definition. The waste products that arise during the production process – the so called pre-consumer waste – will never reach the consumer, however, can become recovered resources. So, when all pre-consumer 'waste' and post-consumer 'waste' is collected, this will total more than the consumption of the end-products. However, seldom will RRDFs have a performance above 100%. Besides the fact that there are technical limitations, from an economical perspective these high recycling rates will not be feasible.

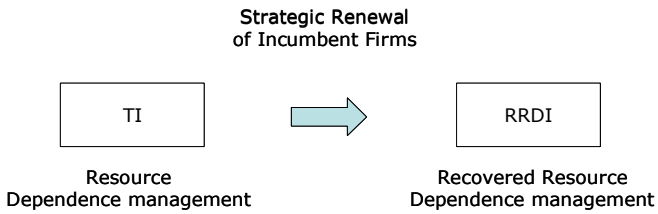
The recycling rate as a performance indicator has limitations. One of the factors influencing the *recycling rate* worth mentioning, but not depicted in Figure 1 is the impact of the import and export of resources. If the demand for specific resources in a certain region is higher than the availability, the lack of resources can be compensated by importing these from regions where the availability is higher; this counts for virgin resources as well as for recovered resources. Import and export of resources influences the recycling rate, more about this in Appendix 1. Despite these limitations it is used here anyway, as it is an accepted indicator in the industry and most of the regulations set targets for the *recycling rate*.

Strategic Renewal and Factors Influencing Incumbent Firms' Resource Dependence

The argument above shows that the journey from a traditional towards a recovered-resource dependent industry asks for *strategic renewal*; incumbent firms have to adapt their resource dependence strategy to this new RRDI-context, see Figure 3. Incumbent firms' resource dependence management that was appropriate in the context of a traditional industry may not be adequate in an RRDI-setting. The strategic renewal journey that is followed will be the result of several major internal and external factors that the firm is confronted with. These factors will be briefly introduced here and discussed more extensively in the following two chapters.

Management, dynamic capabilities, organisational form and a firm's resource dependence strategies are important internal factors (cf. Aragón-Correa et al., 2004; Sharma and Vredenburg, 1998; Wijen and Roome, 2006). Examples of external factors influencing the recycling rate are: Legislation, 'technical' issues related to factor and product markets (e.g. regional scope, market for virgin and recovered resources) and resource recycling characteristics.

Figure 3 Strategic Renewal: From incumbent firm operating in a traditional industry towards incumbent firm operating in a recovered-resource dependent industry



Resource recycling characteristics determine whether it is relatively simple or at the opposite, complex, to recycle the product. Steel, for example, can be recycled endlessly without quality loss; plastics and paper products, on the other hand, decrease in quality when recycled. Regional scope (e.g. country, European, global) shows that the availability of resources differs per region. Technological developments can lead to innovation. Resources that were difficult to recycle can be recyclable with use of new techniques. Also the improvement of the infrastructure and sorting mechanism can lead to a higher recycling rate. Developments on the markets for virgin and recovered resources can influence the recycling rate. If prices for virgin resources rise, a firm will more easily decide to use recovered resources and vice versa.

With regard to regulation, at European level, the EU Packaging and Packaging Waste Directive (94/62/EC) for example obliges member states to reach certain recycling rates, which differ per RRDI. Don Coates, Chief Executive of St. Regis Paper Co Ltd.

argued, 'In the 1990s environmental issues came to the fore and the amount of European and national legislation that impacted upon the paper industry grew at an unprecedented rate' (Annual Review The Paper Federation of Great Britain, 2002: 3). The aforementioned factors will be discussed in more detail in the following two chapters when constructing a conceptual managerial model.

RESEARCH PROBLEM, QUESTIONS, AND APPROACH

This research aims to contribute to the understanding of RRDIs from a *resource dependence* perspective – here labelled as *recovered-resource dependence management* – in the context of *strategic renewal*. Pfeffer and Salancik (1978) phrased the central problem that resource dependence deals with as follows: 'The key to organisational survival is the ability to acquire and maintain resources. The problem would be simplified if organisations were in complete control of all the components necessary for operation. However, no organisation is completely self-contained. Organisations are embedded in an environment comprised of other organisations. They depend on those other organisations for the many resources they themselves require' (1978: 2). There were several reasons to investigate recovered-resource dependent industries from a resource dependence perspective in the context of strategic renewal. The reasons lead back to: the nature of the industry, strategic renewal, and limited empirical evidence on resource dependence.

With regard to the nature of the industry, in RRDIs the "control of all the components necessary for operation" is more complex than in TIs for the return of end-of-life products has to be managed as well which leads to involvement of more actors. This makes the environment comprised of other organisations even more extended than in TIs. On the other side re-using their own produced end-products gives RRDIs an advantage by being less dependent on virgin resources.

Strategic renewal, due to a shift from traditional industry towards recovered-resource dependent industry, makes the resource dependence problem of this research more complicated as well; the changing context confronts management of incumbent firms with situations with which they are not familiar and asks for different (recovered-) resource dependence strategies. This arouses a special interest to apply this particular perspective on RRDIs.

As mentioned in the introduction to the classical work "The External Control of Organizations" (Pfeffer and Salancik, 2003: xvi), '… there is a limited amount of empirical work explicitly extending and testing resource dependence theory and its central tenets'. This research contributes to this lacuna, and moreover, at different levels of analysis and different dimensions.

Research Question

The overall research question guiding this research is the following:

> *In the context of the transition from a traditional towards a recovered-resource dependent industry, which internal and external factors influence incumbent firms' strategic renewal and the use of resource dependence instruments and what are the implications for recovered-resource dependence management and competitive advantage?*

This study centres on recovered-resource dependence management in RRDIs. Research into the factors that influence resource dependence in these kinds of industries is limited; see chapter 2 addressing perspectives on RRDIs. Although several contributions pay attention to institutional forces impacting RRDIs, research on resource dependence management in this kind of industry is still under-researched. At *industry level* this research addresses the following:

- *Which external factors constrain firms in recovered-resource dependent industries?*
- *To what extent are external explanatory constructs associated with these external factors able to explain differences in performance of recovered-resource dependent industries?*

Pfeffer and Salancik (1978) extensively discuss a multitude of resource dependence instruments – e.g. resource diversification, inventories, mergers, etc – that firms can use to reduce their resource dependence. This research is focused on how firms with 'recycling activities' (Conrad, 1999) manage the supply of recovered resources and their interdependencies with other firms, or in other words, what resource dependence instruments (Pfeffer and Salancik, 1978) they apply. At *firm level* this research addresses the following:

- *Which internal factors constrain recovered-resource dependent firms?*
- *To what extent are internal explanatory constructs associated with these internal factors able to explain differences in performance of recovered-resource dependent firms?*
- *Which resource dependence strategies and resource dependence instruments are applied and why is this the case?*
- *What are the implications of these strategies for management processes and organisation structures?*

Furthermore this research is devoted to the strategic renewal of incumbent firms due to a shift from a TI towards an RRDI. Management of incumbent firms must learn how to deal with this new context. This problem has not yet been investigated in this type of industry.

A multiple dimensions approach

Strategic management literature emphasises the importance of exploring the *context*, *content*, and *process* dimension of strategy (Pettigrew, 1990; Pettigrew, 1988). Volberda *et al.* (2001b) investigate *strategic renewal* as a three-dimensional phenomenon. This research will show that the three dimensions play a key role in *recovered-resource dependence management* as well, see Table 3.

Table 3 Dimensions of Strategy

Dimension	(1) General Question	(2) Focus Strategic Management Literature	(3) Focus Recovered-Resource Dependence Management
Context	"Where"	- How does an organisation's context influence its strategy?	- How does a firm's external and in particular institutional context influence recovered-resource dependence management?
Content	"What"	- What of strategy	- What internal factors influence a firm's recovered-resource dependence management? - Which resource dependence instruments can be used in order to manage recovered-resource dependence?
Process	"How", "who", "when"	- How do factors and actors influence the implementation	- In the process of strategic renewal due to the shift from a traditional towards a recovered-resource dependent industry, when and how do resource dependence actions occur?

Source: (1) and (2) Adapted from Volberda et al. (2001b); (3) this research

In strategic management literature the *context* dimension deals with the question regarding how the exogenous and endogenous contexts of the organisation influence strategy. The exogenous context includes 'the economic, social, political, and sectoral environment in which the firm is located. The endogenous context refers to features of the structural, cultural, and political environment through which ideas for change proceed'

(Pettigrew, 1990: 268). With regard to resource dependence management, the *context* dimension answers the question: How does a firm's context influence resource dependence management.

The *content* dimension deals with the "what" of strategy, which refers to strategy as a specific product. In a resource dependence setting, the *content* dimension will give an answer to two questions: The first is what resource dependence instruments can be used to decrease a firm's resource dependence. The second question is what internal factors influence a firm's resource dependence management.

The *process* dimension looks at the 'how', 'who', and 'when' of strategy. The process dimension is related to strategic renewal. Strategic renewal actions are defined "as actions that a firm undertakes to alter its path dependence" (Volberda, 2001a: 160). These actions determine the renewal journey a firm follows in time from point A until point B. The *process* dimension in a resource dependence context answers the question: When and how do resource dependence actions occur, and what strategic renewal journeys are followed by incumbent firms operating in recovered-resource dependent industries?

To address the research problem five theoretical lenses are applied contributing to the three different strategy dimensions, see Table 4. Resource dependence theory constitutes the dominant paradigm in this study. Each of the theories contributing to the different dimensions will now be briefly discussed.

Table 4 Strategy dimensions, examples of theories contributing to strategy dimension, and main contributors to the theory selected

Dimension	Examples of theories contributing to strategy dimension	Main contributors selected in this study
Context	- Resource dependence theory	Pfeffer and Salancik, 1978)
	- Institutional theory	DiMaggio and Powell, 1983; Scott , 2001
Content	- Resource dependence theory	Pfeffer and Salancik, 1978
	- Resource-based view of the firm	Penrose, 1959
	- Dynamic capabilities & Absorptive capacity	Teece et al., 1997; Eisenhardt and Martin, 2000; Dosi et al., 2002; Cohen and Levinthal, 1989; 1990; Van den Bosch et al., 1999; Jansen et al., 2005
Process	- Strategic renewal literature	Volberda et al., 2001a; 2001b
	- Dynamic capabilities & Absorptive capacity	Teece et al., 1997; Eisenhardt and Martin, 2000; Dosi et al., 2002; Cohen and Levinthal, 1989; 1990; Van den Bosch et al., 1999; Jansen et al., 2005

Theoretical perspectives contributing to the context dimension

Two theories contributing to the *context* dimension are selected: Resource dependence theory and institutional theory. Resource dependence theory (Pfeffer and Salancik, 1978) highlights the influence of the external context on firms' resource dependence strategies. The theory assumes that firms are constrained in their resource allocation, and depend on other organisations for the resources they require. Constraints impacting the firm can also be found in new institutional theory (Scott, 2001; DiMaggio and Powell, 1983). Where resource dependence theory (Pfeffer and Salancik, 1978) focuses on transactions between organisations, institutional theory (Scott, 2001; DiMaggio and Powell, 1983) focuses on institutional pressures constraining firms. Institutional theory suggests that firms operating in the same institutional field behave isomorphic, in other words, players in the same RRDI will show similarities. The contribution of institutional theory to the research problem is to provide insight into what specific institutional pressures influence RRDIs.

Theoretical perspectives contributing to the content dimension

The *content* dimension is addressed by four theoretical perspectives: Resource dependence theory, resource-based view of the firm, dynamic capability-based view, and absorptive capacity literature. The central idea in the work of Pfeffer and Salancik (1978) is that firms are embedded in a network of other firms and the focal firm depends on those other organisations for resource supply and selling of products. However, *resource dependence theory* (Pfeffer and Salancik, 1978) also argues that there are opportunities to do something about the constraints emerging from the environment. Firms can change their situations by means of internal as well as external actions. Pfeffer and Salancik (1978) present a multitude of instruments (e.g. long-term contracts, vertical integration, inventories, diversification, etc.) to manage a firm's resource dependence. The theory, however, remains largely silent about the managerial and organisational aspects required for resource dependence. In order to contribute to this lacuna three theoretical lenses are selected.

The *resource-based view of the firm*, with Penrose (1959) chosen as main representative in this research, contributes to resource dependence theory by focusing on the inside of the firm and on the importance of management in particular. The different management levels are responsible for the resource dependence instruments employed by the firm, and the strategic renewal journey followed.

Dynamic capabilities theory (Teece et al., 1997; Eisenhardt and Martin, 2000) is closely related to resource-based view; it also recognises the importance of management, furthermore, it argues that firms need to develop *dynamic capabilities* in order to gain and maintain competitive advantage in volatile environments. Zollo and Winter (2002) argue

that these capabilities lead to changes in firm's operational routines and that they play a role in less volatile environments as well.

The knowledge-based view is associated with learning and addressed by paying attention to *Absorptive capacity* literature (Cohen and Levinthal, 1989; 1990). Cohen and Levinthal define absorptive capacity as a firm's ability to "… recognize the value of new, external knowledge, assimilate it, and apply it to commercial ends" (1990: 128). Absorptive capacity is closely related to dynamic capabilities literature (Jansen et al., 2005) and provides insight into how knowledge from the environment is absorbed and leads to managerial action (Van den Bosch et al., 1999), or in the context of this research, to a change in firm's resource dependence instruments.

Theoretical perspectives contributing to the process dimension

This research investigates resource dependence management in RRDIs in the context of *strategic renewal* and more specific in the strategic renewal journeys of incumbent firms moving from a traditional industry towards a recovered-resource dependent industry. To this end strategic renewal literature is addressed. Volberda *et al*. (2001b) consider strategic renewal as a three-dimensional phenomenon. Volberda *et al.* (2001a) focus on the different attitudes of management with regard to the environment. When management is active with regard to changing environments a firm will follow a mainly *adaptive* journey; when management is passive this will result in a mainly *selective* renewal journey. Absorptive capacity and dynamic capability literature discussed before plays a role in the process dimension as well.

A Multi-level Research Approach

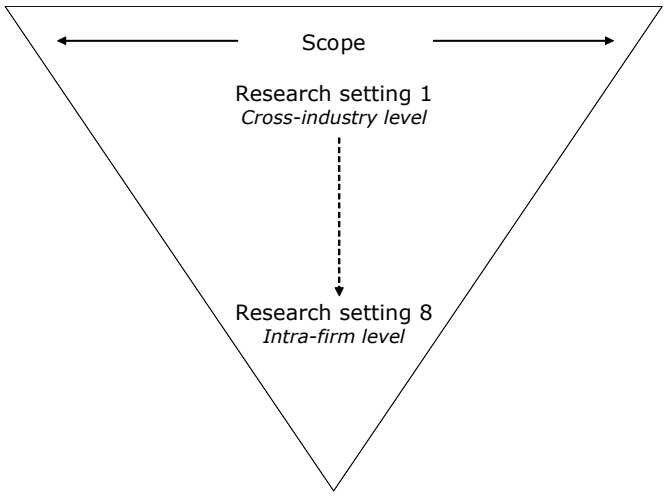
Besides the importance of investigating different dimensions, literature emphasizes the importance of studying different levels of analysis as well (cf. Levinthal, 1995; Lewin and Volberda, 1999; Baden-Fuller, 1995). The theories selected before add to different levels of analysis as well, see Table 5. Resource dependence theory (1978) contributes to industry and firm level. Institutional theory (DiMaggio and Powell, 1983; Scott, 2001) contributes to institutional level. Resource-based view of the firm (Penrose, 1959) focuses on the inside of the firm and contributes to firm/management level. Dynamic capabilities (Teece et al., 1997; Eisenhardt and Martin, 2000; Dosi et al., 2002) and absorptive capacity literature (Cohen and Levinthal, 1989; 1990; Van den Bosch et al., 1999; Jansen et al., 2005) contribute to firm/management level as well.

Table 5 Level of analysis, examples of theories contributing to level of analysis, and main contributors selected in this study

Level of analysis	Examples of theories contributing to level of analysis	Main contributors selected in this study
Industry / institutional	- Resource dependence theory	Pfeffer and Salancik, 1978)
	- Institutional theory	DiMaggio and Powell, 1983; Scott , 2001
Firm / management	- Resource dependence theory	Pfeffer and Salancik, 1978
	- Resource-based view of the firm	Penrose, 1959
	- Dynamic capabilities	Teece et al., 1997; Eisenhardt and Martin, 2000; Dosi et al., 2002
	- Knowledge-based view (Absorptive capacity)	Cohen and Levinthal, 1989; 1990; Van den Bosch et al., 1999; Jansen et al., 2005

Furthermore, this research follows a multi-level and multi-method approach embodying eight different research settings, ranging from a broad scope towards a narrow scope (see Figure 4) and in doing so this study builds on the current literature about resource dependence theory (Pfeffer and Salancik, 1978). A combination of qualitative and quantitative research approaches was chosen, see Table 6.

Figure 4 Research design: From broad towards narrow scope



At *industry level* a qualitative approach was followed. In order to contribute to the industry-level research questions, the following research methods were chosen. Yin (2003) suggests making use of case study research to address "how" and "why" research questions.

At cross industry level (research setting 1) a comparative case study is conducted providing insight into the external factors influencing the performance of three RRDIs (Paper and Board, Aluminium, and Plastic). In the paper and board industry, the best performing RRDI, different research methods are applied. A comparative case study between the three major continents: Western Europe, North America and Asia Far East providing insight into the best performing region (research setting 2). It appeared that Europe is the best performer. In order to provide more insight into the reason for this, a longitudinal case study, contributing to the process dimension, was executed in the European paper and board industry (research setting 3). Furthermore, a case study was executed comparing the performance of two main paper and board sectors; graphic and packaging (research setting 4). Finally six European countries are compared in order to provide insight into contextual matters (research setting 5).

Table 6 Eight research settings, associated level of analysis and research method

Setting	Level of analysis	Research method	Chapter
1.	Cross-Industry level, Comparing three European Recovered-Resource Dependent Industries (Paper and Board, Aluminium, and Plastic	Comparative case study	5
2.	Global Paper and Board Industry (Western Europe, North America, and Asia Far East)	Comparative case study	6
3.	European Paper and Board Industry	Longitudinal case study	6
4.	Comparing European Paper and Board End-Use sectors (Packaging, Graphic, Household & Sanitary, and Other)	Comparative case study	6
5.	Comparing six European countries (France, Germany, the Netherlands, Spain, Sweden, UK)	Comparative case study	6
6.	Comparing six incumbent firms in the European paper and board industry (Kappa Packaging, Smurfit, SCA, Norkse Skog, Stora Enso, and UPM-Kymmene)	Strategic Renewal and Resource Dependence Actions Analysis	7
7.	Resource dependence management at Kappa Packaging	Longitudinal case study	8
8.	In-depth analysis organisation form and the role of Kappa Paper Recycling	In-depth case study	8

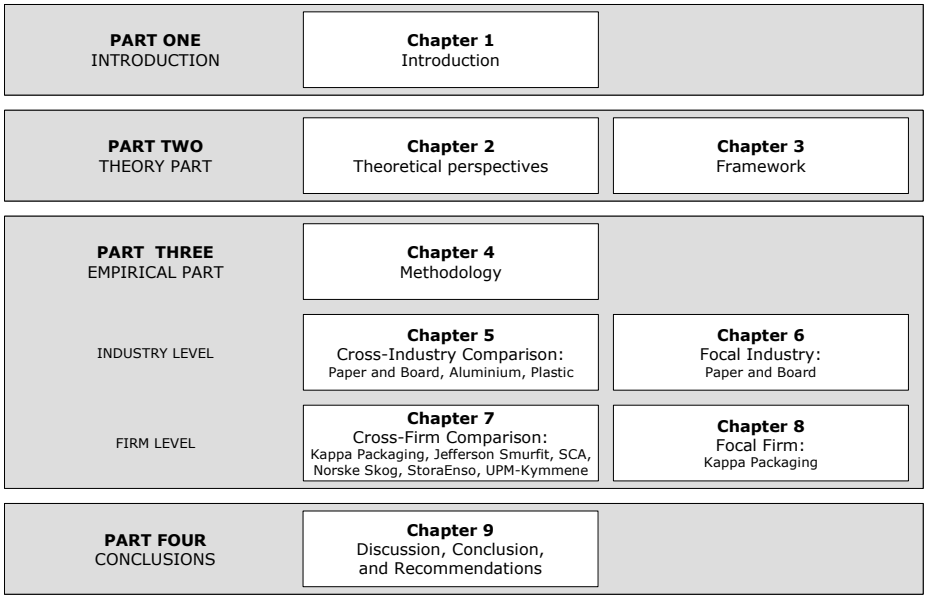
At *firm level* a combination of qualitative and quantitative research was followed. Quantitative research was done by executing a strategic renewal actions analysis of six major players in the two major sectors paper and board industry for the period 1998 – 2003 (research setting 6). On the one hand this method contributes to the process dimension, on the other hand it contributes to the content dimension by investigating the resource

dependence instruments employed. Qualitative research was done by executing a longitudinal case study at Kappa Packaging (research setting 7), the best performing firm of the six in terms of resource dependence management. Finally the development of the organisation form and the role of Kappa Paper Recycling is investigated (research setting 8)

STRUCTURE OF THE MANUSCRIPT

This study is composed of four parts: an introduction, a theoretical part, an empirical part, and the last part discussion and conclusions, see Figure 5. The introduction is the part that was described so far. Attention was paid to the positioning of the thesis, the background and what distinguishes this thesis from previous research. Afterwards, the research aim, problem, and question were set out. Finally the methodology was discussed.

Figure 5: Structure Thesis



The *theory part* of the study focuses on a resource dependence management in RRDIs in the context of strategic renewal, addressing different strategy dimensions. Chapter two starts with Mintzberg's ten schools of thought which provide a literature overview. The ten schools of thought are used to analyse to what extent the different strategy schools take management of resource dependence into account. An analysis of previous research on RRDIs shows what areas have been investigated and which are under-

researched. The importance of the context, content and process dimension with regard to the strategic renewal in managing resource dependence is discussed and the contribution of the theories to the research problem is evaluated. In chapter three, the contribution of the theories in chapter two are used to construct a conceptual managerial framework for managing resource dependence in recovered-resource based industries in the context of strategic renewal. Furthermore, propositions are formulated.

The *empirical part* consists of five chapters and starts with a methodological chapter. In the methodological chapter the multi-method, multi-level, multi-dimension research approach is set out. It was decided to use a research approach with eight research settings in order to address the research questions and propositions at different dimensions and levels of analysis. Chapter 5 discusses a cross-industry comparison between three recovered-resource dependent industries: Paper and board industry, Aluminium, and plastics. The comparison comprises external explanatory constructs of the three different industries including the resource recycling characteristics and institutional context. It appears that the European paper and board industry has the highest recycling rate. Based on this result, chapter 6 deals with the paper and board industry. In chapter 6 the focal industry is investigated in more detail with attention to the process and context dimension. To contribute to the process dimension the position of the three dominant regions (Western Europe, North America, and Asia Far East) is analysed at three snapshots in time. Further the European paper and board industry is described longitudinally. To address the context dimension, different paper and board sectors are compared. Furthermore a comparative case analysis is executed comparing six European countries (France, Germany, the Netherlands, Spain, Sweden, and United Kingdom). Chapter 7 contributes to strategic renewal of incumbent firms in the European paper and board industry. It focuses on the strategic renewal actions and resource dependence management of six major paper and board firms in the packaging sector (Kappa Packaging, Jefferson Smurfit, and SCA) and the graphic paper and board sector (Norske Skog, StoraEnso, and UPM-Kymmene) for the period 1998 - 2003. The strategic actions of the different players are described and compared. Furthermore the resource dependence instruments employed by the different firms are compared. It is argued that Kappa Packaging is most suitable for a more profound investigation which is done in chapter 8. Chapter 8 provides a longitudinal description of Kappa Packaging focusing on strategic renewal actions, resource dependence instruments employed, organisation form and management. Special attention will be paid to the changing role of Kappa Paper Recycling from profit centre towards knowledge centre.

The *final part* of the thesis contains a discussion of the research and the findings. The limitations of the chosen approach and issues not investigated are discussed and recommendations for further research are proposed.

PART TWO:
THEORETICAL PERSPECTIVES, FRAMEWORK, AND PROPOSITIONS

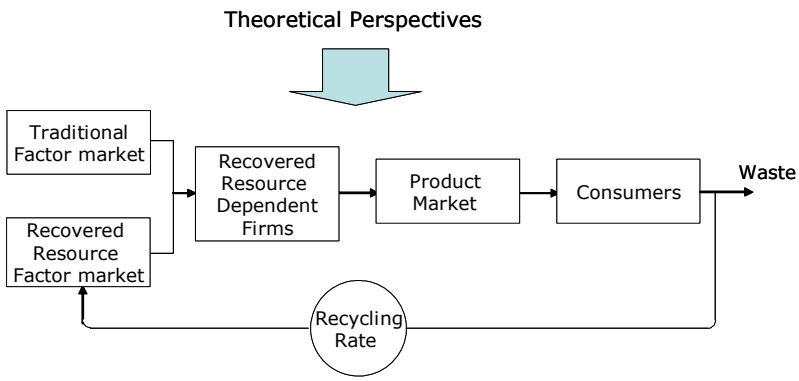
CHAPTER 2

PERSPECTIVES ON RESOURCE DEPENDENCE MANAGEMENT, RECOVERED-RESOURCE DEPENDENT INDUSTRIES, AND RECOVERED-RESOURCE DEPENDENCE MANAGEMENT

INTRODUCTION

Figure 6 presents what this chapter is about: Theoretical perspectives, resource dependence management, and recovered-resource-dependent industries. In order to address the research question that was presented in chapter 1: *In the context of the transition from a traditional towards a recovered-resource dependent industry, which internal and external factors influence incumbent firms' strategic renewal and the use of resource dependence instruments and what are the implications for recovered-resource dependence management and competitive advantage*, this chapter investigates multiple theoretical perspectives. This research encompasses a multi-level, multi-dimension approach. The theoretical perspectives are evaluated on contribution to strategy dimension (context, content, process) and level of analysis; a distinction is made between industry level and firm level. The methodology followed is narrowing down starting with a broad-scope perspective.

Figure 6 Theoretical perspectives on recovered-resource dependence management in RRDIs



The chapter starts by presenting an overview of perspectives in the current strategic management literature on strategy formation in a *resource dependence* context. Different writers have attempted to categorise the avalanche of management literature in schools of thought (*cf.* Mintzberg *et al.*, 1998; Rouleau and Séquin, 1995; Volberda and Elfring, 2001). "A school of thought is understood to be the range of thought of a specific group of researchers, which has crystallized within the field of strategic management" (Volberda and Elfring, 2001: 1). This research follows the ten *schools of thought* distinguished by Mintzberg *et al*. (1998) and investigates the contribution of each school to resource dependence management in the context of strategic renewal.

The following section examines perspectives that have been applied to Recovered-Resource Dependent Industries in *previous literature*. For this purpose a selection is made of contributions dating from 1970 until 2003, all concentrating on RRDIs. The writings are compared on seven different criteria, presented in Table 11. The comparison illustrates the focus of current research, and moreover, identifies under-researched areas in this field of research; the niche on which this research focuses.

The next section places the theoretical perspectives in the context of RRDIs and forms a first step towards a conceptual managerial framework. The following sections discuss the different theories and characteristics of factor and product markets associated with what were called internal and external factors in the research question. The leading perspective is Resource Dependence Theory (Pfeffer and Salancik, 1978). The three main themes of this theory will be discussed with special attention to external factors constraining the firm and internal factors – or opportunities – to reduce resource dependence. Furthermore, these external and internal factors influencing resource dependence will be extended by using multiple theoretical perspectives. Institutional theory (DiMaggio and Powel, 1983; Scott 2001) is addressed in order to provide more insight into external factors constraining the firm. Resource-based view of the firm (Penrose, 1959; Wernerfelt, 1984; Barney, 1986), dynamic capability theory (Teece *et al.*, 1997; Eisenhardt and Martin, 2000), and absorptive capacity literature (Cohen and Levinthal, 1989; 1990) are addressed to contribute to the inside of the firm. The chapter ends with a conclusion.

PERSPECTIVES ON STRATEGY FORMATION AND RESOURCE DEPENDENCE MANAGEMENT

In their book 'Strategy Safari', Mintzberg *et al.* (1998) categorise the strategic management literature into ten broad perspectives, or schools of thought, on strategy formation. The authors divide the schools into three groups, see Table 7. The first group consists of three *prescriptive* schools: design, planning, and positioning. The following six schools are *descriptive*: entrepreneurial, cognitive, learning, power, cultural, and

environmental. The last group of schools consists of only one school: the configuration school. Each school has its own characteristics and is evaluated on different attributes resulting in different views on *strategy formation*, see Table 7.

Table 7 Ten schools of thought, nature and perspective on strategy formation

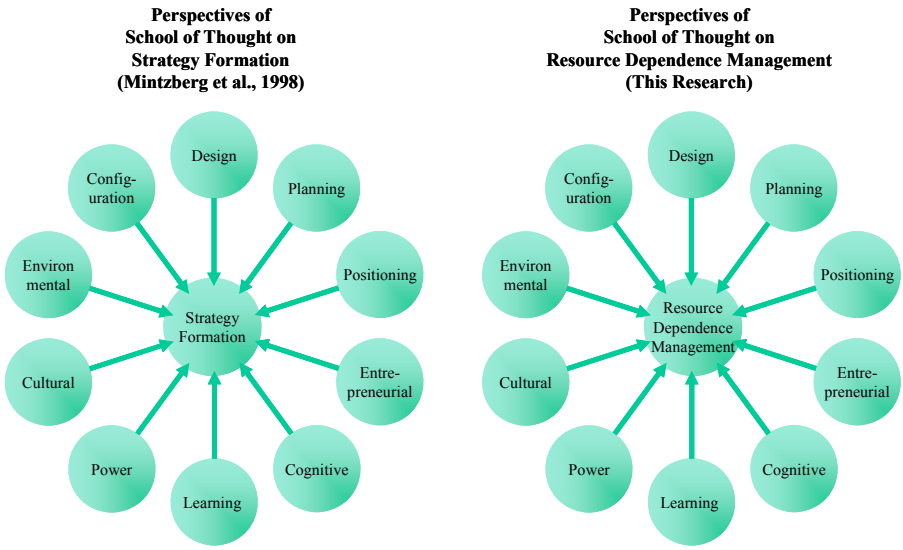
School	Nature	Perspective on Strategy formation
The Design School	Prescriptive	Strategy formation as a process of conception
The Planning School	Prescriptive	Strategy formation as a formal process
The Positioning School	Prescriptive	Strategy formation as an analytical process
The Entrepreneurial School	Descriptive	Strategy formation as a visionary process
The Cognitive School	Descriptive	Strategy formation as a mental process
The Learning School	Descriptive	Strategy formation as a emergent process
The Power School	Descriptive	Strategy formation as a process of negotiation
The Cultural School	Descriptive	Strategy formation as a collective process
The Environmental School	Descriptive	Strategy formation as a reactive process
The Configuration School	Configuration	Strategy formation as a process of transformation

Source: Mintzberg et al. (1998: 5)

In this research it will be shown that these schools of thought form a basis for an account of *resource dependence management* as well, see Figure 7. Where Mintzberg *et al*. (1998) ask themselves the question: what is the school's perspective on *strategy formation*; the question is here rephrased in: what is the school's perspective on *resource dependence management*.

In the remainder of this section the contribution to the research problem of each of the ten schools of thought will be discussed, guided by five questions summed up in Table 8. The central actors involved in managing resource dependence, shows who (or sometimes what) is the enabler of resource dependence management. With regard to the second question, strategic management literature emphasises the importance of exploring the content, context, and process dimension of strategy (Pettigrew, 1988; 1990). In this research it will be shown that the three dimensions can be applied on resource dependence management as well. Examining multiple levels of analysis – industry, firm and intra-firm level – will provide more insight into how resource dependence management is related at different levels.

Figure 7: Perspective of Ten Schools of thought (Mintzberg et al., 1998) on Strategy Formation and Resource Dependence



The fourth question can be related to strategic renewal and the attitude of the different management levels towards the environment and the implications of this for resource dependence management. The change from a traditional industry to a RRDI implies a dynamic business environment, which makes schools' focusing on stable environments less helpful. The last question is more or less the résumé of the contribution of the previous questions with regard to managing resource dependence. For reasons of simplicity a distinction is made between two possibilities: limited and substantial. The individual schools of thought are discussed in Appendix 2. Table 9 provides an overview of the results.

Table 8 Five questions used to assess the Schools of Thought (Mintzberg *et al.*, 1998)

1. Who is (are) the central actor(s) involved in managing resource dependence?
2. Which strategy dimension does the school contribute to in particular?
3. What is the main level of analysis of the school of thought?
4. Does the school focus on a stable or dynamic environment?
5. To what extent does the school contribute to developing conceptual frameworks to address the research question?

Two examples will be given, the design school and the learning school, to illustrate why the contribution of some schools to the research question is limited and the

contribution of other schools is substantial. The contribution of the design school to the research problem is valued as limited, see Table 9 and Appendix 2. The actor involved in managing resource dependence in the design school is the leader of the firm. Although the design school does pay attention to the external context of the firm, it encounters problems when dealing with changing environments. Strategy formation according to the design school is above all a process of conception rather than as one of learning. Mintzberg *et al*. (1998: 33): "We have already suggested that the premises of the model deny certain important aspects of strategy formation, including incremental development and emergent strategy, the influence of existing structure on strategy, and the full participation of others than the chief executive. In the context of strategic renewal from a traditional towards a recovered-resource dependent industry this is not desirable.

Table 9 Contribution Schools of Thought to Resource Dependence Management

School of Thought	**Central actor (s)**	**Dimension**	**Level of analysis**	**Environment**	**Contribution to resource dependence**
	(1)	(2)	(3)	(4)	(5)
Design	Chief executive (as 'architect')	Content, Context	Firm, Industry	Stable	Limited
Planning	Planners	Content, Context	Firm, Industry	Stable	Limited
Positioning	Analysts	Content, Context	Industry	Stable	Limited
Entrepreneurial	Leader	Content	Management	Stable / Dynamic	Substantial
Cognitive	Mind	Content, Process	Cognitive, management	Stable / Dynamic	Substantial
Learning	Learners (anyone who can learn)	Content, Process	Management	Stable / Dynamic	Substantial
Power	Micro: Anyone with power Macro: whole organisation	Content, Context	Intra-firm and Inter-firm	Stable / Dynamic	Substantial
Cultural	Collectivity	Content, Context	Management	Stable/ Dynamic	Substantial
Environmental	'Environment'	Context	Institutional field, Industry	Stable / Dynamic	Substantial
Configuration	All of above, in context	Content, Context, Process	All of the previous	Stable / Dynamic	Substantial

Source: Column (1), Mintzberg et al. (1998); (2), (3) adapted from Mintzberg et al. (1998); (4) and (5) this research

The contribution of the learning school to the research problem is substantial; see Table 9 and Appendix 2. Contrary to the design school the learning school does recognise incremental development and emergent strategy and moreover at different management levels in the organisation. Mintzberg *et al.* (1998: 208): "The role of leadership thus becomes not to preconceive deliberate strategies, but to manage the process of strategic learning, whereby novel strategies can emerge". According to the learning school anyone in the organisation can learn. Or in the words of Mintzberg *et al.* (1998: 208): "… there are many potential strategists in most organisations". The school is well able to deal with changing environments. Actors involved in managing resource dependence learn how to deal with the new circumstances, which is beneficial in the changing context due to the shift from a traditional towards a recovered-resource dependent industry.

Theories selected and schools of thought

Based on the analysis of the schools of thought (Mintzberg *et al.*, 1998) and from a resource dependence perspective, it appears that each school partially contributes to the research question by illuminating specific aspects, see Table 9. How do the selected theories (see chapter 1) and schools of thought relate? Resource dependence theory belongs to the Power school. Resource-based view of the firm to the cultural Dynamic capability theory and absorptive capacity literature are associated with the learning school and Institutional theory with the environment school. This means that the theories selected belong to four schools of thought with a substantial contribution to resource dependence.

All schools contribute to the content dimension, see Table 10. The power school and environmental school contribute to the context dimension as well. The power and environmental school both contribute to the understanding of the importance of the external context in explaining managerial acting with regard to resource dependence. The importance of internal factors is contributed to by the cultural school. The cultural school shows that a firm's culture can lead to resistance to change the current resource dependence strategy. The learning school also focuses on the inside of the firm; moreover, it contributes to the process dimension and provides insight into the learning processes with regard to managing resource dependence.

Furthermore, the combination of these four schools contributes to research at different levels of analysis. The levels covered range from environmental level (environmental school), inter-firm level (power school), intra-firm (power school, cultural school and learning school) until management level (learning school). Resource dependence theory (Pfeffer and Salancik, 1978) pays attention to the resource dependence instruments that can be used inter-firm and intra-firm. Resource-based view of the firm (Penrose, 1959; Barney, 1986; Wernerfelt, 1984) is usually seen as applicable to firm level,

however, pays attention to intra-firm level, management, as well. Dynamic capabilities will be related to changes in operational routines (cf. Zollo and Winter, 2002). Absorptive capacity deals with knowledge absorption from the environment into the firm. Contributors to new institutional theory (DiMaggio and Powell, 1983) are interested in how institutional pressures lead to isomorphism, and applies therefore to (institutional) field level. Neo institutional theory (Greenwood and Hinings, 1996) pays attention to the dynamic potential of institutional theory to explain adaptation (Lewin and Volberda, 1999) and applies to field and intra-firm level.

Table 10 Contribution of theories to strategy dimension and level of analysis

Theory	Associated with School of Thought (1)	Dominant Dimension (2)	Level of analysis (3)
Resource Dependence theory	Power	Content, Context	Intra- and inter firm
Resource-Based View of the Firm	Cultural	Content	Firm, Management
Dynamic Capabilities / Absorptive Capacity	Learning	Content, Process	Firm, Management
Institutional theory	Environmental	Content, Context	Institutional field

Source: (1) Mintzberg et al., 1998

PREVIOUS PERSPECTIVES ON RECOVERED-RESOURCE DEPENDENT INDUSTRIES

Previous research has been conducted on what is coined here as recovered-resource dependent industries. In this section some of the earlier contributions in journals in the period 1970 until 2004 concerning RRDIs are investigated, most of the writings date from the last decade. As mentioned before, this research focuses on the strategic renewal of RRDIs with a focus on managing resource dependence. The analysis of previous writings will show to what extent the need for adequate resource dependence management in RRDIs is addressed in recent literature. Moreover, the added value of this research in relationship to what was done before is highlighted. The writings are investigated on the criteria summed up in Table 11.

Table 11 Criteria for analysing previous research on recovered-resource dependent industries

1. Which recovered-resource dependent industry does the contribution discuss?
2. Which theoretical lens was applied?
3. What is the topic of the research?
4. What is the research question or purpose of the writing?
5. What is the level of analysis
6. To what strategy dimension does the writing contribute?
7. What research methodology was followed?

The first point of attention is the kind of RRDI that the writing addresses, e.g. aluminium, paper and board, etc. The results will be compared with the approach followed in this writing. In this research a cross-industry analysis is followed in order to investigate the impact of institutional effects on different industries in the same recovered-resource dependence field. The following issues, theoretical lens, the topic of the contribution, and research question or purpose of the writing, are all related to the research question of this research. They help in providing insight into the contribution of the writing to resource dependence management of RRDIs in the context of strategic renewal. Literature emphasises the importance to study multiple levels of analysis (cf. Leventhal, 1995; Lewin and Volberda, 1999; Baden-Fuller, 1995) and the importance to explore the content, context, and process dimension of strategy (Pettigrew, 1990; Pettigrew, 1988). In this research both issues are addressed. The selected previous writings are evaluated in these issues as well. The last issue to which attention is paid is the research methodology. The different research methodologies will be investigated and the chosen research approach in this research will be set out. The different questions presented in Table 11 will now be discussed in more detail. Table 12 presents an overview of the results.

The writings are arranged in chronological order from oldest to recent and vary from theoretical contributions about the recycling industry in general (Conrad, 1999) to the combination of theoretical and empirical contributions in different industries: metals recycling (Ayres, 1997; Martin, 1982), End-of-life vehicles (Orsato et al., 2002), paper and board recycling (Glassey and Gupta, 1974; Ibenholt and Lindhjem, 2003; Zhu and Buongionno, 2002; Baumgärtner and Winker, 2003). In none of the contributions is a cross-industry analysis followed in order to obtain insight into performance differences between different industries playing in the same field.

Table 12 Theoretical Perspectives on RRDIs

Author	Industry	Lens	Topic	Research question/ purpose	Level of analysis	Strategy Dimension	Methodology
Glassey and Gupta (1974)	Paper and Board Recycling	Technical	A linear programming analysis of paper recycling	Aim: Estimate of the maximum feasible recycling rate given the current state of pulp and paper technology.	Industry	Content	Linear programming analysis. Construction of a flow model based on three processes: paper production, consumption and waste paper recovery. Description of processes
Martin (1982)	Aluminium Recycling	Economic	Monopoly power and the recycling of raw materials	What is the impact of recycling on the industry output and the price of the product?	Industry	Content	Application of leader-follower model Case comparison
Ayres (1997)	Metal recycling	Institutional Economic	Metals recycling: economic and environmental implications	What are the factors influencing recycling behaviour?	Industry	Content Context	Description situation metal recycling industry and developments. Attention for institutional, economic and technical aspects.
Conrad (1999)	Recycling industry in general	Economic	Resource and waste taxation in the theory of the firm with recycling activities	Show how prevention, recycling and disposal of waste could be part of the theory of the firm	Industry	Content	Comparative static analysis. Comparison of flow models.

Table 12 Theoretical Perspectives on RRDIs (continued)

Author	Industry	Lens	Topic	Research question/ purpose	Level of analysis	Strategy Dimension	Methodology
Orsato, et al. (2002)	End-of- life vehicles in Europe and in Germany, France and Italy in particular.	Institutional, Political	The Political Ecology of Automobile Recycling in Europe	- Providing more political perspectives in environment-related research. - Developing research that integrates organizational and field-level analysis - Contributing to a more politically charged institutional theory.	Firm and industry	Content Context Process	Application of existing framework Longitudinal case studies. Description of development ELV directive in three different countries with attention for organisations and environment. Semi-structured interviews Document analysis
Zhu and Buongiorno (2002)	Paper recycling in the USA	Economic	International impact of national environment policies	What is the potential effect of environmental policies in the United States on the international competitiveness of other countries?	Cross country	Context	Scenario planning. Two cases are discussed. Evolution of US waste paper utilisation 1998 to 2010: (1) continuation of past trends, (2) 10% increase in utilisation of waste paper in 2010. relationship to price of recovered paper and influence on wood pulp and prices

Table 12 Theoretical Perspectives on RRDIs (continued)

Author	Industry	Lens	Topic	Research question/ purpose	Level of analysis	Strategy Dimension	Methodology
Baumgärtner and Winkler (2003)	German recovered paper market	Institutional, Economic, Market forces	Price ambivalence of waste paper in Germany with attention for markets, technology and environmental regulation	What are the determinants of the price ambivalence in the German waste paper market?	Country level. Focus two low quality waste paper grades.	Context	Case study German waste paper industry. Attention for development paper and board production and waste paper consumption with focus on environmental policy, regulatory institutions, market forces, and technology
Ibenholt and Lindhjem (2003)	Paper and Board Recycling, Norway	Economic	Costs and benefits of recycling liquid board containers	Is the Norwegian recycling policy for liquid board containers really cost-effective?	Industry	Context Content Process	Cost benefit analysis: valuing the environment, valuing time in use, Marginal environmental cost of energy production, counting domestic costs and benefits only

Lenses applied in previous research

With regard to the lens applied in the previous writings, the three main groups of lenses that can be distinguished are (1) economic: Conrad, 1999; Ayres, 1997; Martin, 1982; Ibenholt and Lindhjem, 2003; Zhu and Buongiorno, 2002; (2) institutional: Ayres, 1997; Orsato et al, 2002; Baumgärtner and Winkler, 2003; and (3) Technical (Ayres, 1997; Glassey and Gupta, 1974; Baumgärtner and Winkler, 2003). Note that none of the writings follows a resource dependence perspective.

Economics

Conrad (1999) distinguishes three strands of flow models in the current literature with an economic character: (1) Economic models of exhaustible resources, which investigate the interaction of stocks and flows of natural resources including those of recyclable resources. (2) Linear programming models taking into account the costs and benefits of alternative recycling process. (3) Public policies that encourage recycling in order to reduce environmental costs from waste disposal. Policies meant here are e.g. taxes on the use of virgin material, deposit/refund programmes. The point of departure for Conrad's flow model (1999) is neoclassical theory of production which assumes production to be efficient. In his paper he shows how prevention, recycling and disposal of waste could be part of a theory of the firm. He uses a dual cost model. Reusing waste as a resource will reduce the amount of virgin resources necessary for the production. Waste that is not recyclable will leave the firm as disposal which also entails costs to the firm. To enhance the recycling rate, the government can put taxes on exhaustible resources or on waste. In a comparative analysis tax on virgin material appeared to be a more preferable instrument compared to a tax on waste.

Ayres (1997) addresses the question regarding what factors influencing metal recycling behaviour. Here the economical determinant will briefly be discussed. From an economy of scale perspective primary mining and smelting complexes have been favoured over the smaller and less centralized recyclers for a long time. However, a shift is taking place due to factors as availability (depletion of natural resources), public awareness about waste, sustainability and government policies which promote the use of secondary resources over virgin materials.

Martin (1982) discusses the impact of recycling on the industry output and the price of aluminium. He argues that 'In general, recycled raw materials require a smaller net input of other basic resources, such as energy, than do the original primary materials. As a consequence the long run cost trends seem to favour an ever higher use of secondary materials over primary materials' (1999: 405). Martin investigates the welfare implications of a monopolist confronted by an independent and competitive secondary materials sector.

He refers back to the Aluminium Company of America (Alcoa) case of 1945 where a judge ruled that Alcoa did constitute an illegal monopoly under the law since it ultimately had control of the secondary ingot sector through the stock of scrap aluminium. Martin considers a long run stationary model with varies forms of vertical integration by the monopolist in his paper in which five separate cases of integration are analysed. It is demonstrated that the consumer will always benefit from the presence of recycling if the scrap recovery sector is independent.

Ibenholt and Lindhjem (2003) focus on the recycling of a particular issue of the packaging industry: liquid board packaging in Norway. The authors argue that recycling of packaging material has become more or less mandatory in many European countries. Norway is a special case as in this country a system exists for separate collection of liquid board containers. The authors investigate the cost-effectiveness this liquid board container recycling using a cost benefit analysis. The authors argue that because the liquid board containers constitute only a small fraction of the total waste from household they are costly to separate. Cheaper options are land filling or incineration and the best alternative according to the authors is to incinerate the containers with energy recovery.

The last economic contribution discussed here is from Zhu and Buongiorno (2002). Using a global forest products model (GFPM) they make predictions about the impact of environmental policies in the United States on the international competitiveness of other countries. The production, imports, exports, and prices of forest products in different countries were predicted from 1998 to 2010 using two scenarios. One based on continuation of past trends, the other based on ten per cent higher recovery and utilisation of 'waste' paper. Their conclusion is that world prices of paper would decrease and demand would decrease. The United States and other major consuming countries would register total welfare gains, while Canada and the main European producers would lose.

Institutional

Ayres' (1997) economic perspective was discussed before but in his analysis there is also room for the influence of the government on the recycling of metals. In the 'cowboy economy' '… exploitation of cheap and readily available extractive resources, and use (or misuse) of the environment was a free good (1997: 170). But Ayres (1997) argues that there will come a change and 'the principal driver of change in the mining and metallurgical processing sectors in coming decades will be environmental problems' (1997: 148). Ayres (1997) mentions that a shift may occur by gradually reducing taxes on labour and increasing taxes on extractive resources.

The paper of Orsato et al. (2002) addresses the relationship between organisations and the natural environment. The central question in their article is what should be done with vehicles at the end of their lives in order to minimize hazardous waste and landfill.

The evolution of the end-of-life-vehicles issue is described in three different European countries and the authors map the different actors that exerted power during this evolution. This means that in a way they pay attention to resource dependence management, as resource dependence theory is concerned with how organisations can become less dependent on other organisations. It appears that regulation as well as economic influences played a role. The authors aim to provide more political perspectives in environmental-related research, and to contribute to a more politically charged institutional theory. They use a framework proposed by Orssatto and Clegg (1999) for analyzing a specific business-environment relationship issue. 'The analysis emphasizes that relationships between auto-makers and regulators, as well as between the various industrial parties, are deeply embedded in the circuitry of power in an organizational field. Technical information – normally used with claims of neutrality – assumes non-technical dimensions and is used as a political stake' (2002: 662).

Baumgärtner and Winkler (2003) examine the price ambivalence of low quality recovered paper grades on the German market by paying attention to three explaining variables: economic market forces, production technology and environment legislation. 'As a result of waste management legislation the supply of waste paper is mostly independent of its price and its demand. Supply is bounded from below by collection and utilization of quota's fixed by the Regulation on Packaging Waste enacted in 1991. … The only alternative to costly disposal of waste by dumping or incinerating is its use as a secondary resource in the production of new paper, as only the paper industry is capable of using waste paper in a productive manner in a significant amount. … its use as a substitute for primary inputs is technically limited' (2003: 183).

Technical

Glassey and Gupta (1974) construct a model for the production, use, and recovery of paper and related products made from wood fibre. In the model three main processes are distinguished: paper production, consumption and waste paper recovery. Further they pay attention to the types of paper for production, the types of waste paper and sources, the minimum virgin pulp requirements and more. With the model they want to give an answer to the following questions: (1) What is being done at present – how much paper is being recycled and from what sources? (2) Given the present paper making technology, how much paper can easily be recycled? (3) What could be done in order to increase the quantity of paper being recycled

The answers produced by the model unfortunately concern data from around 1970. Since this time many developments have taken place which means they are not representative for the current situation.

Level of analysis applied in previous research

The levels of analysis in most of the selected contributions concerns industry level. Conrad (1999) pays attention to firm level in his model as well. Orsato et al. (2002) establish a link between organizational and field-level factors. Zhu and Buongiorno (2002) use a cross country level by analysing the impact of environmental policies in the United States on the international competitiveness of other countries. Baumgärtner and Winkler (2003) focus on one country while analysing price ambivalence. In this research a multi-level approach will be followed. This offers the opportunity to investigate the impact of contextual forces and changes at different levels of analysis and the implications of these at firm and managerial level.

Strategy dimensions applied in previous research

The dominant dimension applied in previous research is the content dimension. Two recent articles of Zhu and Buongiorno (2002) and Baumgärtner and Winkler (2003) dominantly contribute to the context dimension. Only two writings contribute to all three strategy dimensions. Orsato et al. (2002) pay attention to content, context, and process level and so do Ibenholt and Lindhjem (2003). The number of multi-dimension approaches, as followed in this research, is limited.

Methodological approach followed in previous research

The methodology of selected contributions can be divided into three main methodological approaches. Simulation models, Case study, and Cost-benefit analysis. Conrad (1999) uses a flow model to show how prevention, recycling and disposal could be part of a theory of the firm. Martin (1982) uses a leader-follower model to investigate the factors influencing the impact of recycling on the industry output and the price of the product and applies it to five different cases in his work. Glassey and Gupta (1974) make use of linear programming analysis for the construction of flow model that is able to estimate the maximum feasible recycling rate. Zhu and Buongiorno (2002) make use of a global forest products model, and use it to investigate the influence of a paper recycling apply increase in the United States on other countries in the world. They use two different scenarios. The first assumes a continuation of past trends. The other expects a 10% higher utilisation and collection of by 2010.

Ayres (1997) describes the developments in the metal recycling industry with attention for different influencing factors, economical and institutional. Orsato et al. (2002) describe the evolution of the end-of-life vehicle issue in Germany, France and Italy and differentiate between different motivators. They make use of an existing framework (Orsato and Clegg, 1999) to analyse the business-environment relationship. Baumgärtner and Winkler (2003) describe the German recovered paper industry with special interest for the

motivators of price ambivalence (production technology, economic market forces, and environmental legislation).

Ibenholt and Lindhjem (2003) finally make use of a cost-benefit analysis to investigate the cost effectiveness of the Norwegian recycling policy regarding liquid board containers. 'Cost benefit analysis (CBA) is a straightforward economic evaluation method. It has its theoretical foundation in welfare economics and determines the net benefits (the contribution to welfare) of a project/policy by comparing its social costs and benefits. The main criterion for evaluation is economic efficiency, i.e. that a given policy objective is achieved at least costs' (2003: 303).

Findings previous research

The findings based on the analysis of previous research are presented in Table 13. It appears that most of the writings concerning RRDIs are single lens approaches. They mainly concern three lenses: economic, institutional, and technical. The economic perspectives show how recycling can be part of the theory of the firm (Conrad, 1999), investigate the influence of increased recycling on prices elsewhere (Ayres, 1997; Zhu and Buongiorno, 2002), or analyse the efficiency of current recycling policies (Ibenholt and Lindhjem, 2003). The institutional contributions analyse the influence of regulation on the industry (Ayres, 1997; Orsato et al., 1997) or prices the prices of a product in special cases (Baumgärtner and Winkler, 2003). The technical contribution is interested in the maximum feasible recycling rate. A *resource dependence* approach, the dominant paradigm of this research, making use of multiple lenses and with attention for factors influencing the strategies enabling the reduction of resource dependencies in the context of strategic renewal has not been applied yet.

The level of analysis has mostly been quite broad industry level or country level. Orsato et al. (2002) also have attention for the link between firm behaviour and the environment. In other words, contributions that provide insight how the different levels of analysis interact with each other are limited. From a resource dependence perspective this kind of research is desirable because multiple levels of analysis will provide insight into the impact of the external context and internal context on firm's resource dependence actions.

The dominant strategy dimensions addressed in previous research is content level but on a more limited level the context dimension is addressed as well. Two of the investigated writings contribute to three dimensions (Orsato et al., 2002 and Ibenholt and Lindhjem, 2003).

Table 13 Findings regarding previous research on RRDIs and under-researched areas

Criterion	Findings	Under-researched areas
Theoretical lens	Most writings are single lens approaches: economic, institutional, and technical.	Resource dependence perspective Multiple lens approach
Level of analysis	Mostly industry level	Multi-level comparative analysis Attention for management
Strategy dimension	Dominant dimension is content dimension. Context and process dimension are limited addressed.	Multi-dimension approach
Research methodology	Simulation models, Case study, and Cost-benefit analysis	Research contributing to process dimension Research providing insight into resource dependence instruments employed by firms. Research providing insight into managerial challenges related to RRDIs

In previous research simulation models, case study, and cost-benefit analysis were applied. Seeing the research problem with a focus on strategic renewal and resource dependence of RRDIs, it was decided not to choose an approach with simulation models or cost-benefit analysis. However, the case study method will be followed, longitudinal, comparative and in-depth. Furthermore a strategic renewal analysis, as proposed by the Erasmus Strategic Renewal Centre, is conducted to compare the renewal of six incumbent firms in the paper and board industry. This combination will provide insight into: the context in which resource dependence strategies emerge; the content of resource dependence management by analysing the resource dependence instruments employed; the process dimension, and strategic renewal, is addressed by investigating the development of incumbent firms in RRDIs over time.

DISTINGUISHING EXTERNAL AND INTERNAL FACTORS INFLUENCING RECOVERED-RESOURCE DEPENDENCE MANAGEMENT

This section partly investigates the research problem: "In the context of the transition from a traditional towards a recovered-resource dependent industry, how do internal and external factors influence incumbent firms' strategic renewal enabling the use of resource dependence instruments in order to manage recovered-resource dependence?", by focusing on *internal* and *external* factors influencing incumbent firms' resource dependence. In the next chapter a conceptual managerial framework is suggested (see

Figure 11) that provides insight into the relationship between internal factors, external factors, strategic renewal, resource dependence instruments, and recovered-resource dependence management.

In chapter 1 several internal and external factors influencing resource dependence and strategic renewal were briefly mentioned when the difference between resource dependence management and recovered-resource dependence management was discussed, see Figure 3. In the following sections of this chapter the five theoretical perspectives described in chapter 1 (Table 4) and issues related to characteristics of factor and product markets will be discussed as explanatory constructs associated with internal and external factors influencing resource dependence management, see Table 14.

Table 14 Theories and constructs associated with internal and external factors influencing RRDFs' resource dependence management

Theories and constructs associated with internal factors influencing RRDFs' resource dependence management	**Theories and constructs associated with external factors influencing RRDFs' resource dependence management**
Resource dependence theory: - Resource dependence instruments *Resource-based view of the firm*: - Management *Dynamic capability theory*: - Dynamic capabilities *Knowledge-based view of the firm (absorptive capacity)*: - Prior related knowledge - Organisation form - Combinative capabilities	*Resource dependence theory*: - External context *Institutional theory*: - Legislation *Characteristics of factor and product markets*: - Technological developments - Resource recycling characteristics - Costs recovered resources - End-use markets - Regional scope

Resource dependence theory (Pfeffer and Salancik, 1978) is the dominant theoretical perspective in this study and is the first theoretical perspective that will be discussed. Resource dependence theory is associated with *internal* as well as *external* factors. The external factors are addressed by providing insight into the importance of understanding the industry environment, in order to understand the behaviour of an organisation. The internal factors are addressed by resource dependence theory by providing multiple resource dependence strategies to influence resource dependence. The resource dependence instruments are a means to reduce resource dependence, or to become less dependent on the context. In this research a distinction is made between intra-firm, inter-firm and institutional field resource dependence instruments.

Resource-based view of the firm, dynamic capabilities theory, and the knowledge-based view are all related. These are associated with an internal perspective and management and knowledge plays an important role. Resource-Based View of the firm (Penrose, 1959) looks at the inside of the firm, and management in special to explain firm's performance. Penrose (1959) argues that management is at the same time the enabler and limitation of the growth of the firm. As mentioned before, this study is interested in the renewal of incumbent firms due to the shift from a traditional towards a recovered-resource dependent industry; a changing industry environment. Dynamic capability theory (Teece et al., 1997; Eisenhardt and Martin, 2000; Dosi et al., 2002) contributes to an internal perspective and argues that firms must develop dynamic capabilities to deal with (rapidly) changing environments. Representatives of the knowledge-based view discuss the issues related to knowledge processes in the firm and the internalisation of knowledge as a means to improve firm's performance (Cohen and Levinthal, 1989, 1990; Van den Bosch et al., 1999; Jansen et al., 2005).

The following constructs that will be discussed are associated with *external* factors influencing resource dependence. Institutional theory is the last theory-driven lens that will be discussed in this chapter as an external explanatory construct. Institutional theory is diverse and has many aspects (Scott, 1987). This study focuses on isomorphism and the role of legislation on industry performance (DiMaggio and Powell, 1983; Scott, 2001). The last set of external explanatory constructs is not theory-driven but can influence recovered-resource dependent firms' resource dependence as well. They are here referred to as "characteristics of factor and product markets", for they are all somehow related to factor and product markets (Barney, 1986). The characteristics of factor and product markets that will be discussed are the following: Technological developments, resource recycling characteristics, cost of recovered resources versus the costs of virgin resources, composition of the end-use markets, and regional scope. Each of the theories and constructs associated with internal and external factors influencing recovered-resource dependent firms' resource dependence management will now be discussed in more detail.

RESOURCE DEPENDENCE THEORY

Resource Dependence theory (Pfeffer and Salancik, 1978) is the first theoretical perspective that will be discussed in more detail and, for reasons that will be discussed later in this section, and is also the theory this study focuses on. Resource Dependence theory in this research builds on '*The External Control of Organizations*' by Pfeffer and Salancik (1978) which has three central themes, see Table 15. The first theme is that in order to understand the behaviour of an organisation one must understand the context of that behaviour – that is, the ecology of the organisation. The second theme is that organisations

can do something about their constraints emerging from their situations and environment. Or as it was phrased in the introduction to the classic edition, '… organizations will attempt to manage the *constraints* and *uncertainty* that result from the need to acquire resources from the environment' (Pfeffer and Salancik, 2003: xxiv, italics added). The third theme is that to understand both intraorganisational and interorganisational behaviour one must understand the importance of power. In this research the emphasis is on the first and the second theme.

Table 15 Three central themes in "The External Control of Organizations" (Pfeffer and Salancik, 1978)

Theme 1	To understand the behaviour of an organisation it is required to understand the context of that behaviour
Theme 2	Organisations can do something about the constraints emerging from their environment
Theme 3	In order to understand both intra-organisational and inter-organisational behaviour one must understand the importance of power

Source: Pfeffer and Salancik, 2003: xi-xiv

Theme 1: External Influences Constraining the Firm

Pfeffer and Salancik (2003, xi) regard the first theme as 'perhaps the most central' theme in their book. This is also expressed in the title of the book, '*The External Control of Organizations*'. What is the 'External' that controls organisations? Pfeffer and Salancik phrase it as follows.

> *'The key to organizational survival is the ability to acquire and maintain resources. This problem would be simplified if organizations were in complete control of all the components necessary for their operation. However, no organization is completely self-contained. Organizations are embedded in an environment comprised of other organizations. They depend on those organizations for the many resources they themselves require. Organizations are linked to environments by federations, associations, customer-supplier relationships, and a social-legal apparatus defining and controlling the nature and limits of these relationships. Organizations must transact with other elements in their environment to acquire needed resources, and this is true whether we are talking about public organizations, private organizations, small or large organizations, or organizations which are bureaucratic or organic'(1978: 2).*

This shows that the firms depend on other organisations to survive, but to what extent does the "External" control a firm? What makes a firm vulnerable to extra-organisational influences? Which determinants ensure that firm's are dependent on others? Pfeffer and Salancik (1978: 51) summarise the answer as follows:

> *'Concentration of the control of discretion over resources and the importance of the resources to the organisation together determine the focal organisation's dependence on any given other group or organisation. Dependence can than be defined as the product of the importance of a given input or output to the organization and the extent to which it is controlled by a relatively few organizations'.*

In the remainder of this paragraph the reasoning behind this argument will be explained. To understand why dependence occurs, Pfeffer and Salancik (1978) introduce the construct *interdependence*. 'Interdependence exists when one actor does not entirely control all of the necessary conditions necessary for the achievement of an action or for obtaining the outcome desired from the action' (1978: 40). Then they relate interdependence to dependence. Pfeffer and Salancik discuss three issues that play a role in this: (1) the importance of a resource exchange for the firm, (2) discretion over resource allocation and use, and (3) concentration of resource control.

The importance of a resource exchange for the firm

The importance of a resource has two, not completely independent, dimensions. Both the *magnitude* as well as the *criticality* of the resource plays a role. With regard to the magnitude dimension, a firm can be thought of as operating between a factor market and a product market, (Barney, 1986), see also further chapter 3. At the output side (product market), a firm that produces just one product or service is more dependent on its customers than a firm that produces a variety of products which are disposed of in a variety of markets. At the input side (factor market), a firm that utilises one specific resource for its operations, or production processes, will be more dependent on its resource suppliers than organisations that use multiple kinds of resources in smaller amounts.

Criticality, the other dimension of importance, '… measures the ability of the organisation to continue functioning in the absence of the resource or the absence of the output' (Pfeffer and Salancik, 1978: 46). For single-material organisations, the input is by consequence critical. But a resource that comprises only a small part of the total input necessary for the operations can also be critical. The importance of a resource – magnitude and criticality – on its own need not be problematic for a firm. Pfeffer and Salancik (1978) phrase it as follows. 'Organizational vulnerability derives from the possibility of an

environment's changing so that the resource is no longer assured. Forms of organization which require scarcer resources , for which acquisition is more uncertain, would be less likely to survive than those that require resources in more stable and ample supply' (Pfeffer and Salancik, 1978: 47).

Discretion over resource allocation and use

The second aspect, discretion over resource allocation and use, i.e. 'the capacity to determine the allocation or use of the resource' (Pfeffer and Salancik, 1978: 48), plays an important role too. Discretion over resource allocation and use is a major source of power, especially when it concerns a scarce resource. Discretion over resources can be achieved in various ways. Firms can possess resources or if not, have access to resources. One of the valuable resources Pfeffer and Salancik (1978) mention with regard to possession is knowledge. In the context of this research this can for example be knowledge about which resource dependence instruments to use in changing environments.

Access to a resource is also a means of control. Pfeffer and Salancik give the following example, 'an executive secretary gains considerable power from the ability to determine who is permitted access to the boss' (Pfeffer and Salancik, 1978: 48). Discretion over resources also depends also on who is the owner and who is in control of the resource. 'It is possible for a resource to be used by other than the owners, in which case the users have some measure of control over the resource' (Pfeffer and Salancik, 1978: 48). Municipalities for example may collect recovered resources which are consumed by recovered resource consuming companies. This gives the municipalities a means of control over the recovered resource buyers. The final source of control is the following. If firms have the ability to control the use of them or have the ability to make rules to control the use this also positively influences firm's discretion over resources. An example of this is management active lobbying in committees to promote their stake in new legislation.

Concentration of resource control

About the last aspect with regard to interdependence, concentration of resource control, Pfeffer and Salancik (1978: 51) write: '… regardless of how important the resource is, unless it is controlled by relatively few organisations, the focal organisation will not be particularly dependent on any of them. When there are many sources of supply or potential customers, the power of any single one is correspondingly reduced'. In other words, the extent to which input or output transactions are made by relatively few, or only one, significant organisations also matters. The important thing is whether the focal organisation has access to the resource from additional sources. There are many rules and regulations that can restrict access despite the availability of alternatives.

In the ten schools of thought (Mintzberg et al., 1998) resource dependence theory was placed under the political school which is associated with power. According to Pfeffer and Salancik (1978), power comes forth from an asymmetry in the exchange relationship, which exists when the exchange is not equally important to both organisations. When two firms have agreed upon an exchange relationship and these two firms differ in size, for the larger firm this will be a smaller part of the sum of exchanges than for the smaller firm. This gives the larger firm a power advantage over the smaller firm.

The aforementioned three 'determinants of dependence' together mean that firms are more or less dependent, or put differently, suggests that firms are vulnerable to extra-organisational influences. Table 16 provides a summary of the discussion so far. It will now be set out what resource dependence instruments can be employed to reduce a firm's resource dependence.

Table 16 Determinants of Dependence and Basis of Dependence

Determinants of Dependence	**Basis of Dependence**
Importance of a resource exchange for the firm	Relative magnitude of exchange Criticality of resource
Discretion over resource allocation and use	Possession Access to resource Ability to control the use of a resource Ability to make rules or otherwise regulate the possession, allocation, and use of resources and to enforce the regulations
Concentration of resource control	The extent to which input or output transactions are made by a relatively few, or only one, significant organisations

Source: from Pfeffer and Salancik, 1978: 46-51

Theme 2: Managing Constraints and Uncertainty, Resource Dependence Instruments

The fact that organisations are not self-contained but embedded in an environment comprised of other organisations and depend on those organisations for the resources they themselves require need not be problematic, as long as supply of resources is assured, and uncertainty foreseeable. Moreover, resource dependence theory is not deterministic; firms can influence their dependencies. Pfeffer and Salancik (1978) extensively discuss a multitude of resource dependence instruments that can be used in different contexts to cope with external constraints. Analogue to the previous part, these will here be related to the three dependence determinants distinguished by Pfeffer and Salancik (1978: 51), i.e. the

importance of a resource exchange for the firm, discretion over resource allocation and use, and concentration of resource control.

Table 17 provides an overview of the resource dependence instruments that can be used to influence the different determinants of dependence and the basis of dependence. After the overview, the resource dependence instruments are discussed in more detail.

Table 17: Determinants of Dependence, Basis Dependence and Resource Dependence Instruments

Determinants of Dependence	**Basis of Dependence**	**Resource Dependence Instrument which can be used to influence basis dependence**
(1)	(2)	(3)
Importance of a resource Exchange for the firm	Criticality of resource	Inventories
	Relative magnitude of exchange	Substitute resources Diversification - Entering different lines of business - Merger/Acquisition
Discretion over resource allocation and use	Possession/ ownership/ ownership rights	Vertical Integration: - Merger/Acquisition
	Access to resource	Vertical Integration: - Merger/Acquisition - Joint venture Long-term contracts
	Ability to control the use of a resource	Cooptation Social Coordination
	Ability to make rules or otherwise regulate the possession, allocation, and use of resources and to enforce the regulations	Influence and use of regulation
Concentration of resource control	The extent to which input or output transactions are made by a relatively few, or only one, significant organisations.	Horizontal integration: - Mergers/Acquisitions - Joint venture Growth Anti trust suits

Source: (1), (2), (3) from Pfeffer and Salancik, 1978: 46-51

Importance of a resource exchange for the firm

If a firm is to a high degree dependent on the supply of a particular resource, resource dependence theory suggests that a firm finds ways to make it less important. This can be done in several ways. An organisation can buffer itself against instability. Buffering does not replace the basis of vulnerability, however, it reduces uncertainty. Buffering can

occur via inventories, oil stocks in Europe for example are at least 90 days. 'Generally, the more unstable the source of supply, the larger the inventory must be' (Pfeffer and Salancik, 1978: 108).

More dramatic ways to diminish the resource importance are altering the structure and purposes of the focal firm so that it no longer requires only a limited range of inputs. This can be achieved by the development of substitute exchanges (gas/oil), and diversification into different lines of business. Diversification buffers the organisation against the potential effects of dependence by putting the organisation into another set of relationships that are presumably different.

Diversification can be achieved by merging with another firm '…which is neither in the same business nor in a direct exchange relationship with it. A firm dependent on a signal, critical exchange can reduce its dependence on any single exchange through diversification by engaging in activities in a variety of different domains' (Pfeffer and Salancik 1978: 115).

Discretion over resource allocation and use

Four different bases of dependence can be influenced in order to get more discretion over resources. These are (1) possession, (2) access to the resource, (3) ability to control the use of a resource, and (4) ability to make rules or otherwise regulate the possession, allocation, and use of resources and to enforce the regulations.

The first option to get more discretion over resources is possession, in other words, buying the source of dependence. This is achieved by vertical integration. Pfeffer and Salancik (1978) argue that *vertical* integration represents a method of extending organisational control over exchanges vital to its operation. Means of vertical integration that can be used are mergers and acquisitions. Pfeffer and Salancik (1978) approach these as similar and limit themselves to discussing mergers. Pfeffer and Salancik argue that a merger '… is a mechanism used by organizations to restructure their environmental interdependence in order to stabilize critical exchanges' (1978: 115). Companies may merge vertically, forward or backward, in the production process in an attempt to deal with symbiotic interdependence, "or the mutual dependence between unlike organisms" (Pfeffer and Salancik, 1978: 114).

Vertical integration in the form of mergers and acquisitions changes the possession of resources but is at the same time a means to get access to resources vital to the organisation. Another way of vertical integration is via joint ventures or alliances. Pfeffer and Salancik (1978) only discuss joint ventures. A joint venture refers to the creation of a new organisational entity by two or more partner firms (Boyle, 1968), and can be analysed from the perspective of uncertainty reduction (Pfeffer and Salancik, 1978). 'If the joint venture is created in the same industry as the parent firms, it is unlikely that it will compete

with them. Further, executives from the parent firms will be jointly involved in making decisions on pricing and production policies. It has been judicially recognized that in such a setting, the zeal of competition if it existed among the parent organizations may well be reduced' (Pfeffer and Salancik, 1978: 153). Long-term contracts are another mean to reduce uncertainty, and get access to a resource, for a mutually agreed period. Long-term contracts have the advantage that the capital necessary to get more discretion over the resources is low.

Pfeffer and Salancik (1978) present cooptation as a mean to control the use of a resource. The idea behind this resource dependence attribute is that '… members of the controlling organisation are invited to participate in various activities of the vulnerable organisation, to sit on the board of directors, advisory panels, and so forth. The aim of bringing in potentially hostile outsiders is to socialize them and to commit them to provide assistance to the focal organization' (Pfeffer and Salancik, 1978: 110). Social coordination of interdependent actors is a possible mean for influencing the ability to control the use of a resource as well. 'Coordinating has the advantage of being more flexible than managing dependence through ownership. Relationships established through communication and consensus can be established, renegotiated, and re-established with more ease than the integration of organisations by merger can be altered. The disadvantage of these less complete absorptions of interdependence is the less than absolute control it provides over the other organizations' (Pfeffer and Salancik, 1978: 144).

The last of the bases of dependence that can be influenced to enhance the discretion over resources is the ability to makes rules or otherwise regulate the possession, allocation, and use of resources and to enforce the regulations. Firms can act as political actors and influence the environment in which they are active. Or to use the words of Pfeffer and Salancik, '… organizations are not only constrained by their environments but … law, legitimacy, and political outcomes somewhat reflect the actions taken by organizations to modify their environments for their interests of survival, growth, and certainty. Rather than taking the environment as a given to which the organization than adapts, it is more realistic to consider the environment as an outcome of a process that involves both adaptation to the environment and attempts to change that environment' (1978: 222). Firms can influence regulation by actively representing their interest when taking part in organs where decisions about future policies are being made.

Concentration of resource control

Many of the adaptations which interdependent organisations undertake focus on diminishing the control of others or on obtaining control for the focal organisation. According to Pfeffer and Salancik (1978) *horizontal* expansion represents a method for attaining dominance to increase the organisation's power in exchange relationships and to

reduce uncertainty generated from competition. Mergers and acquisitions not only control asymmetrical interdependence by absorbing it, but also make the surviving organisation more powerful since it now possesses more resources and more resource control itself. Concentration of control can also be eliminated through antitrust suits.

Organisations that are large have more power and leverage over their environments. They are more able to resist immediate pressures for change and, moreover, have more time in which to recognise external threats and adapt to meet them. Growth enhances the organisation's survival value by providing a cushion, or slack, against organisational failure. Large organisations also develop larger sets of groups and organisations interested in their problems with willingness to assist in survival. For even interest groups making demands on large organisations are better off with the survival of the organisation than without it. Growth may make the organisation more dependent on its environment rather than less. But these new interdependencies can be, in turn, addressed, and in general, growth provides the ability for the organisation to deal with its interdependence with the environment by absorbing portions of the interdependence and developing additional power with respect to those other organisations with which it is interdependent.

Resource Dependence Instruments and Level of Analysis

As mentioned before, this study follows a multi-level approach. Depending on the resource dependence instrument, different levels of analysis are involved in managing resource dependence. A distinction is made between intra-firm resource dependence instruments, inter-firm resource dependence instruments, and institutional field resource dependence instruments, see Table 18. Intra-firm resource dependence instruments mainly influence the importance of the resource and concern inventories, substitute resources, and entering different lines of business.

The most effective mean to reduce resource dependence is influencing the 'importance of a resource exchange'. Although substitute resources and entering different lines of businesses could be regarded as inter-firm resource dependence instrument as well, for they change the relationship between firms. The importance of a resource determines how long a firm can continue to survive without that resource. When a resource is no longer important for the firm, the dependence no longer exists. This, however, is not always possible. When a firm needs the resource anyway it will apply means to get more discretion over resource allocation and use and apply instruments that influence the concentration of resource control. Influencing the discretion over resource allocation and use does not diminish the dependence on the resource but offers more security to get the resources that are needed.

Examples of inter-firm resource dependence instruments are mergers, acquisitions, and joint ventures. They can be executed in the form of diversification, vertical integration, and horizontal integration. Also long-term contracts, cooptation, and social coordination are regarded as inter-firm resource dependence instruments. Institutional field resource dependence instruments finally concern legislation formation in RRDIs, examples anti trust suits and influence and use of legislation in other ways.

Table 18 Resource dependence instruments and level of analysis

Resource Dependence Instrument (1)	**Level of Analysis** (2)	**Determinant of Dependence** (3)
Inventories	Intra-firm	Importance of resource exchange
Substitute resources	Intra-firm	Importance of resource exchange
Diversification: Entering different lines of business	Intra-firm	Importance of resource exchange
Organic growth (Growth other than via merger, alliance, acquisition)	Intra-firm	Discretion over resource allocation and use
Diversification: Merger/Acquisition	Inter-firm	Importance of resource exchange
Vertical Integration	Inter-firm	Discretion over resource allocation and use
Long-term contracts	Inter-firm	Discretion over resource allocation and use
Cooptation	Inter-firm	Discretion over resource allocation and use
Social Coordination	Inter-firm	Discretion over resource allocation and use
Horizontal integration	Inter-firm	Concentration of resource control
Influence and use of regulation	Institutional field	Discretion over resource allocation and use
Anti trust suits	Institutional field	Concentration of resource control

Source: (1) see Table 17, (3) from Pfeffer and Salancik (1978)

Resource Dependence and Vertical Integrated Firms

In order to increase the understanding of the challenges of resource dependence management in recovered-resource dependent industries, the industry will now be regarded as comprised of *interrelated vertical integrated firms*. After this, the place of resource dependence instruments in the vertical integrated model will be illustrated.

Pfeffer and Salancik (1978) emphasise the importance to investigate the context of an organisation in order to understand its behaviour (theme 1, Table 15). Barney's (1986) concept of factor and product markets was chosen to provide more insight into the context and illustrate that there are different players that compete for resources in the same market, see Figure 8. By regarding the industry as vertically integrated interdependencies become more obvious. Not only do they compete for the same resources, they are also together responsible for the performance (recycling rate) of the industry. The flow model of a vertical integrated RRDI is as follows. Recovered-resource dependent firms (RRDFs)

purchase virgin and recovered resources at a factor market. In the firms these resources are, with use of human resources, transformed into semi-finished goods and sold at a product market. This semi-finished good product market is a factor market for the end product producing firms – which can be an other semi-fabricated good producing firms as well but for reasons of simplicity they are here regarded as end product producing firms – one level higher in the chain. The end product producing firms sell their products at a product market, which is a factor market for retail companies. The retail companies sell the products to the consumer. But there are more steps. At different stages in the production process waste arises, for example not approved badges, by-products, see arrow 'products to be recovered' in Figure 8. Parts of these "waste" products might be usable as a resource again. The disposed off products by the consumer and companies earlier in the chain are till a certain extent collected, cleaned, sorted, traded and become recovered resources or 'secondary raw materials'. The producer can decide to do this in-house (vertical integration) or decide to let third parties take care of this (externalisation).

Figure 8 Recovered-Resource Dependent Industry regarded as comprised of vertical interrelated vertical integrated firms

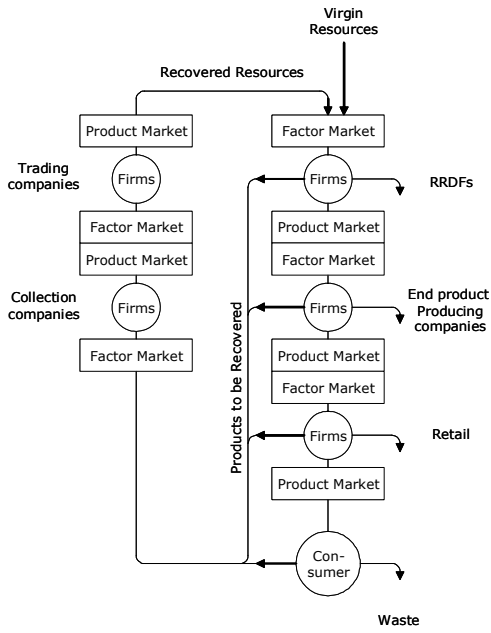
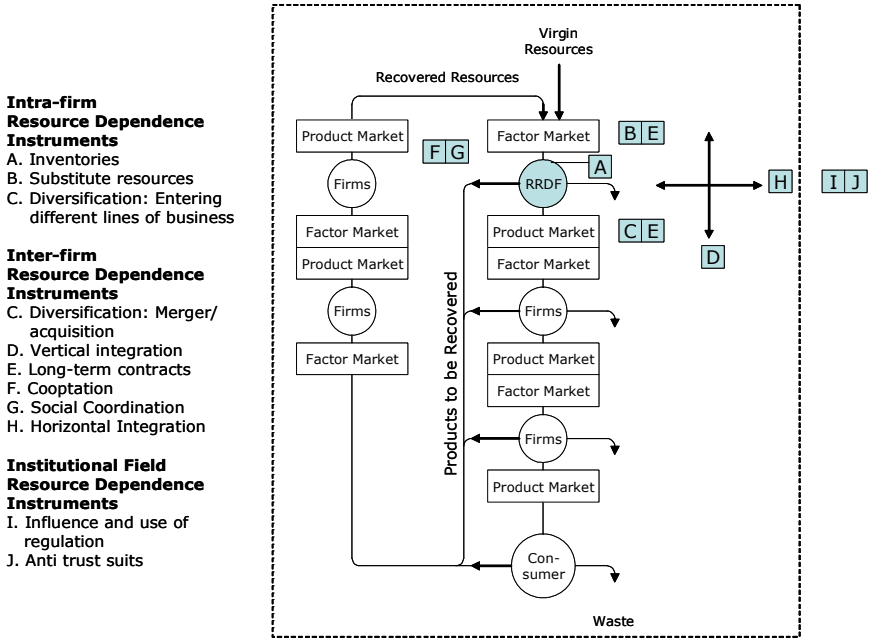


Figure 9 shows where the resource dependence instruments are situated. The instruments belonging to the three different levels of analysis will now be discussed. With regard to intra-firm resource dependence instruments, first of all, a firm can choose to

create inventories (A) to buffer itself from uncertainty of resource supply. Substitute resources (B) influence the factor market where the raw materials for the focal firm are bought. Diversification (C) can occur in two ways. A firm can decide to diversify by itself, which makes it an intra-firm resource dependence instrument. When diversification is obtained by acquiring other firms, it becomes an inter-firm resource dependence instruments. Growth (not presented in Figure 9) is also a resource dependence attribute that can concern intra-firm level and inter-firm level.

Figure 9 Vertical interrelated firms and Resource Dependence Instruments



Besides the intra-firm resource dependence instruments, firms can employ instruments that reach further than the boundaries of the firm. Firms can integrate vertically (D) to absorb the firm on which they are dependent. When firms integrate horizontally (H) they absorb their competitors. When they grow bigger their power increases which positively influences their ability to get the required resources. Horizontal and Vertical integration can be achieved by merger or joint venture. Long-term contracts (E) can be closed as a mean to assure the continuation of the resources flow or product flow. Cooptation (F) and social coordination (G) can also be used as a mean to assure the resource supply.

Finally firms can try to influence and use legislation (I) by actively taking part in commissions where decisions about industry legislation are being made. This way a firm is involved in shaping the industry. Other factors that influence the use of resource dependence instruments are antitrust suits (J). Antitrust suits are meant to prevent players to become too dominant.

Contribution of resource dependence theory to the research problem

Resource dependence theory has contributed to the research problem by investigating what makes that firms are dependent on other organisations and how they can change their situations, see Table 19. Three determinants of dependence were distinguished and multiple resource dependence instruments, covering different levels of analysis, were discussed to reduce a firm's resource dependence. In this way resource dependence theory has contributed to the context and the content dimension. Moreover, resource dependence theory has contributes to different levels of analysis: firm level and industry level.

Table 19 Contribution of Resource Dependence Theory to the research problem

Context Dimension	External constraints influencing the firm: - Importance of a resource exchange for the firm - Discretion over resource allocation and use - Concentration of resource control
Content Dimension	Resource dependence instruments: - intra-firm - inter-firm - institutional field
Level of Analysis	- Firm - Industry

RESOURCE-BASED VIEW OF THE FIRM

The resource-based view of the firm (RBV) focuses on the inside of the firm (Penrose, 1959). Recent resource-based view contributions focus on the internal differences between firms leading to sustained competitive advantage. Resources must meet several criteria – sometimes referred to as 'vrin' criteria, representing the first letters of each of the four criteria – to lead to competitive advantage. Barney argued that 'sustained competitive advantage derives from the resources and capabilities a firm controls that are *valuable*, *rare*, *imperfectly imitable*, and *not substitutable*. These resources and capabilities can be

viewed as bundles of tangible and intangible assets, including a firm's management skills, its organizational processes and routines, and the information and knowledge it controls' (Barney 2001, 625). This research aims to show the importance of management and grips back on the work of Edith Penrose (1959).

Edith Penrose is one of the founding scholars of the resource-based view of the firm. In her influential work on resource-based thinking 'The Theory of the Growth of the Firm' (1959) she analyses managerial activities and decisions, organizational routines, and knowledge creation within the company and argues that they are critical to the ability of the firm to *grow*. In the context of this research it will be shown that her argument, the importance of management, plays a prominent role in *managing resource dependence* as well.

Penrose (1959: 31) defines the business firm as ' … both an administrative organization and a collection of productive resources; its general purpose is to organize the use of its 'own' resources together with other resources acquired from outside the firm for the production and sales of goods and services at profit; physical resources yield services essential for the execution of the plans of personnel, whose activities are bound together by the administrative framework within which they are carried on'. In this definition of the firm the presence of the first two themes of resources dependence theory (Pfeffer and Salanik, 1978) is evident. 'Other resources acquired from outside the firm' resembles what Pfeffer and Salancik (1978) call the constraints emerging from the environment. 'Execution of the plans of personnel' resembles what Pfeffer and Salancik (1978) mean with attempts to manage the constraints and uncertainty that result from the need to acquire resources from the environment.

The paradox of management: growth and limit of growth

In the introduction to the classical work Penrose (1959) phrases her idea as follows: 'In undertaking an analysis of the growth of firms in the 1950's, the question I wanted to answer was whether there was something inherent in the very nature of any firm that both promoted its growth and necessarily limited its *rate* of growth' (Penrose, 1995: xi). In the context of this study her question can be rephrased in: 'Is there something inherent in the very nature of any firm that both promotes resource dependence and at the same time limits resource dependence?' Penrose finds the solution in the *inside* of the firm and turns in a new path; where in neoclassical economic theory the discussion concerns prices and the allocation of resources among different users, in Penrose's work the emphasis of the discussion is on the internal resources of a firm. In resource dependence theory (Pfeffer and Salancik, 1978) management plays a major role as well.

Penrose makes a distinction between physical resources, human resources, and services. 'The physical resources of a firm consist of tangible things – plant, equipment,

land, natural resources, raw materials, semi-finished goods, waste products and by-products, and even unsold stocks of unsold goods' (1959: 24). Note that even at this time, far before environmental issues and sustainability start playing an eminent role, Penrose regards 'waste products' as a *resource*. Human resources include: unskilled and skilled labour, clerical, administrative, financial, legal, technical, and managerial staff. But even more important than the resources in the work of Penrose are the *services* rendered by the resources. In the next paragraph it will be shown that for rendering these services firms need to develop capabilities.

> *'Strictly speaking, it is never the resources themselves that are the 'inputs' in the production process, but only the services they can render. The services yielded by resources are a function of the way in which they are used – exactly the same resource when used for different purposes or different ways and in combination with different types or amounts of other resources provides a different service or set of services. The important distinction between resources and services is not their relative durability; rather it lies in the fact that resources consist of a bundle of potential services and can, for the most part, be defined independently of their use, while services cannot be so defined, the very word 'service' implying a function, an activity. As we shall see, it is largely in this distinction that we find the source of uniqueness of each individual firm' (Penrose, 1959: 25).*

The cause of growth

This distinction between services and resources illustrate the importance of management knowledge in the work of Penrose (1959). The services that resources can render lead back to the administrative organisation. In the words of Best (1990: 125), 'an administrative unit implies teamwork amongst individuals'. The administrative organisation is the unit that has to deliver the services, the people, and the knowledge. Penrose argues that 'an administrative group is something more than a collection of individuals; it is a collection of individuals who have had experience working together, for only in this way can 'teamwork' be developed' (1959: 46).

Penrose 1995: xvi) argues that '…the firm is a unit of planning and as it grows its boundaries expand as do its administrative responsibilities' Managers will develop knowledge about the resources they are working with. However, in Penrose's words '… not only the resources with which a particular firm is accustomed to working will shape the productive services its management is capable of rendering (where management is defined in the broadest sense), but also the experience of management will affect the productive services that all its other resources are capable of rendering' (1959: 5). In the next

paragraph the importance of absorptive capacity (Cohen and Levinthal, 1989; 1990) in relationship with this issue will be discussed. Penrose's argument illustrates that history, or past management experience, matters and influences the future journey a firm will follow. It also makes firms unique and idiosyncratic. In the context of this research, management's recognition of the importance of knowledge about resource dependence management is a panacea for adequate resource dependence management.

Limits to growth

How important the firm's managerial and administrative activities may be for a firm to grow, and for adequate resource dependence management according to Penrose (1959), the firm's managerial and administrative activities at the same time limit the growth of the firm. Penrose distinguishes three aspects of firm's management that cause a limit in growth rate. Sanchez (2001: 145) summarises these as follows: (1) Management's ability to recognize market demand that presented the firm with opportunities suited for the services that the firm's available resources could provide. (2) Management's ability to combine the firm's available resources with new resources needed to compete in a new geographic or product market. (3) Management's willingness to accept the risk inherent in trying to use new combinations of resources to serve new market demands. All of these arguments count for managing a firm's resource dependence as well.

Management's ability to recognise market demand is influenced by prior related knowledge (Cohen and Levinthal, 1989; 1990; Van den Bosch et al., 1999) and what in weak signal literature in the field of strategic management is referred to as management's dominant logic or managerial blindness (Prahalad and Bettis, 1986; Bettis and Prahalad, 1995). This obstructs management to see new opportunities. Management's ability to combine the firm's available resources with new resources resembles what in absorptive capacity literature are called combinative capabilities. Another issue that plays a role in these is that the processes in the business firm require firm specific knowledge, human resources cannot be found easily in the market place. People must develop skills and routines before the resources render services. This takes time, or as Best (1990: 125) put it '…teamwork takes time to establish'. The willingness to accept the risk inherent in trying to use new combinations of resources to serve new market depends on whether management is risk-averse or not. However, past experiences play a role again here too. If taking certain risks has paid off in the past, management will likely be less risk-averse in new situations as well. These three limiting aspects distinguished by Penrose (1959) affect a firm's resource dependence management as well.

Contribution to the research problem

The contribution of the resource-based view of the firm, and Penrose in particular, to the research problem is summarised in Table 20. The dominant dimension addressed is the content dimension. Resource-based view of the firm has provided in the importance of the inside of the firm to explain firm behaviour. Firm's management can at the same time be a source of growth of the firm and a source of the limit of the growth of the firm. Resource-based view of the firm shows that management knowledge plays a crucial role in reducing resource dependence. The level of analysis addressed is firm level, or management level.

Table 20 Contribution of Resource-Based View of the Firm to the research problem

Content Dimension	Firms' management is at the same time the source of the growth of the firm and a source of the limit of the growth of the firm. The same is true with regard to a firm's resource dependence. The reasons for this lead back to dominant management logic (managerial blindness), combinative capabilities, and the fact whether management is risk averse or not. Management knowledge plays a crucial role in reducing a firm's resource dependence and influences the strategic renewal journey of the firm
Level of Analysis	Firm / Management

DYNAMIC CAPABILITIES THEORY

Because of the interest in the changing business environment due to shift from traditional towards recovered-resource dependent industry, dynamic capability theory closely related to the RBV will be discussed as well. Dynamic capabilities are associated with rapidly changing environments (Teece et al., 1997). Although authors discussing the topic in general agree about the fact they are important for a firm to have, there seems to be a lack of uniformity about what dynamic capabilities are. Three recent articles from major journals are compared: Teece et al., 1997; Eisenhardt and Martin, 2000; Zollo and Winter, 2002, and the contribution to research problem is discussed. The articles are evaluated on the following criteria: Research question or reason of the argument, definition dynamic capabilities, and necessity of a dynamic environment. Finally the contribution of dynamic capabilities to the research problem is discussed.

Research question or reason of the argument

With regard to the first issue, research question or reason of the argument the different authors argue as follows. Teece *et al.*, 1997 argue that the fundamental question in the field of strategic management is how firms achieve and sustain competitive advantage. Their argument grips back on the resource-based view; they develop the view that a firm's competitive advantage is determined by its processes, its positions, and its paths. The firm's processes can be regarded as its routines, whereby the authors make distinction between coordination and, integrating, learning, and reconfiguration processes. A firm's positions are determined by its assets (technical, financial, reputational, structural, etc.). The path a firm has followed will also influence its future actions, in other words history influences a firm's strategic renewal journey. According to the authors, resource-based view lacks contribution to changing environments. In stable environments a firm's standard responses to external and internal stimuli may be adequate but in *rapidly changing* environments a firm's capabilities may not reach out. To gain and maintain competitive advantage in dynamically changing environments firms therefore have to develop *dynamic capabilities*.

Eisenhardt and Martin (2000) elaborate on the question that was addressed by Teece et al. (1997) as well: What are dynamic capabilities? Where Teece et al. (1997) use an economical lens Eisenhardt and Martin (2000) use an organisational and empirical lens. They examine the nature of dynamic capabilities, how they are influenced by market dynamism, and their evolution over time. Furthermore they distinguish between moderately dynamic markets and high velocity markets.

Zollo and Winter (2002) argue that the contribution of Teece et al. (1997) leaves open the question where dynamic capabilities come from and question the necessity of rapidly changing environments. Furthermore Zollo and Winter (2002) investigate the mechanisms through which organisations develop dynamic capabilities.

Definition dynamic capabilities

Teece et al. (1997: 516) define dynamic capabilities as '*the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments. Dynamic capabilities thus reflect an organization's ability to achieve new and innovative forms of competitive advantage given path dependencies and market positions*'. Eisenhardt and Martin (2000: 1107) define dynamic capabilities as '*The firm's processes that use resources – specifically the processes to integrate, reconfigure, gain and release resources – to match and even create market change. Dynamic capabilities thus are the organizational and strategic routines by which firms achieve new resources configurations as markets emerge, collide, split, evolve, and die*'. So, Eisenhardt and Martin (2000) regard dynamic capabilities as organizational and strategic routines, processes. Zollo and Winter (2002: 340) propose the following definition: '*dynamic*

capability is a learned and stable pattern of collective activity through which the organization systematically generates and modifies its operating routines in pursuit of improved effectiveness'. This brings dynamic capabilities back to the level of operating routines. The authors distinguish three different learning mechanisms – experience accumulation, knowledge articulation, and knowledge codification – and the coevolution of these three shape a firm's dynamic capabilities.

Necessity of market dynamism

Teece et al. (1997) reserve *dynamic capabilities* to volatile environments. 'The term 'dynamic' refers to the capacity to renew competences so as to achieve congruence with changing business environments. The term 'Capabilities' emphasizes the key role of strategic management in appropriately adapting and reconfiguring internal and external skills, resources, and functional competences to match the requirements of a changing environment' (Teece et al., 1997: 515). With regard to market dynamism Eisenhardt and Martin (2000) make a distinction between dynamic capabilities in moderately dynamic market and high volatile markets. According to the authors, in moderately dynamic markets dynamic capabilities resemble the traditional conception of routines and have predictable outcomes; in high velocity markets they are simple, highly experiential and fragile processes with unpredictable outcomes. Zollo and Winter (2002) question the need of a rapidly changing environment. The authors reason that, '… firms obviously do integrate, build, and reconfigure their competencies even in environments subject to lower rates of change' (2002: 340). The authors argue that the function of environment is twofold: first of all it supplies diverse stimuli and substance for internal reflection. Secondly, it functions as a selection mechanism in the classic evolutionary sense as it provides feedback on the value and viability of the organization's current behaviour.

Contribution of dynamic capabilities to the research problem

Table 21 presents a summary of the contribution of dynamic capabilities to the research problem. All of the three contributions discussed share the following idea: knowledge creation in the firm is important and a firm's processes, or routines, play a major role in this. The three different definitions all add to the research problem. A firm should possess the ability to integrate, build, and reconfigure internal and external competences (Teece et al., 1997) because this will lead to lower resource dependence. The processes to integrate, reconfigure, gain and release resources (Eisenhardt and Martin, 2000) influence a firm's resource dependence as well. And also the notion to regard dynamic capabilities as a 'learned and stable pattern of learned activity' leading to changes in operating routines (Zollo and Winter, 2002) is relevant; a change in resource dependence instruments will

probably lead to a change in operating routines. Dynamic capability theory addresses the content dimension and the level of analysis is firm level, or management level.

Table 21 Contribution Dynamic Capabilities theory to the research problem

Content Dimension	Knowledge creation in the firm is important and a firm's processes, or routines, play a major role in this Importance to change operational routines in order to keep congruence with the business environment.
Level of Analysis	Firm / Management

THE KNOWLEDGE-BASED VIEW OF THE FIRM

The importance of knowledge was expressed by Penrose (1959) already. The need to change operating routines due to dynamics in the environment must be perceived by management and absorptive capacity plays a major role in this. Cohen and Levinthal (1989, 1990) define absorptive capacity as a firm's ability to "… recognize the value of new, external knowledge, assimilate it, and apply it to commercial ends" (1990: 128). Remark the resemblance with the definition of dynamic capabilities by Teece et al. (1997: 516): 'the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments'. In both definitions knowledge plays a major role. And like in the resource-based perspective, and the dynamic capability-based view, management plays an important role in absorptive capacity literature; however, organisational antecedents play a role as well (Cohen and Levinthal, 1990; Van den Bosch et al., 1999). Van den Bosch et al. (1999) distinguish three determinants of absorptive capacity: (1) a firm's level of prior related knowledge, (2) a firm's organization form, and (3) the portfolio of combinative capabilities.

Prior Related Knowledge

The first determinant of absorptive capacity distinguished by Van den Bosch et al. (1999) is *prior related knowledge*. Cohen and Levinthal (1989, 1990) argued that "… a stock of prior knowledge… constitutes the firm's absorptive capacity" (1989: 570) and, "… the ability to evaluate and utilize outside knowledge is largely a function of the level of prior related knowledge" (1990: 128). Both quotes illustrate that prior related knowledge plays an important role with regard to absorptive capacity. Prior related knowledge can concern many issues firms are confronted with.

Organisation Form

Cohen and Levinthal (1990: 131), point out that it is '… useful to consider what aspects of absorptive capacity are distinctly organizational'. Van den Bosch et al. (1999) introduce a firm's *organisation form* as a second determinant that influences the way knowledge is processed. In the words of Van den Bosch *et al*. (1999) the organisation form can be regarded as '… a type of infrastructure that supports the process of evaluation, assimilation, integration and application in a specific way' (1999: 554). Or in other words, depending on the organisation form firms will be better able to manage resource dependence in the shift from a TI towards a RRDI. The organisation form of a firm is a product of past experiences as well. Firms operating in turbulent environments are likely to have developed an organisation structure that is more flexible with regard to knowledge transfer than firms operating in more stable environments. Building on Grant's (1996) three characteristics of knowledge integration, Van den Bosch *et al*. (1999) set out that the extent to which an organisation form is suited for knowledge absorption can be analysed with use of three dimensions of knowledge absorption: *efficiency*, *scope*, and *flexibility*, see Table 22.

Table 22 Three Basic Organization Forms, Dimensions of Knowledge Absorption and Absorptive Capacity

Dimensions of knowledge absorption	Organisation Forms		
	Functional Form	**Divisional Form**	**Matrix Form**
Efficiency of Absorption	H	L	L
Scope of Absorption	L	L	H
Flexibility of Absorption	L	H	H
Impact on Absorptive Capacity[a]	Negative	Moderate	Positive

H: high; L: low

[a]Assumption: both scope and flexibility of knowledge absorption have a positive influence on the level of absorption capacity, while efficiency has a negative impact.

Source: Van den Bosch et al., 1999

Van den Bosch *et al*., (1999: 552) describe the differences between the three dimensions as follows: 'Efficiency of knowledge absorption refers to how firms identify, assimilate, and exploit knowledge from a cost and economies of scale perspective. Scope of knowledge absorption refers to the breadth of component knowledge a firm draws upon. Flexibility of knowledge absorption refers to the extent to which a firm can access additional and reconfigure existing, component knowledge'. The component knowledge, the authors mention here can be knowledge related to products or services, production

processes, markets, but also related to resource dependence instruments and recovered-resource dependent industries. Component knowledge can be both explicit and tacit (Nonaka, 1994; Boisot, 1998). Furthermore, Van den Bosch *et al* (1999: 552) assume that … the *efficiency* dimension of knowledge absorption is associated with *exploitation* adaptation of a firm's knowledge configuration… and the *scope* and *flexibility* dimension of knowledge absorption is associated with the *exploration* adaptations of a firm's knowledge configuration' (italics added). With use of these dimensions of knowledge absorption, Van den Bosch et al. (1999) discuss three organisation forms: the functional form, the divisional form, and the matrix form. It is beyond the scope of this study to discuss these organisation forms in detail, the results are summed up in Table 22. In chapter 7 this table will be applied as a mean to analyse the development of the organisation form of Kappa Packaging.

Combinative Capabilities

The third determinant of absorptive capacity distinguished by Van den Bosch et al. (1999) is called *combinative capabilities*. According to Jansen et al. (2005) combinative capabilities and dynamic capabilities are very similar. Cohen and Levinthal (1990: 133) argue that: "An organization's absorptive capacity is not resident in any single individual but depends on the links across a mosaic of individual capabilities". As Van den Bosch *et al*. mention: 'organization forms are the bones; however, combinative capabilities, provide the necessary "flesh" and "blood"' (1999: 557). Kogut and Zander (1992) define combinative capabilities as '… the intersection of the capability of the firm to exploit its knowledge and the unexplored potential of technology, or what Scherer (1965) originally called the degree of "technological opportunity" '.Van den Bosch *et al*. (1999) distinguish three combinative capabilities: (1) systems capabilities, (2) coordination capabilities, and (3) socialization capabilities. If one wants to enhance the absorptive capacity of a firm, attention must be paid to the portfolio of combinative capabilities. In Table 23 these combinative capabilities are related to the dimensions of knowledge absorption.

Systems capabilities are related to which degree rules, procedures, instructions, and communications are written down in documents or formal systems. 'The virtue of systems capabilities is that they eliminate the need for further communication and coordination among subunits and positions' (Van den Bosch *et al*., 1999: 556). Systems capabilities can be regarded as the routines of a firm and make that people know how to handle. The authors assume that systems capabilities negatively influence a firm's knowledge absorption; the efficiency of knowledge absorption is very high, but the scope, and moreover, the flexibility are expected to be low.

Table 23 Combinative Capabilities, Dimensions of Knowledge Absorption and Absorptive Capacity

Dimensions of knowledge absorption	Combinative Capabilities		
	Systems	Coordination	Socialization
Efficiency of Absorption	H	L	H
Scope of Absorption	L	H	L
Flexibility of Absorption	L	H	L
Impact on Absorptive Capacity[a]	Negative	Positive	Negative

H: high; L: low
[a]Assumption: both scope and flexibility of knowledge absorption have a positive influence on the level of absorption capacity, while efficiency has a negative impact.

Source: Van den Bosch et al., 1999

Coordination capabilities refer to the lateral ways coordination can take place. Van den Bosch et al. (1999) argue that coordination capabilities are path dependent. 'They accumulate in a firm as a result of (1) training and job rotation, (2) natural liaison devices, and (3) participation' (Van den Bosch et al., 1999: 557). Training and job rotation are the 'coordination equivalents' of what rules and procedures are with the systems capabilities. They help to make people skilled in absorbing knowledge. Van den Bosch *et al*. (1999: 557) reason that '… liaison devices result in lateral forms of communications and joint decision-making processes that cut across functions of lines and authority'. A low level of people participating will result in a low degree of knowledge exchange, and therefore will have a negative impact on the level of knowledge absorption. Turning to the impact on knowledge absorption. The impact of coordination capabilities on absorptive capacity is expected to be relatively high; although efficiency is expected to be low, flexibility and scope are high.

According to Van den Bosch et al., *socialization capabilities* refer to the ability to produce a shared ideology that offers members an attractive identity as well as collective interpretations of reality. Socialization capabilities can create mental prisons that prevent people from seeing important changes, for instant, in the market (De Leeuw and Volberda, 1996. Notice the resemblance to dominant management logic. Dominant logics change slowly and rarely in the absence of a crisis (Prahalad and Bettis, 1986; Bettis and Prahalad, 1995; Hedberg, 1981). Camerer and Vepsalainen (1998) argue that the efficiency of knowledge integration and knowledge utilization of socialization capabilities is very high but question the scope and flexibility.

Contribution to the research problem

Table 24 provides an overview of the contribution of absorptive capacity literature as an exponent of the knowledge-based view to the research problem. Firm's absorptive

capacity influences the extent to which firms are able to adapt their resource dependence strategies in the shift from a TI towards a RRDI. Absorptive capacity literature contributes to the process dimension, for absorption of knowledge is a process that takes time and so does the development of (combinative) capabilities. Furthermore, the content dimension is addressed by providing determinant that influence knowledge absorption. As well managerial factors (prior related knowledge), organisational antecedents (organisation form), as combinative capabilities influence a firm's knowledge absorption. The level of analysis that absorptive capacity literature contributes to is firm level or management level.

Table 24 Contribution of knowledge-based view to the research problem

Content Dimension	Three determinants of absorptive capacity: - Prior related management knowledge - Organisational Form - Combinative Capabilities (closely related to dynamic capabilities)
Process Dimension	Absorption of external knowledge takes time and development of combinative capabilities
Level of Analysis	Management, Firm

INSTITUTIONAL THEORY

Scott (1987: 493) wrote: "the beginning of wisdom in approaching institutional theory is to recognise at the outset that there is not one but several variants". Through time institutional theory has been contributed to by scholars of different disciplines: economics (Menger, [1871] 1981; Veblen, 1898; Commons, 1924) sociology (Weber, [1924] 1968; Parsons, 1951) and politics (Burgess, 1902; Wilson, 1889; Willoughby, 1896, 1904) and this has left its traces. The meaning of institutionalism is disparate in different disciplines which makes it difficult to speak about '*the institutional theory*'; institutional theory has many faces. In the introduction to the classic edition of *The External Control of Organisations* three theories that focus on organisations and environments are compared: resource dependence theory, institutional theory and population ecology. Pfeffer and Salancik (2003: xiii) argue that: 'There originally were, and to some extent still are, important theoretical differences among the theories, although resource dependence theory and institutional theory have grown somewhat closer together over time'. This research is interested in how institutional forces influence a firm's resource dependence management.

Several approaches have been undertaken to classify the institutional theory contributions. In one of his later works "Institutions and Organisations" Scott (2001) presents three pillars of institutional theory: regulative, normative and cultural/cognitive. DiMaggio and Powell (1983) distinguish three forms of isomorphism (coercive, mimetic, and normative). In this thesis the categorisation of Greenwood and Hinings (1996) is followed, who distinguish between three wings of institutional theory: old, new and neo. Each wing has a different perspective on level of analysis and source of change. An overview of the characteristics of the different wings is presented in Table 25. In the remainder of this section the three wings are discussed in more detail. It is argued that the new and neo institutional theory contribute most to the research problem and the section ends with deliverables in the form of resource dependence instruments that contribute to the framework constructed in chapter 3.

Table 25: Characteristics Old, New and Neo Institutional Theory

	Old	**New**	**Neo**
Central question	Why do organisations become institutionalised?	Why look organisations in the same organisational field so similar?	What internal dynamics influence the organisation's response to pressures in the institutional field?
Level of analysis	Firm	Institutional field	Firm and institutional field
Carriers	Values, norms and attitudes.	Routines, scripts, templates	Values, norms, routines, templates, external and internal dynamics.
Organisational Dynamics	Change	Persistence	Change and persistence

Source: Based on Greenwood and Hinings (1996)

Old Institutional Theory: Institutionalisation

The central question of the old institutional theory is: Why do organisations become institutionalised? The contributions date back to Weber and his bureaucracy. Weber argues that the bureaucracy is the most efficient form. In the old institutionalism (Selznick, 1949) the key forms of cognition are values, norms, and attitudes. The individual organisation is the locus of institutionalisation and the primary unit of analysis. Brint and Karabel (1991: 352) observed that old institutionalism "emphasises the details of an organisation's interactions with its environments over time" and pays attention to the beliefs and actions of those who have the power to define directions and interests.

Institutional theorists declare that regularised organisational behaviours are the product of ideas, values, and beliefs that originate in the institutional context. To survive, organisations must accommodate institutional expectations, even though these expectations may have little to do with technical notions of performance accomplishment.

New Institutional Theory: Isomorphism and templates

The central question in new institutional theory is: Why do organisations look so similar? In their 1983 article 'the Iron Case Revisited' DiMaggio and Powell (1983: 148) notice that 'in the initial stages of their life cycle, organisational fields display considerable diversity in approach and form. Once a field becomes well established, however, there is an inexorable push towards homogenisation'. The authors wonder what makes organisations to become so similar. DiMaggio and Powell (1983) argue that organisations in an organisational field face the same environmental conditions, and respond to these conditions isomorphic. In Hawley's (1968) description, isomorphism is a constraining process that forces one unit in a population to resemble other units that face the same set of environmental conditions. DiMaggio and Powell (1983) Distinguish three mechanism of institutional isomorphic change: coercive, mimetic, and normative.

Coercive isomorphism stems from political influence and the problem of legitimacy. This results from both formal and informal pressures exerted on organisations by other organisations upon which they are dependent and by cultural expectations in the society with in which organisations function. Notice the similarity with resource dependence theory here in which it is argued resource dependence occurs because organisations are dependent on resources they acquire from other organisations. Pfeffer and Salancik (1978: 188-224) have discussed how organisations faced with unmanageable interdependence seek to use the greater power of the larger social system and its government as a mean to eliminate difficulties of provide for needs.

Mimetic stems from standard responses to uncertainty. Uncertainty is a powerful tool that encourages imitation when organisational techniques are poorly present, developed. Organisations tend to model themselves after similar organisations in their field that they perceive to be more legitimate or successful. The advantage of this is that this may yield a viable solution with little expense (Cyert & March, 1963).

Institutional theorists declare that regularised organisational behaviours are the product of ideas, values, and beliefs that originate in the institutional context. To survive, organisations must accommodate institutional expectations, even though these expectations may have little to do with technical notions of performance accomplishment. Institutional pressures lead organisations to adopt the same organisational form. That is, the institutional context provides "templates for organising" (DiMaggio & Powel, 1991: 27). Normative isomorphism stems from professionalisation. The collective struggle of members of an

occupation to define the conditions and methods of their work, to control "the production of producers", and to establish a cognitive base and legitimation for their occupational autonomy (DiMaggio and Powell, 1983). Two important sources of normative isomorphism are formal education, a cognitive base produced by university specialists. Networks that span across organisations make that new models diffuse rapidly.

DiMaggio and Powell (1991) contemplate that institutional pressures lead organisations to adopt the same organisational form; institutional context provides *templates* for organizing. In the context of resource dependence this would mean that institutional pressures lead organisations to adopt the same set of resource dependence instruments.

From the point of view of understanding change, the old institutionalism suggests that change is one of the dynamics of organisations as they struggle with differences of values and interests. The new institutionalism emphasises persistence. Persistence (New Oxford Dictionary, 1995): the fact of continuing in an opinion or course of action in spite of difficulty or opposition. Oliver suggested (1992:584) that "the persistence and longevity of institutionalised values and activities may be less common than the emphasis of institutional theory on cultural persistence and the diffusion of enduring change implies".

Neo Institutional Theory: Organisational dynamics, template shifts.

The central question of neo institutional theory (Greenwood and Hinings, 1996) is: what are the processes by which individual organisations adopt legitimated templates and change them, given the institutionalised nature of organisational sectors? Greenwood and Hinings (1996) argue that institutional theory is not just a theory to explain similarities between organisations but the theory is very well capable to explain when radical organisational change occurs. Greenwood and Hinings (1996) differentiate between *convergent* and *radical* change. Like new institutional theory, neo institutional theory accepts the concept of templates. *Convergent change* occurs within the parameters of an existing archetypal template. *Radical change*, in contrast, occurs when an organisation moves from one template-in-use to another. The focus of neo-institutional theory is not only upon the individual organisation but upon a category or network of organisations. Neo-institutional theorists treat organisations as a population within an organisational field. These theorists stress that the institutional context is made up of vertically and horizontally dependent organisations and that the pressures and prescriptions within these contexts apply to all of the relevant classes of organisations. Notice the resemblance with the first central theme of resource dependence theory, which also focuses on the influence of the external context of organisations.

Contribution to the research problem

Table 26 provides an overview of the contribution of institutional theories to the research problem. Which of the three wings contributes most to the research problem? As mentioned before, institutional theory was selected in order to get more insight external factors influencing resource dependence. Old institutional theory focuses on why organisations become institutionalised, which was not chosen as the interest of this research. New institutional theory does pay attention to the external forces that influence a firm's resource dependence and in this way contributes to the research problem. Neo institutional theory accepts the premises of both and presents the notion that institutional theory forms a basis for an account of change. This means that new institutional theory meets the means best. New institutional theory contributes to the context dimension. The level of analysis is institutional level.

Table 26 Contribution of Institutional Theory to the research problem

	Old IT	**New IT**	**Neo IT**
Dimension	Internal context	External context	Internal and external context
Level of Analysis	Firm	Institutional	Firm and Institutional
Contribution to Resource dependence	Individual norms and values influence resource dependence management	Organisations in the same field use similar resource dependence instruments	As well internal as external dynamics influence resource dependence management

CHARACTERISTICS OF FACTOR AND PRODUCT MARKETS

Central theme 1 in "The External Control of Organizations" (Pfeffer and Salancik, 1978) concerns the importance of the context of an organisation in order to understand the behaviour of that particular organisation. Firms are constrained by their environment. In Figure 8 the concept of factor and product markets (Barney, 1986) was illustrated as a mean to get more insight into the context of RRDFs. RRDFs operate between factor and product markets. In this section several constructs associated with the characteristics of these markets will be discussed and it will be illustrated how these can influence the resource dependence management and the performance of the firm. Attention will be paid to: Technological developments, resource recycling characteristics, cost of the (recovered) resource, end-use market, and regional scope.

Technological developments

Technological developments can positively influence the availability of recovered resources. Due to new techniques it might be better able to sort 'waste' flows which increases the availability of recovered resources. Improvement of the infrastructure to collect the recovered resources, also positively contributes to the use of recovered resources.

Technological developments can contribute to the use of substitute resources. This counts for virgin resources but also for recovered resources. In cars and constructions there is a tendency to use lighter materials, aluminium instead of steel which changes resources dependencies. This also covers the recovered resource flows when these products become end-of-life products. Substitute from virgin to recovered resources can also take place. An example of this is the newspaper industry as sub-sector of the paper and board industry, more about this in chapter seven. In the beginning of the 1990 the use of recovered paper for newsprint production was limited, at present the newspaper sector is the paper and board sector with the highest utilisation rate.

Resource recycling characteristics

Generally speaking the energy intensity of primary production is often high compared to secondary production (Ayres and Ayres, 1996). The recycling of aluminium saves up to 95% of the energy needed to produce primary metal; making steel from scrap uses up to 60% less energy than from iron ore; and recycling of paper and board can reduce energy consumption by 40% (Assurre fact sheets consulted June 2005). This positively influences the use of recovered resources. Especially the aluminium industry will prefer recycled aluminium for here the difference is highest.

From a quality perspective there are limitations to the amount of products that can be recycled for some resources. The consumer expects a certain quality of the products it buys, no matter whether the product is made from recovered resources or virgin. Aluminium for example will keep the same quality when recycled. However, some end-of-life products decrease in quality after recycling. Paper and board fibres become smaller during the recycling process and have to be supplemented with virgin (wood pulp) material. This limits the maximum amount of recovered resources that can be used for production and by consequence leads to a decrease in recycling rate and means that other purposes will have to be found for the end-of-life products. In chapter 6 and 7 it will appear that there are even differences in ability to utilise recovered resources between paper and board *sectors*. Plastics also suffer from quality loss, moreover, plastics are often recovered instead of recycled and used as fuel. The advantage of plastics is that, depending on the purpose, they can be reused multiple times, e.g. PET bottles.

Another issue related to the quality aspects is contamination and pollution. The difference in chemical characteristics makes that some end-of-life products can more easily be recuperated than others. Metals for example can easily be extracted from waste streams with use of magnets. For plastics and paper this does not work and to assure a good quality they have to be collected separately. The different glass bottles for example are sorted on colour collection. 'Successful paper recycling depends largely on receiving good quality recovered paper and board. Therefore quality of recovered paper in addition to quantity has become a critical issue. Quantity and quality tend to be linked: The increased collection of paper in total, and especially the increasing share of recovered paper coming from households, would, if not addressed adequately, result in higher levels of impurities' (ERPA annual report 2003: 6).

Resource recycling characteristics influence the resource dependence instruments being used. If the recovered resources are of a high quality level, the industry becomes less dependent on virgin resources. If, however, the recovered resource suffers from quality loss, there will be a need to supplement the recovered resources with other resources.

Costs of (recovered) resources

Traditionally recycling of resources is 'largely determined by considerations of relative cost and appropriateness of primary and secondary resources' (Reijnders, 2000: 121). As long as the price of recovered resources is considerably lower than the price of virgin material, firms will be inclined to use recovered resources and perhaps even be prepared to invest in projects to be better able to utilise the recovered resources.

According to neo-classical economics a market price arises as an outcome of supply and demand. If the availability of resources decreases, prices are expected to go up and vice versa. If the demand of resources increases, prices will go up and vice versa. Therefore, factors influencing the availability or demand of resources can lead to higher or lower prices, which on its turn can highly impact the profitability of RRDIs.

Due to regulation, it might occur that the market mechanism is manipulated. The EU Directive on Packaging and Packaging Waste (EC/94/62) for example obliges Member States to reach certain recycling rates. This of course does influence the availability but it does not prescribe what happens with the demand. Therefore it might occur that collection is high and demand is low. Export to other parts of the world can influence the demand and availability as well.

End-use market

The time in use of the end-product influences the performance as well. The recycling rate is defined as the ratio of utilised recovered resources and the consumption of the products in a certain year. If the products are in use for longer periods of time, this

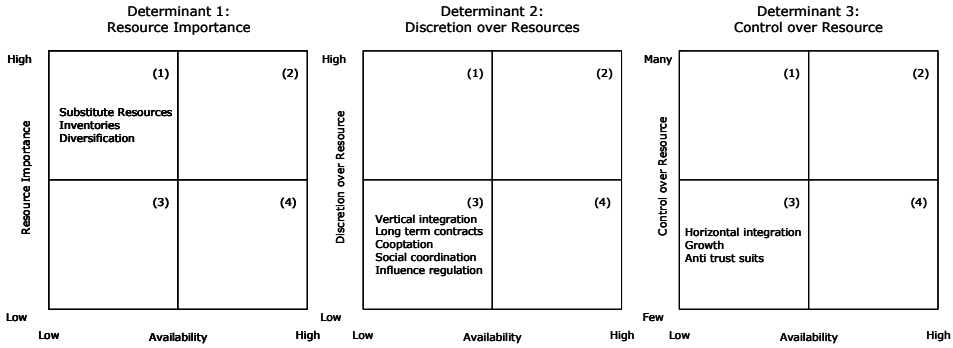
influences the performance of the industry. This counts especially for resources that are used in end markets as construction and automotive. In chapter 5 this issue is addressed and a distinction is made between products that are long in use (>1 year) and products that are short in use (<1 year).

Regional scope

The issue regional scope was addressed in the introduction of this research. It was argued that the availability of virgin and recovered resources differs per region (cf. Kono *et al*., 1998). Further, it is expected that the availability of virgin resources influences the collection of recovered resources, for if a region has a surplus of virgin resources the need to collect recovered resources will be low. If on the other hand a region does not possess virgin resources, the motivation to collect end-of-life products and use these as a recovered resource will be high. Ceteris paribus, a surplus of virgin resources will negatively influence use of secondary resources. The population density in a region will also affect availability of recovered resources. In low density population areas, the transportation cost to get the end-of-life products back will be higher than in regions where people live closely together. These higher costs will make recovered resources less attractive as a resource.

Here we are interested in how regional scope in the form of availability influences the strategies enabling reduction of resource dependence. In order to answer this question, this research grips back on the three determinants of dependence discussed in chapter two: resource importance, discretion over resources, and control over resources. In Figure 10 the impact of availability on resource importance is shown. If the availability of the recovered resource is low and the importance of the resource is low (quadrant 3), a firm will feel no need to do anything. Because the resource importance is low, a firm can do without the resources. The same is true for the situation where the availability is high and the resource importance is low (quadrant 4). If the availability of resources is high and the importance of the resource is high (quadrant 2), there still is no need to do anything for there are resources enough. The situation becomes problematic, however, when the resource importance is high and the availability is low (quadrant 1). Pfeffer and Salancik (1978) offer multiple resource dependence strategies to deal with this situation (cf. chapter 2, this research): substitute resources, inventories and diversification. In the case of RRDI's, substitute resources can be virgin resources as well. Inventories do not directly make the resource less important but the firm can continue operating longer in the absence of resource supply. Diversification changes the external context in which the firm operates and in doing so makes the resource less important.

Figure 10 Impact of Availability on three Determinants: Resource Importance, Discretion over Resource, and Control over Resource



In the argument regarding the following two determinants, discretion over resource and the control over resource, the assumption is made that the importance of the resource is significant.

The impact of availability on discretion over resources is shown in the second scheme in Figure 10. If availability of resources is low but a firm's capacity to determine the allocation or use over a resource is high already (quadrant 1), there is no need for a firm to change its resource dependence strategy. The same is true for the situation where availability is high and discretion over resources is high (quadrant 2). When availability of the resource is high and the discretion is low, there exists still no danger for the firm; the high resource availability makes that there will be enough for the firm to supply the need. The situation that will lead to a change in resource dependence strategies is when availability is low and the discretion over resources is low. Pfeffer and Salancik (1978) propose multiple resource dependence strategies that firms can apply: vertical integration, long term contracts, cooptation, social coordination, and influencing the regulation.

The illustration regarding the third determinant (Figure 10) shows how the availability of the resource influence a firm's resource dependence strategy in situations where (1) a few organisations control the resource and (2) many organisations are in control over the resource. In the situations where many organisations are in control over the resource, the individual dependence is relatively low (quadrant 1 and 2) and firms will feel no need to change the current resource dependence strategy, no matter the availability is low or high. When the resource is controlled by relatively few organisations and the availability is high (quadrant 4), the need to change the current strategy will still be moderate. However in the situation where the availability is low and the resource is controlled by relatively few organisations (quadrant 3), a firm will need to change its resource dependence strategy. Pfeffer and Salancik (1978) offer the following resource

dependence instruments to deal with these circumstances: growth, horizontal integration and anti trust suits.

Another issue related to regional scope which was not addressed before is resource knowledge creation. It is expected that in regions where the resources are available in high quantities the knowledge about how to deal with these is better developed than in regions where availability is low.

CONCLUSION

In this chapter *theoretical perspectives* on resource dependence management have been investigated in order to contribute to the research problem. By applying a resource dependence perspective on Mintzberg's schools of thought the contribution of current management literature to the research problem was evaluated. Each school showed a different perspective on managing resource dependence and each school contributed in a different way to the research problem.

The single lens theories described in this chapter show the need for a more encompassing approach on managing resource dependence. To this aim internal and external factors and theories associated with these factors were discussed, contributing to the research question and covering external and internal factors influencing resource dependence management, see Table 14.

Resource dependence theory (Pfeffer and Salancik, 1978) is the dominant theory of this study and contributes to insight into external as well as internal factors. Pfeffer and Salancik discuss three dominant themes: (1) firms are constrained by the environment; (2) firms can manage these constraints when they understand the environment; (3) power is the intermediating force. In this study the former two themes are extended. Three determinants of dependence and resource dependence instruments to influence these determinants have been discussed, whereby a distinction was made between intra-firm, inter-firm and institutional field resource dependence instruments. Other theories associated with internal factors influencing the use of resource dependence instruments discussed are: Resource-based view of the firm. Dynamic capabilities theory, and knowledge-based view of the firm (absorptive capacity). In order to provide more insight into the external factors influencing resource dependence management institutional theory was addressed. Furthermore, constructs associated with factor and product markets were discussed like: Technological developments, resource recycling characteristics, cost of the (recovered) resource, end-use market, and regional scope

Following a multi-dimension, multi-level approach, all of the selected theories were evaluated in their contribution to the strategy dimensions (context, content, process), and level of analysis (institutional field, industry, firm, management). In the next chapter,

the theoretical perspectives associated with external and internal factors influencing firms' resource dependence will be used to develop a conceptual managerial framework on resource dependence management. Moreover the context of strategic renewal will be addressed.

CHAPTER 3

STRATEGIC RENEWAL AND RECOVERED-RESOURCE DEPENDENCE MANAGEMENT: CONCEPTUAL MANAGERIAL FRAMEWORK AND PROPOSITIONS

INTRODUCTION

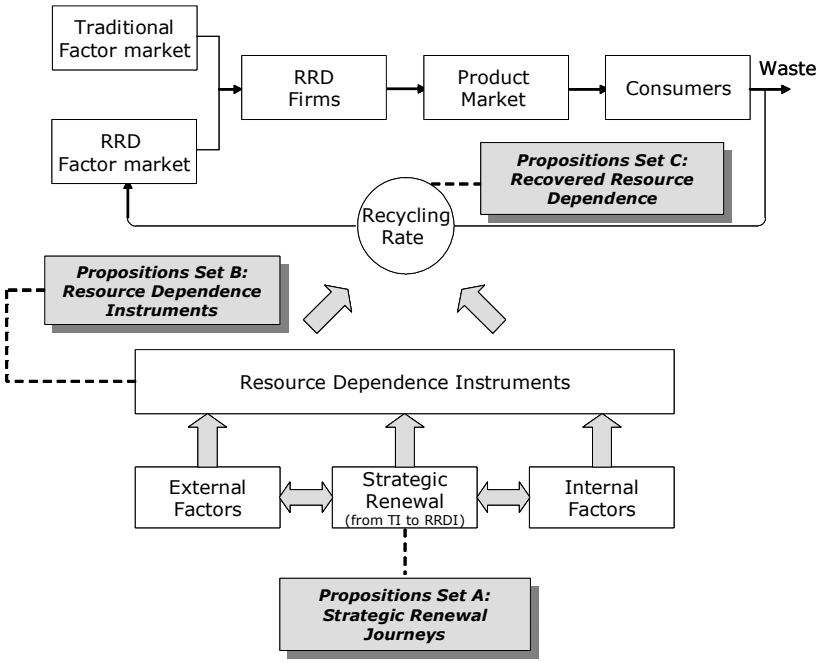
In the previous chapter theoretical perspectives were discussed associated with internal and external factors influencing resource dependence, see Table 14. In this way the research question, "*In the context of the transition from a traditional towards a recovered-resource dependent industry, which internal and external factors influence incumbent firms' strategic renewal and the use of resource dependence instruments and what are the implications for recovered-resource dependence management and competitive advantage*" was partly addressed. In this chapter research on resource dependence theory will be extended and a conceptual managerial framework is suggested incorporating the five theory-driven internal and external factors distinguished in the previous chapter, influencing incumbent firms' strategic renewal enabling the use of resource dependence instruments in order to manage recovered-resource dependence.

The chapter is organised as follows. In the next section the extended conceptual managerial framework is introduced. In the following sections the constructs of the framework are discussed more extendedly and propositions are developed. The constructs that will be discussed are: Strategic renewal and the different renewal journeys that incumbent firms can follow, resource dependence instruments that are likely to be used in the transition from a traditional towards recovered-resource dependent industry, and resource dependence instruments that can be used to manage incumbent firms' recovered-resource dependence. The sections conclude with an overview of the propositions discussed and the chapter ends with a conclusion and an overview of the framework and the position of the propositions in the framework. Propositions developed in this chapter will be illustrated in the empirical chapters. Due to data availability, not all propositions will be illustrated. Since the focus of this study is on theory building, no hypotheses will be tested.

TOWARDS A CONCEPTUAL MANAGERIAL FRAMEWORK OF RECOVERED-RESOURCE DEPENDENCE MANAGEMENT

The previous chapter discussed external factors and internal factors that influence resource dependence management, however, remained largely silent about strategic renewal and renewal journeys that can be followed, how these factors influence the use of resource dependence instruments, and how resource dependence instruments can influence RRDFs' recovered-resource dependence. In this section a managerial model is proposed that addresses the remaining issues of the research question, see Figure 11. The framework illustrates that strategic renewal due to the shift from a traditional towards a recovered-resource dependent industry is influenced by external and internal factors. Volberda et al. (2001a: 160) define renewal actions as: "the activities a firm undertakes to alter its path dependence". Strategic renewal actions, and the external and internal factors, on its turn influence the resource dependence instruments employed by incumbent firms. Resource dependence instruments used by incumbent firms, finally, influence the firms' recovered-resource dependence (in the framework expressed by the recycling rate).

Figure 11 Conceptual Managerial Framework and Situation of Propositions



In the next three sections of this chapter attention will be paid to three constructs of the framework: (A) Strategic renewal journeys, (B) Resource dependence instruments, and (C) Recovered-resource dependence, and three sets of propositions are developed, see Table 27. On each construct the five theoretical lenses discussed in chapter 2 will be projected, representing the external and internal perspectives on resource dependence management. The combination of each construct and theoretical lens generates an illustrative proposition (see Table 27). As mentioned before, a selection of these propositions will be empirically illustrated in the empirical chapters.

Applying an approach as mentioned above complements the multi-dimension approach. Strategic renewal, due to the shift from a traditional industry toward a recovered-resource dependent industry, contributes to the process dimension (Volberda et al., 2001a; 2001b). The context dimension is addressed by using five theoretical perspectives associated with internal and external factors influencing resource dependence management. The theories add content as well. Furthermore, this approach contributes to the content dimension by investigating resource dependence instruments employed and their impact on recovered-resource dependence.

Table 27 Five theoretical perspectives applied on three constructs: Strategic renewal, resource dependence instruments and recovered-resource dependence.

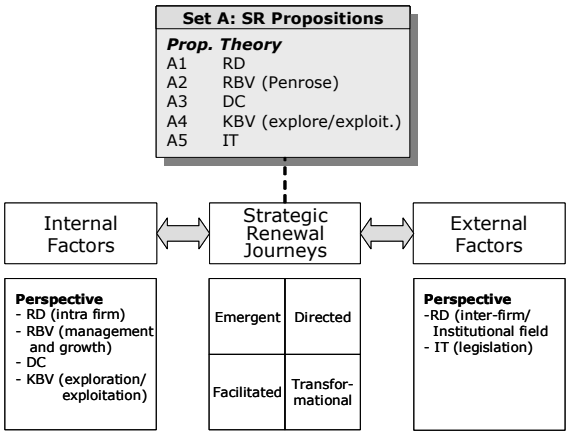
	Construct		
	A	**B**	**C**
Theoretical perspective	**Strategic renewal journeys**	**Resource dependence instruments**	**Recovered-resource dependence**
1. Resource dependence theory	Proposition A1	Proposition B1	Proposition C1
2. Resource-based view of the firm	Proposition A2	Proposition B2	Proposition C2
3. Dynamic capabilities theory	Proposition A3	Proposition B3	Proposition C3
4. Knowledge-based view of the firm	Proposition A4	Proposition B4	Proposition C4
5. Institutional theory	Proposition A5	Proposition B5	Proposition C5

By using these lenses, the framework contributes to different levels of analysis as well (cf. Table 10). Resource dependence theory (Pfeffer and Salancik, 1978) contributes to industry and firm level. Resource-based view of the firm (Penrose, 1959), Dynamic capabilities literature (Teece et al., 1997; Eisenhardt and Martin, 2000; Dosi et al., 2002; Cohen and Levinthal, 1989; 1990) and absorptive capacity literature (Van den Bosch et al., 1999; Jansen et al., 2005) contribute to firm level. And institutional theory (DiMaggio and Powell, 1983; Scott, 2001) contributes to institutional field, or industry level. The disadvantage of this five lenses approach is a misbalance in firm-level and industry-level propositions. However, the influence of external factors impacting the industry will be illustrated in the empirical chapters by investigating the constructs as proposed in Table 14.

PROPOSITIONS SET A: FIVE THEORETICAL PERSPECTIVES ON STRATEGIC RENEWAL JOURNEYS

In chapter two it was argued that a firm's (recovered-) resource dependence is determined by external factors (EF) and internal factors (IF), schematically: RRD = *f* (IF, EF). Here it is reasoned that a *change* in recovered-resource dependence is caused by *changes* in external and/or internal factors: ΔRRD = *f* (ΔIF, ΔEF). Incumbent firms' renewal journey can then be regarded as a change in internal factors enabling a realignment of resource dependence instruments to changing resource dependencies, SR ↔ ΔIF. The change in internal factors can be influenced by the external factors. The issues of selection versus adaptation in strategic renewal (Volberda et al., 2001a) will be addressed below, i.e. how active management reacts to changes in the environment. The remainder of this section focuses on the four idealised renewal journeys that incumbent firms can follow (Volberda et al., 2001a) and five theoretical lenses discussed in chapter 2 are projected on these journeys representing internal and external factors influencing these journeys, see Figure 12.

Figure 12 Strategic Renewal: The result of the interplay between changes in internal and external factors



Four Idealised Renewal Journeys

What strategic renewal journey can incumbent firms follow in their journey from traditional towards recovered-resource dependent industry? Volberda et al., (2001a) make a distinction between selective and adaptive perspectives on strategic renewal, whereby in *selection* perspectives renewal is viewed as highly restricted by resource scarcity, convergence to industry norms, and structural inertia. *Adaptation* perspectives on renewal

on the other hand suggest that firms can and do change, overcoming their rigidities. Firms learn to explore new competencies.

Volberda, et al. (2001a) argue that the different levels of management matter and make a distinction between top management and frontline management. Based of the attitude of different levels of management towards the environment (passive or active) Volberda, et al. (2001a: 160) identify four ideal renewal journeys incumbent firms can follow and label them: emergent renewal, directed renewal, facilitated renewal, and transformational renewal, see Figure 13. Each of them will be briefly discussed.

Figure 13 Idealised Renewal Journeys of Multi-Unit Firms

	Top management is PASSIVE with respect to Environment	**Top management is ACTIVE with respect to Environment**
Frontline and Middle Management are PASSIVE	**1. Emergent Renewal** "market decides"	**2. Directed Renewal** "Top management decides"
Frontline and Middle Management are ACTIVE	**3. Facilitated Renewal** "Frontline and middle Management decide"	**4. Transformational Renewal** "Top, frontline, and middle Management decide jointly"

Source: Volberda et al., 2001a: 163

In an *emergent* renewal journey, top management and frontline and middle management are both passive with respect to the environment. Management follows the market, or industry rules, because it is assumed that the market knows best. There will be a strong bias towards exploitation in the multi-unit firm. A *directed* renewal implies that top management is active with respect to the environment and frontline and middle management are passive. In this journey, top management knows best what direction to go, and also with regard to managing resource dependence. The third journey, *facilitated* renewal, is characterised by an active middle and frontline management and a passive top management. 'Front and middle management challenge "market knows best" and orchestrate organisational knowledge integration' (Volberda et al., 2001a: 163). In the case of the multi-unit firm, this can result in different units that have their own way of managing resource dependence, and will lead to a variety of renewal initiatives. In a *transformational* renewal journey, top management and frontline and middle management are both active with respect to the environment. Where in the directed renewal journey top management know best what to do, in the transformational renewal journey top, middle, and frontline management jointly know best what to do.

How are these four idealised renewal journeys (Volberda et al., 2001a) and incumbent firms' resource dependence management related? Figure 14 presents an overview of the four journeys and the expected potential for active resource dependence management. In an *emergent* renewal journey, where top management, and frontline and middle management are both passive with respect to the environment the potential for active resource dependence management is expected to be limited; the market will be followed with respect to resource dependence instruments, see Figure 14. In a *directed* renewal journey top management is active with respect to the environment, and in the context of this research it is expected active with managing resource dependence as well. Top management determines the resource dependence instrument instruments that will be used. Frontline and middle management are passive. The potential for active resource dependence management in this journey is moderate to high.

Figure 14 Idealised Renewal Journeys of Multi-Unit Firms and potential for active resource dependence management

	Top management is PASSIVE with respect to Environment	**Top management is ACTIVE with respect to Environment**
Frontline and Middle Management are PASSIVE	**1. Emergent Renewal** "market decides" ***Potential for active Resource dependence management LIMITED***	**2. Directed Renewal** "Top management decides" ***Potential for active Resource dependence management*** ***MODERATE / HIGH***
Frontline and Middle Management are ACTIVE	**3. Facilitated Renewal** "Frontline and middle management decide" ***Potential for active Resource dependence management MODERATE / HIGH***	**4. Transformational Renewal** "Top, frontline, and middle Management decide jointly" ***Potential for active Resource dependence management*** ***HIGH***

Source: Adapted from Volberda et al., 2001a: 163

A *facilitated* renewal journey is characterised by an active middle and frontline management and a passive top management. 'Front and middle management challenge "market knows best" and orchestrate organisational knowledge integration' (Volberda et al., 2001a: 163). In the case of the multi-unit firm, this can result in different units that have their own way of managing resource dependence, and will lead to a variety of renewal initiatives. The potential for active resource dependence management is moderate to high,

however as will appear later, front-line and middle management have the disposition over less resource dependence instruments than top management. In a *transformational* renewal journey, the potential for an active resource dependence management is high. Top management and frontline and middle management are both active with respect to the environment, and both will be motivated to manage resource dependencies as good as possible. Where in the directed renewal journey top management know best what to do, in the facilitated renewal journey top, middle, and frontline management jointly know best what to do.

Knowing what journeys can be followed, what do the theoretical perspectives discussed in chapter 2 suggest on the renewal journeys that will be followed? In following paragraphs this question will be answered by projecting the theoretical perspectives on the renewal journeys. Propositions are made regarding the renewal journeys that are likely to be followed. Table 28 presents an overview of the selected theories and an evaluation of the attitude towards renewal journeys.

Table 28 Theoretical perspectives, renewal journey, attitude towards renewal, and main contributors in this research

Theoretical perspective	**Renewal Journey** (1)	**Attitude Towards Renewal** (2)	**Main Contributors in this Research** (3)
Resource Dependence Theory	Adaptive and Selective	The external control of organisations and the use of resource dependence instruments by the different levels of management determine the strategic renewal journeys.	Pfeffer and Salancik (1978)
Resource-Based View of the Firm (Penrose)	Mainly selective	Management characteristics determine incumbent firms' growth and strategic renewal journey.	Penrose (1959)
Dynamic Capacities	Mainly adaptive	In volatile environments the adaptation of organisational routines leads to renewal journeys.	Teece *et al*. (1997), Eisenhardt and Martin (2000), and Zollo and Winter (2002)
Knowledge-based View (Absorptive Capacity)	Mainly adaptive	A firm's ability to internalise external knowledge and use it to commercial ends influences renewal journeys.	Cohen and Levinthal (1989, 1990), Van den Bosch et al. (1995), Jansen et al. (2005)
Institutional Theory	Mainly selective	Renewal journeys result from coercive, normative, and mimetic isomorphism. Renewal is achieved through maintaining congruence with shifting industry norms and shared logics	DiMaggio and Powell (1983), Greenwood and Hinings (1996), Scott (2001)

Source: (1) & (2) Adapted from Volberda et al, 2001a: 162, with exception of resource dependence theory and absorptive capacity

Resource dependence theory

In resource dependence theory selective as well as adaptive elements can be traced. Selective in the sense that the focal firm is constrained by its environment; it depends on other firms for the supply of resources, the first central theme in "The External Control of Organizations" (Pfeffer and Salancik, 1978). However, adaptive because the second central theme of resource dependence theory states that firms can use a variety of resource dependence instruments to change and overcome their rigidities that stem from uncertainty in the environment (Pfeffer and Salancik, 1978).

Renewal journeys of incumbent firms are shaped not only by developments in their business environment but also by the resource dependence instruments employed by the different management levels. In chapter 2 multiple resource dependence instruments were discussed and related to three levels of analysis: intra-firm, inter-firm and institutional field level. Although Pfeffer and Salancik (1978) do not explicitly discuss it, here it assumed that resource dependence instruments, levels of analysis, and management levels are related as well see Table 29.

Table 29 Resource dependence instruments and management involved

Resource Dependence Instruments	**Level of Analysis**	**Management levels that are likely to be involved: (1) Top management; (2) Middle and Frontline Management**
(1)	(2)	(3)
Inventories	Intra-firm	(1) & (2)
Substitute resources	Intra-firm	(1) & (2)
Diversification: Entering different lines of business	Intra-firm	(1) & (2)
Organic growth (Growth other than via merger, alliance, acquisition)	Intra-firm	(1) & (2)
Diversification: Merger, acquisition, joint venture, alliance	Inter-firm	(1)
Vertical Integration: Merger, acquisition, joint venture, Alliance	Inter-firm	(1)
Long-term contracts	Inter-firm	(1) & (2)
Cooptation	Inter-firm	(1)
Social Coordination	Inter-firm	(1)
Horizontal integration: Merger, acquisition, joint venture, alliance	Inter-firm	(1)
Influence and use of regulation	Institutional field	(1) & (2)
Anti trust suits	Institutional field	(1)

Source: (1), (2) see Table 18

A brief investigation of the management levels that can be involved when using the different resource dependence instruments suggests the following. *Intra-firm* resource

dependence instruments can be employed by all levels of management, see column 3, Table 29. *Inter-firm* resource dependence instruments can mainly be used by top management. *Institutional field* resource dependence instruments can be employed by top management and partly by middle and frontline management. This suggests that top management have most opportunities to influence resource dependence; all three levels of analysis can be addressed by them. Middle and frontline management can make use of intra-firm resource dependence instruments and make use of long-term contracts.

What are the consequences of this for the idealised renewal journeys (Volberda et al, 2001a) that are likely to be followed? Inter-firm resource dependence instruments are mainly associated with top management involvement. Depending on the attitude of top management towards the environment, or in the context of this study, top management's attitude towards resource dependence management this will lead to passive or active attitude renewal journey, respectively an emergent or directed renewal journey. This leads to the following proposition.

Proposition A1 (Related to Strategic Renewal)

In the context of the transition from a traditional towards a recovered-resource dependent industry:

From a *resource dependence* perspective, incumbent firms using mainly inter-firm resource dependence instruments are likely to be associated with an emergent or directed renewal journey.

Resource-based view of the firm

Resource-based theory emphasises the importance of the inside of the firm, whereby the firm is regarded as a bundle of tangible and intangible resources and tacit knowledge (Penrose, 1959; Wernerfelt, 1984). Volberda et al. (2001a) write the following with regard to the resource-based theory: "Renewal journeys are converging journeys of exploitation of unique core competencies". They therefore regard resource-based view as mainly *selective*. This perspective is also supported by Lewin and Volberda (1999) who argue the following 'Idiocratic resources are the basis of sustained competitive advantage; causal ambiguity in evaluating own and competitor core competencies is the source of suboptimal performance' (1999: 524). The implications for management are that they '… should maximize unique core competency, correct causal ambiguity in judging own and competitors core competencies' (Lewin and Volberda, 1999: 524). Firms are heterogeneous with regard to resources and capabilities, and this heterogeneity can be a source of competitive advantage.

The following argument of Penrose (1959) seems to support the view of an adaptation journey at first sight: 'The environment is not something 'out there' fixed and immutable, but can itself be manipulated by the firm to serve its own purposes' (Penrose, 2003: xiii). Volberda et al. (2001a: 160), argue 'Important parameters of a journey of renewal include: the behaviour of managers at each level of the organisation in response to each other (top-down or bottom-up); the way they view investing for tomorrow versus milking profits today (exploration versus exploitation); and the way in which they share knowledge with each other across organisation boundaries (intra-organisation learning)'. However, the way the environment is manipulated by the firm depends on management experiences or, as you like, management culture which suggests a selective journey. Remind that Mintzberg et al. (1998) place the resource-based view of the firm under the cultural school. Management of a firm is important; management characteristics and experiences determine a firm's renewal journey. If in the change process from a traditional towards a recovered-resource dependent industry all levels of management have a low involvement in managing resource dependence, the firm is expected to follow an emergent renewal journey. This leads to the following proposition.

Proposition A2 (Related to Strategic Renewal)

In the context of the transition from a traditional towards a recovered-resource dependent industry:

From a *resource-based view of the firm* perspective, incumbent firms in which both top, and middle and frontline management have a low involvement in managing resource dependence are likely to follow an emergent renewal journey.

Dynamic Capabilities

Where resource-based view of the firm emphasises the importance of management, Eisenhardt and Martin (2000) focus on the change in organisational and strategic routines. As discussed in chapter 2, they define dynamic capabilities s as 'The firm's processes that use resources – specifically the processes to integrate, reconfigure, gain and release resources – to match and even create market change. Dynamic capabilities thus are the organizational and strategic routines by which firms achieve new resources configurations as markets emerge, collide, split, evolve, and die'(Eisenhardt and Martin (2000: 1107).

This research is interested in the strategic renewal of incumbent firms from a traditional industry towards a recovered-resource dependent industry. This means a change in industry context, (cf. Figure 3) or in the words of Eisenhardt and Martin (2000) a change in markets. If firms fail to adapt their resource configurations to the new recovered-resource

dependent industry context, this can lead to a misfit between a firms' current resource dependence strategies and the new industry context. More precisely, firms have to develop dynamic capabilities regarding recovered-resource dependence management. Firms' traditional processes and routines will have to be revised and, where necessary, adapted. The repertoire of resource dependence instruments that was appropriate in the traditional industry context will have to be reconsidered for adequate recovered-resource dependence management in the new context. If firms fail to develop organisational routines regarding recovered-resource dependence, they are likely to follow selective, or more precise, emergent journey. This leads to the following proposition.

Proposition A3 (Related to Strategic Renewal)

In the context of the transition from a traditional towards a recovered-resource dependent industry:

From a *dynamic capabilities theory* perspective, incumbent firms that fail to develop organisational and strategic routines regarding recovered-resource dependence management are likely to follow an emergent renewal journey.

Knowledge-based view of the firm

Because this research focuses on the strategic renewal of incumbent firms from a traditional industry towards a recovered-resource dependent industry, from a knowledge-based view of the firm, knowledge development of how to deal with changing environments, and how to deal with recovered-resource dependence management in particular, is important. The knowledge-based view handles an adaptive perspective on renewal.

As discussed in chapter 2, Van den Bosch et al. (1999) distinguish three determinants of knowledge absorption (Efficiency, scope and flexibility). According to Van den Bosch et al. (2002), March's (1991) distinction between *exploration* and *exploitation* in the development of organisation knowledge can be related to these three dimensions of knowledge absorption. Van den Bosch et al. (2002) point out that the *efficiency* dimension of knowledge absorption is associated with the *exploitation* of a firm's knowledge configuration, or in the words of March (1991: 85) 'the essence of exploitation is the refinement and extension of existing competencies, technologies, and paradigms'. The *scope* and *flexibility* dimension of knowledge absorption can be associated with the *exploration* of the firm's knowledge configuration. The scope dimension is associated with the breadth of knowledge a firms draws upon and the flexibility of knowledge refers to the extent to which a firm can access additional, and reconfigure existing knowledge (Van den

Bosch et al., 1999). Note the similarity with dynamic capabilities (Teece et al., 1997; Jansen et al., 2005).

Volberda et al. (2001b) measure the content dimension of strategic renewal by analysing if renewal actions are explorative or exploitative. They argue that "… exploitation is primarily related to refinement and improvement in efficiency of existing activities, exploration is related to search and innovation activities" (2001b: 211). If the exploration ratio is expressed as the number of exploration-related renewal actions a firm undertakes during its renewal journey relative to the sum of the exploration and exploitation renewal actions (cf. Volberda 2001b), it can be assumed that low exploration ratio is associated with a low search for innovation activities, following the market, which suggests an emergent renewal journey. This leads to the following proposition.

Proposition A4 (Related to Strategic Renewal)

In the context of the transition from a traditional towards a recovered-resource dependent industry:

From a *knowledge-based view of the firm* perspective, incumbent firms with a low absorptive capacity, i.e. exploration ratio, are likely to follow an emergent renewal journey.

Institutional theory

New institutional theory (DiMaggio and Powell, 1983; Scott, 2001) handles a selective perspective on strategic renewal. Belonging to the environmental school (Mintzberg et al, 1999) institutional theory focuses on how firms respond to their environment. DiMaggio and Powell (1983: 149) argue: "Organizations in a structured field … respond to an environment that consists of other organizations responding to their environment, which consists of organizations responding to an environment of organizations' responses". Furthermore the authors wonder why organisations look so similar. They observe that firms operating in the same field adopt the same kind of organisational template. "In the initial stages of their life cycle, organizational fields display considerable diversity in approach and form. Once a field becomes well established, however there is an inexorable push towards homogenisation" (DiMaggio and Powell, 1983: 148). Incumbent, or long-lived, firms are not in the initial stages of their life cycle anymore and are from an institutional perspective are therefore expected to behave isomorphic.

DiMaggio and Powell (1983) present three different sources of isomorphism – coercive, normative, and mimetic – which make that organisations in the same institutional field behave isomorphic. Coercive isomorphism stems for example from the rules made by

institutions that have to be followed. Normative isomorphism stems from convergence to industry norms. Mimetic isomorphism stems from standard responses to uncertainty; firms that are regarded as successful are followed. This study is primarily interested in the influence of legislation related to recovered-resource dependence on industry performance, which has a coercive element in the sense that industry is forced to achieve certain recycling rates. If all firms in the industry are subjected to the same legislation, it is expected that they will behave similar, or isomorphic, as a response to this. Firms are therefore expected to follow an emergent renewal journey. This leads to the following proposition.

Proposition A5 (Related to Strategic Renewal)

In the context of the transition from a traditional towards a recovered-resource dependent industry:

From a *new institutional theory* perspective, incumbent firms behave isomorphic and are likely to follow an emergent renewal journey.

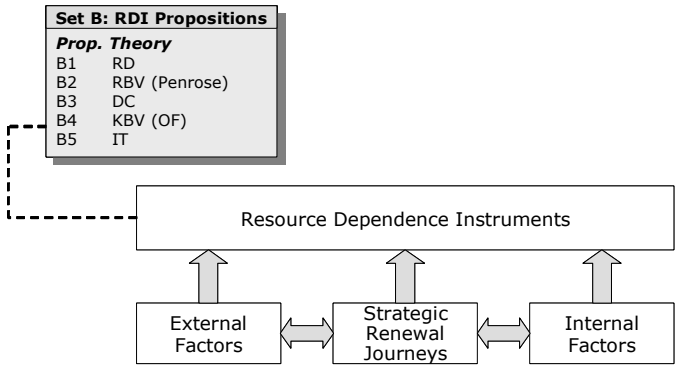
Table 30 Overview Strategic Renewal Propositions derived from five theories

	In the context of the transition from a traditional towards a recovered-resource dependent industry:
A1	From a *resource dependence* perspective, incumbent firms using mainly inter-firm resource dependence instruments are likely to be associated with an emergent or directed renewal journey.
A2	From a *resource-based view of the firm* perspective, incumbent firms in which both top, and middle and frontline management have a low involvement in managing resource dependence are likely to follow an emergent renewal journey.
A3	From a *dynamic capabilities theory* perspective, incumbent firms that fail to develop organisational and strategic routines regarding recovered-resource dependence management are likely to follow an emergent renewal journey.
A4	From a *knowledge-based view of the firm* perspective, incumbent firms with a low absorptive capacity, i.e. exploration ratio, are likely to follow an emergent renewal journey.
A5	From a *new institutional theory* perspective, incumbent firms behave isomorphic and are likely to follow an emergent renewal journey.

PROPOSITIONS SET B: FIVE THEORETICAL PERSPECTIVES ON THE USE OF RESOURCE DEPENDENCE INSTRUMENTS

This section examines the implications of strategic renewal due to the transition from a traditional industry towards a recovered-resource dependent industry for the *resource dependence instruments* incumbent firms employ, see Figure 15. In chapter 2 a distinction was made between intra-firm, inter-firm and institutional field resource dependence instruments that firms can use to reduce their resource dependence. In the following paragraphs the five theoretical perspectives discussed in chapter 2 will be used to analyse what resource dependence instruments are likely to be used by incumbent firms.

Figure 15 Factors influencing incumbent firms' resource dependence instruments



Resource dependence theory

In chapter 2 it was argued that a firm's dependence is determined by three determinants of dependence: (1) the importance of a resource exchange for the firm, (2) a firm's discretion over resource allocation and use, and (3) the concentration of resource control (Pfeffer and Salancik, 1978). Here it is illustrated that the change from a TI towards a RRDI leads to a change in determinants of dependence and this has implications for resource dependence instruments employed, see Table 31. In the remainder of this section the implications of for each of the determinants of dependence will be discussed in more detail. Afterwards resource dependence instruments at different levels of analysis influencing the determinants will be analysed.

Table 31 Change in determinants of dependence due to a shift from traditional towards recovered-resource dependent industry

Determinants of dependence (Pfeffer and Salancik, 1978)	Traditional industry	Recovered-resource dependent industry
1. *Importance of a resource exchange for the firm*	*Traditional* resources important	*Traditional* and *recovered* resources important
2. *Discretion over resource allocation and use*	Possession, access to resource, ability to control the use of a resource, and ability to make rules or otherwise regulate aforementioned issues focused on *traditional* resources	Possession, access to resource, ability to control the use of a resource, and ability to make rules or otherwise regulate aforementioned issues focused on *traditional* and *recovered* resources
3. *Concentration of resource control*	Input and output transactions are made by organisations involved in *traditional* resources.	Input and output transactions are made by organisations involved in *traditional* and *recovered* resources.

Implications for determinant 1: Importance of a resource exchange for the firm

In TIs 'traditional' or virgin resources are the most important raw materials for the continuation of the production processes. RRDIs rely to a certain extent on recovered resources. The extent to which they do is expressed by the recycling rate. In most cases a firm will depend on both types of resources, for a recycling rate of 100% will seldom be the case. It is therefore expected that the traditional resource remains critical for the production process, however, the relative magnitude of the exchange changes because recovered resources will be used for the production process as well. In terms of resource dependence instruments, this is an example of substitute resources, one of the resource dependence instruments Pfeffer and Salancik (1978) offer as a mean to reduce resource dependence. However it cuts both ways, being less dependent on virgin resources at the same time means being more dependent on recovered resources; this makes resource dependence management more complex. In the RRDI context incumbent firms have to manage their *recovered-resource dependence*. As mentioned before, RRDIs are more complex than TIs.

Implications for determinant 2: Discretion over resource allocation and use

The shift from a TI towards a RRDI has implications for the discretion over resource allocation and use of resources as well. Where in TIs incumbent firms might have obtained a prominent position with regard to access to resources, ownership of resources, or the ability to control the use of a resource, in RRDIs they might not have. In a RRDI-context a firm might have to start all over again to manage the discretion over recovered resource allocation and use. Furthermore, resource dependence management in RRDIs is

different, as mentioned in the introduction, recovered resources are not somewhere available but 'arise'.

In RRDIs firms will be confronted with different legislation which impacts discretion over resource allocation and use. For example the EU Packaging and Packaging Waste Directive (EU/96/EC) obliges Member States to reach targets sets for recycling rates for different materials. Countries are free to choose the way to meet these targets, and this has lead to a multitude of collection systems in Europe. The legal aspects, financing of the system, and ownership of recovered resources differs per country. The United Kingdom for example knows producer responsibility which means that the industry is responsible for getting end-of-life products back in the production chain and also carries the costs for this. In other countries communities are responsible for collecting end-of-life products. If incumbent firms are operating in different European countries, the firms will be confronted with the different collection schemes which influence the extent to which they will be able to get discretion over resource allocation and use. Firms can for example not be permitted to integrate backwards as a mean to get access to a resource. On the other hand, firms can actively take part in the organisations where the rules regarding the industry are made and in this way influence their recovered-resource dependence.

Implications for determinant 3: Concentration of resource control

The shift from TI towards RRDI has also consequences for the concentration of resource control. Because the firm will be using traditional and recovered resources, input and output transactions are made by more significant organisations than when only active in a TI. This means that the total concentration of resource control will reduce. Pfeffer and Salancik (1978) suggest horizontal integration and growth as means to influence the concentration of resource control.

Resource dependence instruments influencing determinants of dependence

The analysis above illustrates that the shift from traditional towards recovered-resource dependent industry impacts all three determinants of dependence. To be able to deal with these altered determinants of dependence incumbent firms will have to reconsider their resource dependence instruments configuration. What determinants of dependence can incumbent firms alter and what resource dependence instruments can be employed for this purpose? Table 18 presents an overview of the resource dependence instruments discussed before.

Table 32 Resource dependence instruments and level of analysis

Determinant of Dependence (1)	Resource Dependence Instrument (2)	Level of Analysis (3)
Importance of resource exchange	- Inventories	Intra-firm
	- Substitute resources	Intra-firm
	- Diversification: Entering different lines of business	Intra-firm
	- Diversification: Merger/Acquisition	Inter-firm
Discretion over resource allocation and use	- Organic growth (Growth other than via merger, alliance, acquisition)	Intra-firm
	- Vertical Integration	Inter-firm
	- Long-term contracts	Inter-firm
	- Cooptation	Inter-firm
	- Social Coordination	Inter-firm
	- Influence and use of regulation	Institutional field
Concentration of resource control	- Horizontal integration	Inter-firm
	- Anti trust suits	Institutional field

Source: (1) & (2) from Pfeffer and Salancik (1978); (3) see Table 17, Chapter 2

Incumbent firms can influence the *importance* of the exchange of recovered resources only to a limited extent. A firm can influence the relative magnitude of the resource exchange by adjusting the mixture of recovered resources relative to virgin resources but a firm's presence in a certain industry more or less sets the standard for the extent recovered resources are used for the production processes. Regulation tends to prescribe firms to utilise ever increasing amounts of recovered resources instead of traditional resources. The most likely way to influence the importance of the resource exchange for incumbent firms is to diversify into different lines of business; in this way the relative magnitude of the exchange changes.

The second determinant, discretion over *resource allocation and use*, is easier to alter for incumbent firms. Firms can vertically integrate, by acquiring firms that posses the recovered resources they need, or firms that control the access to recovered resources, and in this way influence the possession of and access to recovered resources. A less direct mean incumbent firms can apply is extending liaisons with organisations where regulation formation takes place. By actively promoting the industry's interest industry legislation can be influenced. Firms can influence the *concentration of resource control* by becoming bigger, in other words, horizontal integration.

From the analysis above it appears that most of the resource dependence instruments suggested to manage recovered-resource dependence are inter-firm resource dependence instruments. This is not unexpected, Pfeffer and Salancik (1978) highlight the importance to investigate the context of an organization; it is for this reason that they called

their book "The External Control of Organizations". "The underlying premise of the external perspective on organizations, is that organizational activities and outcomes are accounted for by the context in which the organization is embedded" (Pfeffer and Salancik, 1978: 39). It can therefore be expected that firms will use inter-firm resource dependence instruments because this give the possibility to influence their environment directly. This leads to the following proposition.

Proposition B1 (Related to Resource Dependence Instruments)

In the context of the transition from a traditional towards a recovered-resource dependent industry:

From a *resource dependence* perspective, incumbent firms are likely to use inter-firm prior to intra-firm resource dependence instruments as a mean to decrease resource dependence.

Resource-based view of the firm (Penrose)

In the previous section it was argued that management at different levels in the organisation plays an important role in the strategic renewal journey incumbent firms follow due to a shift from TI towards RRDI as well. Or in the words of Volberda et al. (2001a: 160), 'Important parameters of a journey of renewal include: the behaviour of managers at each level of the organisation in response to each other (top-down or bottom-up); the way they view investing for tomorrow versus milking profits today (exploration versus exploitation); and the way in which they share knowledge with each other across organisation boundaries (intra-organisation learning)'.

According to Penrose (1959) *management* plays a dominant role in the *growth* of the firm. Penrose (1959: 5) "In all of the discussion the emphasis is on the internal resources of a firm – on the productive services available to a firm from its own resources, particularly the productive services available form management with experience within the firm". Penrose (1959: 5) stresses that managerial knowledge plays a major role in organisational growth. "It is shown that not only the resources with which a particular firm is accustomed to working will shape the productive services its management is capable of rendering (where management is defined in the broadest sense), but also that the experience of management will affect the productive services that all its other resources are capable of rendering".

The previous paragraph showed that the shift from a TI towards a RRDI has implications for the determinants of dependence and resource dependence employed to deal with this. Management must develop certain capabilities with regard to recovered-resource dependence instruments management. Or in Penrosian jargon, firms must develop

managerial services to deal with resource dependence instruments in a recovered-resource dependent context. This leads to the following proposition.

Proposition B2 (Related to Resource Dependence Instruments)

In the context of the transition from a traditional towards a recovered-resource dependent industry:

From a *resource-based view of the firm* perspective (Penrose), the growth of incumbent firms necessitates the development of managerial services to cope with resource dependence instruments.

Dynamic Capabilities

As argued before, the change from a traditional industry towards a recovered-resource dependent industry has consequences for resource dependence instruments employed. In chapter 2 it was argued that in order to do so, firms have the disposition over intra-firm, inter-firm, and institutional field resource dependence instruments. Management must develop the skills to apply resource dependence instruments that conquer a firm's determinants of dependence.

Teece et al. (1997) argue that in order to address the changing environment, firms need to possess the ability to reconfigure internal and external firm-specific competences. Eisenhardt and Martin (2000) regard dynamic capabilities as the routines by which firms achieve new resource configurations. If routines regarding intra-firm resource dependence instruments are associated with internal firm-specific competences, and routines regarding inter-firm and institutional resource dependence instruments are associated with external firm-specific competences, then it can be argued that firms have to develop the ability to change their resource dependence instruments-related routines to address the recovered-resource dependent industry. Routines regarding intra-firm resource dependence instruments can for example concern inventory management. Routines regarding inter-firm resource dependence instruments can for example concern long-term contracts, or mergers and acquisitions. This leads to the following proposition.

Proposition B3 (Related to Resource Dependence Instruments)

In the context of the transition from a traditional towards a recovered-resource dependent industry:

From a *dynamic capabilities theory* perspective, incumbent firms need to develop the ability to change their routines regarding the application of intra-firm and inter-firm resource dependence instruments.

Knowledge-based view of the firm

Cohen and Levinthal (1990: 128) define absorptive capacity as a firm's ability to "… recognize the value of new, external knowledge, assimilate it, and apply it to commercial ends". According to Van den Bosch *et al*. (1999) three determinants of absorptive capacity can be distinguished: (1) a firm's prior related knowledge, (2) a firm's organizational form, and (3) the portfolio of combinative capabilities.

Recovered-resource dependence management is different from resource dependence management in TIs. For example getting the end-of-life products back in the production cycle is not an issue in TIs but plays a key role in RRDIs. Prior related management knowledge can help on these issues and with regard to choosing the right resource dependence instruments as well. The importance of management knowledge was discussed before when discussing the resource-based view of the firm (Penrose, 1959). Combinative capabilities are similar to dynamic capabilities (Jansen et al., 2005), and were discussed in the previous paragraph. Therefore the focus will be on the role of *organisation form*. From a resource dependence perspective, it is expected that incumbent firms will have chosen an organisational form that is appropriate in the traditional industry context. The recovered-resource dependent industry context is more complex and management will probably need to use a different portfolio of resource dependence instruments. This requires a higher absorptive capacity and a firm will have to change its organisation to enable this increase of absorptive capacity. This leads to the following proposition.

Proposition B4 (Related to Resource Dependence Instruments)

In the context of the transition from a traditional towards a recovered-resource dependent industry:

From a *knowledge-based view of the firm* perspective, incumbent firms are likely to increase their absorptive capacity by adopting their organisation form to cope with a variety of resource dependence instruments.

Institutional theory

New institutional theory suggests that institutional pressures lead to isomorphic behaviour. Here it is set out that isomorphic pressures will impact the resource dependence instruments employed as well. DiMaggio and Powell (1983: 148) argue that: "In the initial stages of their life cycle, organizational fields display considerable diversity in approach and form. Once a field becomes well established, however there is an inexorable push towards homogenisation." The authors observe that firms behave similar, which of course does not mean that these firms *are* similar. As discussed in chapter 2, and above when discussing a new institutional perspective on strategic renewal journeys, DiMaggio and

Powell (1983) distinguish between three sources of isomorphism: coercive, normative, and mimetic.

Coercive isomorphism is associated with industry rules and legislation. There are different directives or rules that apply to recovered-resource dependent industries. This means that firms operating in this industry context are all submitted to the same rules. Firms for example have to reach certain recycling targets. An overview of how these directives influence firms operating in RRDI's will be presented in chapter 5. From a mimetic isomorphism point of view it is expected that if firms' management is not certain about what direction to go, or which resource dependence instruments to use, it will copy the behaviour of other firms that they regard as successful. Therefore, when the organizational field becomes well established, it can be expected that firms operating in the same RRDI are likely to behave isomorphic with regard to resource dependent instruments. This leads to the following proposition.

Proposition B5 (Related to Resource Dependence Instruments)

In the context of the transition from a traditional towards a recovered-resource dependent industry:

From a *new institutional theory* perspective, incumbent firms are likely to behave isomorphic with regard to resource dependence instruments.

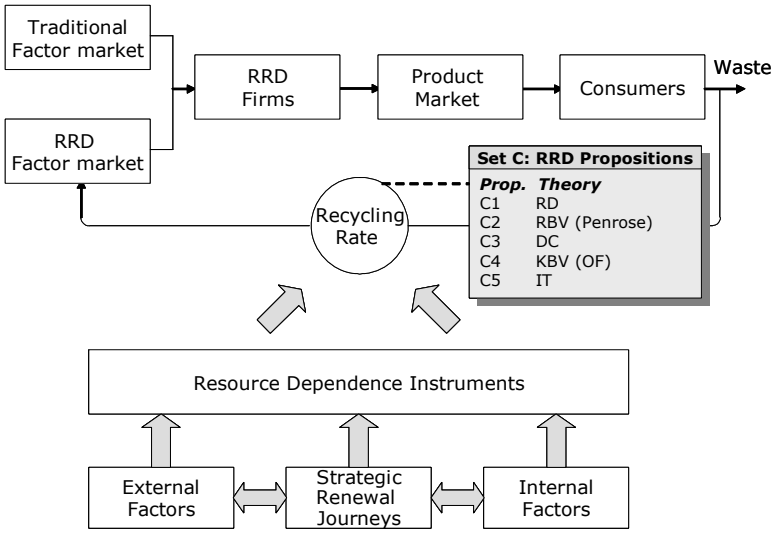
Table 33 Overview resource dependence instrument propositions derived from five theories

	In the context of the transition from a traditional towards a recovered-resource dependent industry:
B1	From a *resource dependence* perspective, incumbent firms are likely to use inter-firm prior to intra-firm resource dependence instruments as a mean to decrease resource dependence.
B2	From a *resource-based view of the firm* perspective (Penrose), the growth of incumbent firms necessitates the development of managerial services to cope with resource dependence instruments.
B3	From a *dynamic capabilities theory* perspective, incumbent firms need to develop the ability to change their routines regarding the application of intra-firm and inter-firm resource dependence instruments.
B4	From a *knowledge-based view of the firm* perspective, incumbent firms are likely to increase their absorptive capacity by adopting their organisation form to cope with a variety of resource dependence instruments.
B5	From a *new institutional theory* perspective, incumbent firms are likely to behave isomorphic with regard to resource dependence instruments.

PROPOSITIONS SET C: FIVE THEORETICAL PERSPECTIVES ON RECOVERED-RESOURCE DEPENDENCE

The previous two sections paid attention to strategic renewal of recovered-resource dependent firms and the resource dependence instruments that are likely to be used. In this section the former issues are related to recovered-resource dependence management, in Figure 16 expressed by the recycling rate. Analogue to the previous sections, the construct recovered-resource dependence will be approached with the five theoretical perspectives discussed in chapter 2. Each of the five lenses will now be discussed in more detail.

Figure 16 Conceptual Managerial Framework



Resource dependence theory

Contrary to firms operating in traditional industries, recovered-resource dependent firms have to manage their recovered-resource dependence, in Figure 16 represented by the recycling rate. External factors as environmental pollution, sustainability issues, and legislation are ever more playing a role, which makes that firms operating in RRDFs have become obliged to reach certain recycling rates, or in other words, have become more recovered-resource dependent.

According to theme two of "The External Control of Organizations" (Pfeffer and Salancik, 1978) incumbent firms will use resource dependence instruments to reduce the resource dependence stemming from their situations. It is expected therefore, that incumbent firms will use resource dependence instruments that enable access to recovered

resources. Long-term contracts with suppliers for example ensure the supply of recovered resources. Backward integration via acquisition of waste paper companies as well. In other words, firms are likely to use resource dependence instruments that improve their recovered-resource dependence. This leads to the following proposition.

Proposition C1 (Related to Recovered-Resource Dependence)

In the context of the transition from a traditional towards a recovered-resource dependent industry:

From a *resource dependence* perspective, incumbent firms are likely to employ resource dependence instruments that increase their recovered-resource dependence.

However, there are exceptions. Not all resource dependence instruments that influence recovered-resource dependence will lead to an increase in recovered-resource dependence. This leads back to differences at sub-level. In the paper and board sector for example, the packaging sector has a higher recycling rate, i.e. uses a higher quantity of recovered resources, than the graphic sector. This is explained by differences in legislation. The recycling targets set in the Directive 94/62/EC apply to firms operating in the packaging sector and not in the graphic sector. If a paper and board company in the packaging sector acquires a company operating in the graphic sector (diversification), this will lead to an overall lower recycling rate. However, resource dependence is reduced.

Resource-based view of the firm (Penrose)

Growth and the importance of management and services necessary to accomplish this growth play a dominant role in Penrose's (1959) work. According to Penrose (1959) management is at the same time the enabler of growth and also the limitation of growth. Growth in the transition from a traditional industry towards a recovered-resource dependent industry poses management with an even bigger challenge than growth in a traditional industry. In a traditional industry resource dependence management plays a role and management needs to develop services to resource dependence instruments. Incumbent firms operating in a recovered-resource dependent industry have to manage their *recovered*-resource dependence. Recovered-resource dependent firms that want to grow have to deal with recycling targets. The larger the firm, the more recovered resources will be needed in order to reach a certain recycling rate.

Management needs to acquire experience and to develop capabilities what resource dependence instruments to use in order to reach this target. This means that if

incumbent firms operating in RRDI's want to grow, they will have to develop services concerning recovered-resource dependence management. If they don't, they might not be able to cope with the recycling targets set for the industry. If recovered resources are easily available it will not be problematic. If however, recovered resources are scarce, it will be more difficult for the firm to grow. This leads to the following proposition.

Proposition C2 (Related to Recovered-Resource Dependence)

In the context of the transition from a traditional towards a recovered-resource dependent industry:

From a *resource-based view of the firm* perspective (Penrose), the development of managerial services of incumbent firms enabling an increase of recovered-resource dependence is a necessary condition for growth.

Dynamic Capabilities

Eisenhardt and Martin (2000) make a distinction between dynamic capabilities in moderately dynamic and high velocity markets. "In moderately dynamic markets, dynamic capabilities resemble the traditional conception of routines. They are detailed, analytic, stable processes with predictable outcomes. In contrast, in high-velocity markets, they are simple, highly experiential and fragile processes with unpredictable outcomes" (2000: 1105). The shift of incumbent firms from a traditional towards a recovered-resource dependent industry will most likely be moderately dynamic. Many actors are involved in the development of the industry regulation. Adaptations in the industry legislation will take some time.

In the previous section it was argued that from a dynamic capabilities perspective in the shift from a TI towards a RRDI incumbent firms must develop the ability change resource dependence instrument-related routines. Firms that possess these kinds of dynamic capabilities are likely to be able to increase their recovered-resource dependence, i.e. recycling rate. This leads to the following proposition.

Proposition C3 (Related to Recovered-Resource Dependence)

In the context of the transition from a traditional towards a recovered-resource dependent industry:

From a *dynamic capabilities theory* perspective, incumbent firms are likely to develop resource dependence instrument-related routines enabling an increase of recovered-resource dependence.

Organisation Form

Not only have firms to develop dynamic capabilities, absorptive capacity literature argues that a firm's organisation form plays an important role in knowledge absorption and creation as well. Kogut and Zander (1992) argue that a firm's knowledge base cannot be separated from the way it is organised. Van den Bosch et al. (1999: 554) argue: "The existing organization form influences how a firm processes knowledge. In this respect, an organization form is viewed here as a type of infrastructure which enables the process of evaluating, assimilating, integrating, and utilizing knowledge in a specific way".

In traditional industries firms do not have to manage their recovered-resource dependence. In recovered-resource dependent industries, however, they have to. Based on the arguments discussed in chapter 2 where the knowledge-based view is introduced, it is assumed that in the transition towards a recovered-resource dependent industry, incumbent firms will adapt their organisation form in such a way that the knowledge processes required for recovered-resource dependence management are positively influenced. This leads to the following proposition.

Proposition C4 (Related to Recovered-Resource Dependence)

In the context of the transition from a traditional towards a recovered-resource dependent industry:

From a *knowledge-based view of the firm* perspective, incumbent firms are likely to adapt their organisation form (including knowledge processes) enabling an increase of recovered-resource dependence.

Institutional theory

Not only internal factors influence recovered-resource dependence, external factors influence the recycling rate as well. Scott (2001) distinguishes between three institutional pillars: regulative, normative, and cognitive. According to Scott (2001: 51), "… all scholars underscore the *regulative* aspects of institutions: Institutions constrain and regularize behavior". An example of this regulative behaviour impacting the industry is the EU Packaging and Packaging Waste Directive, which obliges Member States to reach certain recycling targets. The targets set in the directive differ per RRDI. With regard to the social pillar Scott (2001) mentions the following. "Emphasis here is placed on normative rules that introduce a prescriptive, evaluative, and obligatory dimension into social life. Normative systems include both values and norms. *Values* are conceptions of the preferred or the desirable, together with the construction of standards to which existing structures of behavior can be compared and assessed. *Norms* specify how things should be done; they define legitimate means to pursue valued ends" (2001: 54). The representatives of the

cognitive pillar "…stress the centrality of cultural-cognitive elements of institutions: the shared conceptions that constitute the nature of social reality and the frames through which meaning is made" (Scott, 2001: 57).

As argued before, in the last decades sustainability and environmental awareness have started playing a dominant role, and legislation (regulative pillar) has responded to these developments by obliging firms to reach certain recycling rates. Institutions influence in this sense influence firm's behaviour. In order to obtain *legitimacy* (normative pillar), firms will behave according to the industry rules. An example of this is the initiative of the European paper and board industry, the recovered paper collectors, and merchants to further improve long-term environmental protection and to close the paper loop. They voluntary sign the European Declaration on Paper Recovery in 2000 and commit themselves to have achieved a recycling rate of 56% by 2005. This leads to the following proposition.

Proposition C5 (Related to Recovered-Resource Dependence)

In the context of the transition from a traditional towards a recovered-resource dependent industry:

From a *new institutional theory* perspective, , it is expected that in order to maintain legitimate legislation will increase incumbent firms' recovered-resource dependence.

Table 34 Overview recovered-resource dependence propositions derived from five theories

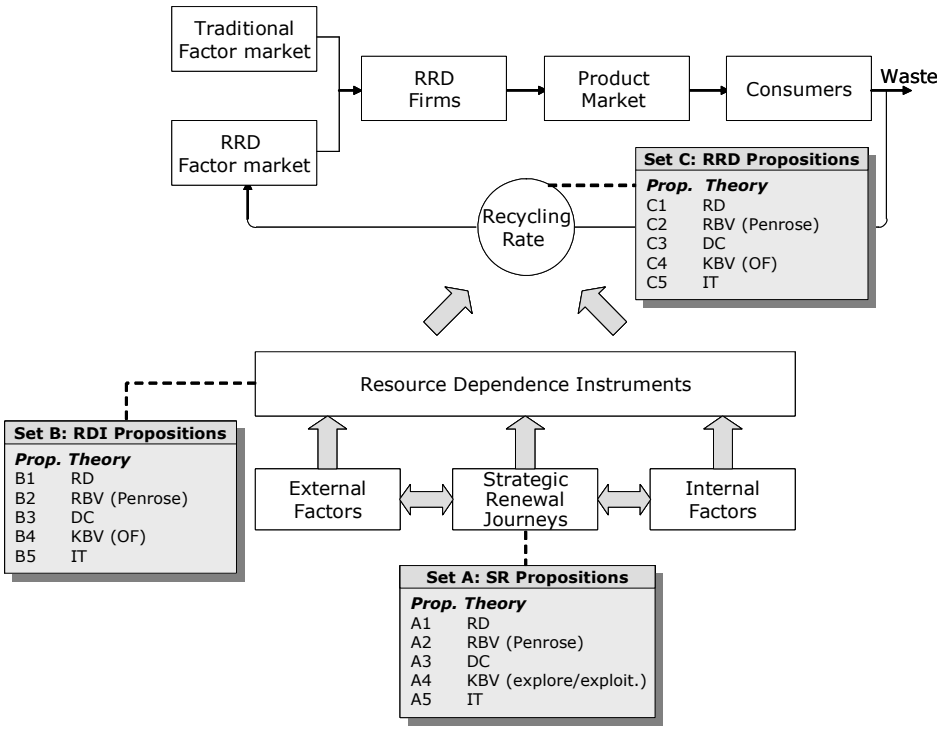
	In the context of the transition from a traditional towards a recovered-resource dependent industry:
C1	From a *resource dependence* perspective, incumbent firms are likely to employ resource dependence instruments that increase their recovered-resource dependence.
C2	From a *resource-based view of the firm* perspective (Penrose), the development of managerial services of incumbent firms enabling an increase of recovered-resource dependence is a necessary condition for growth.
C3	From a *dynamic capabilities* theory perspective, incumbent firms are likely to develop resource dependence instrument-related routines enabling an increase of recovered-resource dependence.
C4	From a *knowledge-based view of the firm* perspective, incumbent firms are likely to adapt their organisation form (including knowledge processes) enabling an increase of recovered-resource dependence.
C5	From a *new institutional theory* perspective, it is expected that in order to maintain legitimate legislation will increase incumbent firms' recovered-resource dependence.

CONCLUSION

In this chapter the research question of the study has been addressed by constructing a conceptual managerial framework that can assist incumbent firms' management to develop adequate resource dependence strategies in their struggle moving from a traditional industry towards a recovered-resource dependent industry, see Figure 17. In this context, three relevant constructs, and the relationship between these, are discussed: (A) strategic renewal journeys, (B) resource dependence instruments, and (C) recovered-resource dependence management.

The constructs have been approached from a multi-lens perspective. With use of five theoretical lenses it was argued that internal as well as external factors influence the strategic renewal journey that is followed and that these factors influence incumbent firms' resource dependence instruments employed, i.e. intra-organisational, inter-organisational and institutional field-level resource dependence instruments. The resource dependence instruments on its turn influence incumbent firms' recovered-resource dependence management.

Figure 17 Conceptual Managerial Framework and Propositions



Resource dependence theory (Pfeffer and Salancik, 1978) is associated with internal as well as external factors. Resource-based view of the firm (Penrose, 1959), Dynamic capabilities literature (Teece et al., 1997; Eisenhardt and Martin, 2000; Dosi et al., 2002; Cohen and Levinthal, 1989; 1990) and knowledge-based view (Van den Bosch et al., 1999; Jansen et al., 2005) are associated with internal factors influencing resource dependence management. Institutional theory (DiMaggio and Powell, 1983; Scott, 2001) is associated with an external factor influencing resource dependence management

The combination of these perspectives and constructs has led to three sets of illustrative propositions, see Figure 17. A selection of the propositions will be illustrated in the empirical part. The institutional theory-related propositions will be addressed in the chapters five and six because these chapters focus on industry level or the context in which incumbent firms operate. The strategic renewal journey and resource-dependence instrument related propositions will be addressed in the chapters seven and eight which both concentrate on firm level.

This chapter has paid attention to the three dimensions of strategy: Context, Content, and Process. The process dimension is addressed by investigating strategic renewal due to a shift from traditional towards recovered-resource dependent industry. The context dimension is addressed by paying attention to external and internal factors influencing the strategic renewal journey. The content dimension is addressed by suggesting what resource dependence instruments are likely to be employed by the different levels of management in order to manage recovered-resource dependence.

PART THREE:
EMPIRICAL RESEARCH

CHAPTER 4

EMPRICAL RESEARCH DESIGN: SELECTION OF INDUSTRIES AND FIRMS

INTRODUCTION

When '*The External Control of Organizations*' was published in 1978[1] the authors pointed out the following: 'While some empirical attention has been paid to the effects of environment on organizational structures, and there has been some theoretical emphasis on the importance of the environment, there are remarkable few studies of interorganizational influence activities' (Pfeffer and Salancik, 1978: 39). Since 1978, research on the effects of the environment on organisation structures has evolved and there have been many references to *The External Control of Organizations*. The idea that organisations are constrained by the environment and that they will attempt to manage the constraints and uncertainty that result from the need to acquire resources from the environment seems to be generally accepted. However, the empirical contributions to resource dependence theory have remained limited. Or as it was written in the 2003 edition of the classical work: 'Yes, there is a limited amount of empirical work explicitly extending and testing resource dependence theory and its central tenets' (Pfeffer and Salancik, 2003: xvi). This study aims to extend resource dependence theory.

With regard to recovered-resource dependent industries, most of the writings approach the field with an economical, institutional or technological lens (cf. Table 13). The institutional influences that RRDFs are confronted with is paid attention to in some of the writings, however these are not related to the implications that are associated with *managing resource dependence*. The resource dependence management challenges that come along with these industries are undervalued. The understanding of resource dependence in recovered-resource dependent industries is limited in scope and scale. The idea that firms can do something overcoming their rigidities is not emphasised.

Resource dependence theory (Pfeffer and Salancik, 1978) does recognise that there is a connection between the external control of organisations and interorganisational processes; this connection is mediated by power. Pfeffer and Salancik (2003: xix): "Specifically, those people or subunits which could best cope with critical organizational

[1] "The External Control of Organizations" by Pfeffer and Salancik was published in 1978. In this research also the 2003 edition was used which is a reprint of the original book and includes an introduction to the classical edition written by Jeffrey Pfeffer.

uncertainties came to have more power inside the organization … and used that power to ensure that their view of what should be done, including who should succeed to various positions, prevailed". In this sense resource dependence theory contributes to the process dimension. However, how *strategic renewal* influences resource dependence, the theory (Pfeffer and Salancik, 1978) does not tell. In the words of the authors, '… the theory is largely silent concerning which of the various cooptive strategies organizations will use, and how the use of these strategies will change over time and circumstances' (2003: xxiv).

Research focusing on resource dependence theory **a**nd considering explanatory constructs (external and internal) influencing the use of resource dependence instruments applied by firms in their transition from a traditional towards a recovered-resource dependent industry over time, can be considered as an extension. Therefore, this research focuses on the influence of context (explanatory constructs) and process (strategic renewal) on content (resource dependence instruments).

A MULTI-LEVEL, MULTI-DIMENSION RESEARCH APPROACH

This chapter discusses the research methodology followed in order to address the research questions that were introduced in chapter 1 (Table 35) and to illustrate the conceptual managerial framework and propositions presented in chapter 3 (Figure 11). The industry and the firm level research questions that were introduced in chapter 1 ask for a multi-level research approach.

Moreover, a multi-dimension research approach is followed. At industry level this research is interested in how external factors (context) influence incumbent firms' (recovered-) resource dependence. At firm level this research is interested in resource dependence instruments employed by incumbent firms (content) in their renewal journey (process). Therefore, this study embodies a multi-level multi-dimension research approach with *eight research settings*, see Table 36. These settings were chosen to address the research questions at different levels of analysis and units of analysis. Moreover, they provide the possibility to address the different dimensions of strategy (context, content and process).

The industry level research questions are investigated at cross-industry level (chapter 5) and industry level (chapter 6). The aim of these two chapters is primarily to investigate external factors influencing strategic renewal of RRDIs. In terms of Pfeffer and Salancik (1978) these chapters address theme one: the external control of organisations. The firm level research questions are investigated at cross-firm level (chapter 7) and firm level (chapter 8). The aim of the firm level chapters is to investigate the resource dependence instruments employed and the implications for management processes and

organisation structures. In terms of Pfeffer and Salancik (1978) these chapters address theme two: firms' opportunities to influence their environment.

Besides different levels of analysis, this research follows a multi-dimension approach. Attention is paid to three dimensions of strategy: context, content and process. The process plays an important role, for this research is interested in strategic renewal of incumbent firms due to the transition from a traditional towards a recovered-resource dependent industry. Therefore the process dimension is addressed in all four empirical chapters. With regard to the other dimensions of strategy, generally speaking, the industry level chapters focus on the context dimension and the firm level chapters focus on the content dimension. However, when the 8 research settings are discussed in more detail it will appear that this border is too narrow.

Table 35 Research questions at firm and industry level

Overall research question:

- In the context of the transition from a traditional towards a recovered-resource dependent industry, which internal and external factors influence incumbent firms' strategic renewal enabling the use of resource dependence instruments in order to increase competitive advantage?

Industry level research questions:

- Which external factors constrain firms in recovered-resource dependent industries?
- To what extent are external explanatory constructs associated with these external factors able to explain differences in performance of recovered-resource dependent industries?

Firm level research questions:

- Which internal factors constrain firms in recovered-resource dependent firms?
- To what extent are internal explanatory constructs associated with these internal factors able to explain differences in performance of recovered-resource dependent firms?
- Which resource dependence strategies and resource dependence instruments are applied and why is this the case?
- What are the implications of these strategies for management processes and organisation structures?

In this study two research strategies, qualitative and quantitative are followed. The two methods (case study and strategic renewal actions analysis) were chosen in line with the different dimensions addressed. To address the process dimension, longitudinal case studies and a strategic renewal and resource dependence actions analysis were conducted. To contribute to the context dimension, comparative and in-depth case studies were conducted. All research settings contribute to the content dimension.

The remainder of the chapter is structured as follows. In most research settings (see Table 36), the case study method is applied and therefore this method will be set out first. After this, the research method for measuring strategic renewal and resource dependence actions will be described. Then the eight research settings are discussed,

following the structure of the levels of analysis, from broad to narrow focus, i.e. from industry level to firm level (cf. Figure 4), followed by the ways in which the methods complement each other and triangulation of sources of evidence. The chapter is ends with a discussion and limitations of the research design.

Table 36 Research settings: level of analysis, unit of analysis, period, dimension, research method, data sources, and chapter

Setting	Level of analysis	Unit of analysis	Period	Dimension	Research method	Data sources	Chapter
1.	Cross-Industry level, Comparing three European Recovered-Resource Dependent Industries	Industries: - Paper and Board - Aluminium - Plastic	2000 – 2002	Context, Content, Process	Case study (comparative)	Industry documents (e.g. branch organisations, websites)	5
2.	Global Paper and Board Industry	Continent level: - Western Europe - North America - Asia far East	1990, 2002, 2010	Context, Content, Process	Case study (comparative)	Industry documents (EU Consulting 2002; 2004)	6
3.	European Paper and Board Industry	European Level: - Paper and Board	1960 – 1970 1970 – 1995 1995 – 2004	Context, Content, Process	Case study (Longitudinal)	Industry documents, EU Directives, Interviews, Meetings with experts	6
4.	Comparing European Paper and Board End-Use sectors	Paper and Board Sectors: - Packaging sector - Graphic sector	2002	Context, Content	Case study (Comparative)	Industry documents (CEPI data), Meetings with industry experts	6
5.	Comparing six European countries in the Paper and Board industry	Country level: - France - Germany - the Netherlands - Spain - Sweden - UK	1996 – 2004	Context, Content	Case study (Comparative)	Industry documents, Meetings with industry experts	6

Table 36 Research settings: level of analysis, unit of analysis, period, dimension, research method, data sources, and chapter (continued)

Setting	Level of analysis	Unit of analysis	Period	Dimension	Research method	Data sources	Chapter
6.	- Cross-Firm	Packaging sector: - Kappa Packaging - Smurfit - SCA Graphic sector: - Norske Skog - StoraEnso - UPM-Kymmene	1998 – 2003	Content, Process	Strategic Renewal and Resource Dependence Actions Analysis	Annual reports, Paperloop, industry documents, Meetings with industry experts	7
7.	Resource dependence management at Kappa Packaging	Kappa Packaging	1970 – 2004	Context, Content, Process	Case study (Longitudinal)	Company documents, interviews, Meetings with industry experts	8
8.	In-depth analysis organisation form and the role of Kappa Paper Recycling	Kappa Packaging - Corporate - Kappa Paper Recycling	1995 – 2004	Context, Content	Case study (In-depth)	Company documents, interviews, meetings with industry experts	8

Source: See Table 6 for setting and level of analysis

CASE STUDY METHOD

As argued before in the literature little attention was paid to resource dependence management in RRDIs. RRDIs are an interesting field for examining resource dependence management, for incumbent firms are increasingly confronted with sustainability issues and legislation aiming at reusing and recycling end-of-life products (Conrad, 1999; Sterner and Bartelings, 1999; Prendergast *et al*., 1997; Ayres, 1997). Little is known about the use of resource dependence instruments, the impact of explanatory constructs and their evolution through time. Case study methodology has been suggested as an appropriate method for examining in-depth phenomena of organisations in their real-life context. Case studies allow researchers to infer causal relations and to grasp holistic patterns in their real setting (Miles and Huberman, 1994; Numagami, 1998; Yin, 1984). In that vein, it serves the purpose of exploring contemporary issues, and of developing and expanding theory (Eisenhardt, 1989). Yin (1984) argues that a case study design can either be holistic or embedded. In this research a combination of both is applied.

The holistic view is contributed to by maintaining longitudinal case study research (Pettigrew, 1990). Longitudinal case study facilitates the detection of causality, the inference on data on processes, understanding of organisational change, and the inclusion of contextual constraints (Kimberly, 1976). When time and dynamics are central in an analysis (Kimberly, 1976; Pettigrew, 1992; 1997b), the longitudinal case study methodology can be employed. In order to gain insight into the impact of external factors impacting the industry and resource dependence management at firm level longitudinal case studies were employed in the European Paper and Board industry (setting 3, Table 36) and at the focal firm Kappa Packaging (setting 7, Table 36).

The cross sectional approach refers to studying developments across a number of units of analysis at a given point in time (Porter, 1991). This approach is mainly suited to execute comparative studies of static situations and, contrary to the longitudinal case study, does not render insight into the chain of causality of different strategic renewal processes and their outcomes. An embedded case study design was employed embodying four units of analysis (cross-industry, industry, cross-firm, and firm level), shown in Table 36, using comparative case study research and in-depth case studies.

By adopting a methodology as advocated by Pettigrew (1990), this study was in search of (1) embedding the case study across a number of levels of analysis, (2) temporally interconnecting events, (3) explaining action in its context, and (4) linking process to outcome. In that capacity, the research method is on all fours with the contextual research tradition in which an event or phenomenon is investigated ‘in its setting’; that is, not only

the socio-economic, political and business context, but the intra-organisational context were of concern (Pettigrew, 1985).

To gain insight into the external factors influencing RRDIs in general, at European level an industry comparison was employed (setting 1, Table 36). To this aim three industries are compared: the paper and board industry, aluminium industry and plastic industry. The process dimension is addressed by providing a brief historical description of the industries. The content dimension is paid attention to by comparing the performance (recycling rate) of the industries. The context dimension is addressed by investigating the market for virgin and recovered resources, the resource recycling characteristics, and legislation impacting the industry.

The developments in the focal industry (paper and board) at global industry level (setting 2, Table 36) were analysed by considering the paper and board production and consumption, and recovered paper consumption and collection, for the three major players (North America, Western Europe, and Asia Far East). To contribute to the process dimension of resource dependence management, three points in time are described. The snapshots chosen are: 1990 representative for the nearby past situation, 2002 as the present situation, and the expectations for 2010 (based on data from EU Consulting, 2004) to see where recycling rate in the industry is heading to.

From the analysis of the developments in the Paper and Board industry at global level it appeared that from a resource dependence perspective Europe is a remarkable case. In order to gain more insight into the strategic renewal of this focal industry, a longitudinal case study was employed (setting 3, Table 36) whereby attention was paid to resource dependence management and external factors impacting the industry: regional scope, technological developments, market for virgin and recovered resources, and legislation.

In order to gain insight into performance differences between European paper and board sectors and countries, a case study was conducted to investigate the heterogeneity of the focal industry, and at two levels: sector and country level. Four paper and board end-use sectors are compared and implications of the differences in consumption of recovered resources on resource dependence management are considered (setting 4, Table 36). The strategic renewal actions of six incumbent firms in the two major paper and board sectors will be described in the next section. For six European countries dynamics in the factor market (price volatility of recovered paper) were related to inventory management of these countries (setting 5, Table 36).

To contribute to the analysis of strategic renewal actions at firm level, a longitudinal case study was conducted at Kappa Packaging (setting 7, Table 36), covering the period 1970 until 2004. From this study comes forth that the importance of recovered resources for the company, and also the attitude of management towards recovered resources, has changed through time. Special attention is paid to the change in organisation

form and the role of Kappa Kaper Recycling in the recovered paper purchasing process (setting 8, Table 36).

ASSESSING STRATEGIC RENEWAL AND RESOURCE DEPENDENCE ACTIONS

In the introduction the construct of strategic renewal was introduced and defined as "the activities a firm undertakes to alter its path dependence" (Volberda, 2001a: 160). It was also argued that a firm's management played a major role in this and the attitude of management at different levels in the organisation towards the environment influences the strategic renewal journeys. Building on Volberda, et al. (2001a; 2001b) in this paragraph metrics will be employed to measure firms' strategic renewal journeys. Following Volberda, et al. (2001b), strategic renewal is regarded as a three dimensional construct consisting of a context, content and process dimension, see Table 37.

The *context* dimension refers to the environments in which firms operate, it gives an answer to the 'where' question. Volberda et al (2001b) distinguish between internal and external actions. Internal actions: include starting up new business, closing offices, reorganising activities, launching new products, improvement of existing processes, machine upgrades. External actions: include mergers, acquisitions, joint ventures and alliances. Another indicator of contextual firm behaviour is the distinction between domestic and international actions. A high number of domestic actions, where domestic is regarded as the country where the head office is located, imply that the firm is a local player. A relative high number of international actions suggest that a firm is more international operating.

The *content* dimension concentrates on the 'what' of strategy renewal. A distinction is made between exploitation and exploration (March, 1991). According to Volberda et al, exploitation actions are defined as "renewal actions that elaborate on the current range of its activities and fall within the current geographic scope, or that rationalise activities. These include cost savings, the dissolution of product ranges, sale of activities and increasing scale by merger or acquisition (2001b: 214)". Exploration actions are renewal actions that add new activities to the current repertoire of the organisation, or that increase the geographic scope of the firm. Examples in the focal industry can concern new sorts of paper or buying a mill in areas where the company is not yet present. The content dimension is also expressed by the number of expansion actions or retreat actions.

The *process* dimension looks at the 'how', 'who' and 'when' of strategy renewal. The number of strategic actions in a certain period of time for example gives insight into this. In this research the three dimensional strategic renewal construct described before is extended with a resource dependence perspective, see Table 37.

Table 37 Dimensions of strategic renewal and resource dependence

Dimension	Central question	Indicator of dimension	
		Volberda, et al. (2001b)	Resource dependence perspective
Context	'Where'	Internal and external actions Domestic and international	Internal and external factors influencing the use of resource dependence instruments
Content	'What'	Exploration and exploitation Expansion and retreat	Intra-organisational, inter-organisational, and extra-organisational resource dependence instruments
Process	'How', 'who', and 'when'	Number of strategic actions in a certain period.	Number of resource dependence actions over time.

With regard to the *context* dimension a distinction is made between internal and external explanatory constructs. Strategic renewal internal actions are regarded as change in operational routines, management, and organisation structure. External explanatory constructs concern resource recycling characteristics, regulation, and regional scope. In other words, internal explanatory constructs are more related to *adaptive* strategic renewal journeys, external explanatory constructs are related to *selective* strategic renewal journeys.

The *content* dimension of strategic renewal is extended by paying attention to the use of resource dependence instruments. A distinction is made between actions where intra-organisational are used and actions where inter-organisational resource dependence instruments are used. *Intra-organisational* resource dependence instruments influence a firm's resource importance. Examples are inventories, diversification of resources, and diversification of products. *Inter-organisational* resource dependence instruments influence a firm's discretion over recourses and include: long term contracts with suppliers, vertical integration, and horizontal integration.

The *process* dimension is captured by examining the use of resource dependence instruments over time. This way insight is provided in the dynamics of resource dependence instruments employed, moreover, it shows what resource dependence instruments are dominantly used by incumbent firms.

Measuring strategic renewal and resource dependence actions

In order to measure strategic renewal and resource dependence actions, presented in Table 37, multiple metrics are chosen. The metrics enable the analysis and comparison of strategic renewal processes within and between firms over time across institutional settings and industries (McKelvey, 1997) and discern between managerial intentionality, institutional and environmental pressures (Lewin and Volberda, 1999), and explanatory

constructs with regard to resource dependence instruments that drive strategic renewal of large and mature organisations. The definitions of the metrics are summed up in Table 38. All of them are based on the principle relating the number of times the indicator takes place to the total number of actions. To give an example, the external internal ratio indicates the number of external actions that occur in a certain period as a ratio of the total number of actions in that period, which are the number of external and internal actions together. With regard to resource dependence indicators the calculation is slightly different; each of the selected metrics is related to the total number of resource dependence actions, cf. Table 18.

Table 38 Definitions of strategic renewal and resource dependence metrics

Metric	Definition
Strategic renewal	
External / Internal Ratio	Number of external actions / Total number of external and internal actions
Domestic / International Ratio	Number of domestic actions / Total number of domestic and international actions
Exploitation / Exploration ratio	Number of Exploitation actions / Total number of exploitation and exploration actions
Retreat/ Expansion ration	Number of retreat actions / Total number of retreat and expansions actions
Resource dependence	
Intra-organisational ratio	Number of intra-organisational resource dependence actions / Total number of resource dependence actions
Substitute resource ratio	Number of substitute resource actions / Total number of resource dependence actions
Inventory ratio	Number of inventory management actions / Total number of resource dependence actions
Diversification ratio 1	Number of diversification actions regarding entering different lines of business / Total number of resource dependence actions
Inter-organisational ratio	Number of inter-organisational resource dependence actions / Total number of resource dependence actions
Diversification ratio 2	Number of resource diversification actions using acquisitions or alliances / Total number of resource dependence actions
Vertical integration ratio	Number of vertical integration action / Total number of resource dependence actions
Horizontal integration ratio	Number of Horizontal integration actions / Total number of resource dependence actions
Long term contracts ratio	Number of long term contracts actions / Total number of resource dependence actions
Cooptation ratio	Number of cooptation actions / Total number of resource dependence actions
Social Coordination ratio	Number of social coordination actions / Total number of resource dependence actions
Institutional field ratio	Number of institutional field dependence actions / Total number of resource dependence actions
Influence and use of Legislation ratio	Number of resource dependence actions influencing or using legislation / Total number of resource dependence actions
Anti trust suits ratio	Number of resource dependence actions influencing antitrust suits / Total number of resource dependence actions

Resource dependence metrics based on Table 18

RESEARCH SETTINGS AND DATA SOURCES

In the following sections the eight research settings listed in Table 36 will be described in more detail with attention for data sources as well.

Research Setting 1: Cross-Industry Level, Comparing Three European Recovered-Resource Dependent Industries

A comparative case study in three recovered-resource dependent industries was conducted to investigate the impact of the external factors distinguished in chapter 2 and chapter 3 on RRDFs at cross-industry level. In this way this setting contributes to the industry level research questions (Table 35). The selected industries are: Aluminium, Paper and Board, and Plastic. There were different selection criteria.

First of all, there is a difference in the resource recycling characteristics of the products. Aluminium does not decrease in quality and can be recycled endlessly. This implies that the availability of aluminium increases through time. Paper and board products suffer from quality loss and cannot be recycled endlessly. The limits of recycling paper and board products are still uncertain; the number of times paper and board products can be recycled is still under investigation. Plastics suffer considerably more from quality loss. This research is interested in how these differences influence the applied resource dependence instruments.

The second point is related to factor market conditions. There is a difference in availability between the different primary and recycled resources. Aluminium is a finite natural resource. The origin of paper and board products leads back to forestry, trees, which can be grown again when used. Plastics lead back to the chemical or oil industry.

Relative price is another issue on which the industries differ. For example, aluminium is the most expensive of the three. Especially aluminium made from raw materials is energy consuming and expensive. With regard to the paper and board industry, pulp wood is more expensive than recovered paper.

The last point is legislation. All three industries are subjected to the EU directive on Packaging and Packaging Waste (94/62/EC). But all of the three industries are also subjected to industry-specific legislation, e.g. End-of-life vehicle directive (2000/53/EC) for the aluminium industry and the declaration on paper recovery for the paper and board industry. This research is interested in how differences and similarities in institutional effects affect the use of resource dependence instruments.

Setting 1 contributes to three dimensions of strategy. First of all the process dimension is addressed by providing a brief description of the history of the three industries (past until 2004). Attention is paid to external factors like regional scope, resource recycling characteristics, market for virgin and recovered resources, and legislation. This

research contributes to the content dimension by providing a comparison of the performance, i.e. recycling rate, of the three industries in 2002. Attention is paid to the context dimension by examining some of the external factors in more detail: the market for virgin and recovered resources, resource recycling characteristics, and legislation impacting the industry. When discussing the industry legislation, proposition C5 (see, Table 34) will be illustrated as well.

Data collection

In order to obtain statistics and other information for the aforementioned issues, European branch organisations and internet websites were consulted, see Table 39. For the aluminium this was the European Aluminium Association (EAA). For paper and board this was the Confederation of European Paper Industries (CEPI). For plastics the European Association of Plastics Recycling and Recovery Organisations (EPRO) was consulted. Other consulted organisations are listed in Table 39.

Table 39 Data sources used in research setting 1 *)

Paper and Board
Confederation of European Paper Industries (CEPI), www.cepi.org
EU Consulting (2002, 2004)
Food and Agricultural Organization of the United Nations (FAO), http://Faostat.fao.org/faostat and www.unece.org
www.hqpapermaker.com/paper.htm
www.geocities.com/Tokyo/Island/3268/invention/paperinvention.html
www.mead.com/docs/facts/history.html
www.indiapapermarket.com/history.asp#pmprocess
www.paperonline.org/history
"Kleine Papiergeschichte" by Dieter Freyer, http://members.vienna.at/difr/papier/

Aluminium
European Aluminium Association (EAA), www.aluminium.org
London Metal Exchange, www.lme.co.uk
Organisation of European Aluminium Refiners and Remelters (OEA), www.eoa-alurecycling.org
European Aluminium Foil Association (EAFA), www.alufoil.org
European Aluminium Association, www.eaa.net
European Aluminium Packaging Association (Packalu)
International Aluminium Institute (IAI), www.world-aluminium.org

Plastics
European Association of Plastics Recycling and Recovery Organisations (EPRO)
www.epro-plasticsrecycling.org
BASF website, www.basf.com
American Plastics Council, www.americanplasticscouncil.org
APME (now: PlasticsEurope), www.plasticseurope.org
www.wasteonline.org.uk/resources/InformationSheets/Plastics.htm

*) not mentioned in references section

Research Setting 2: The Global Paper and Board Industry

Seeing the results of the industry comparison, the paper and board industry was believed to be a promising field to perform the case study analysis. In order to obtain more insight into the development of the external explanatory construct 'regional scope' a case study was conducted and the three major players in the paper and board industry (North America, Western Europe, and Asia Far East) were compared at three points in time: 1990, 2002, and 2010. This approach gives the opportunity of looking backward, describing the current situation, and paying attention to developments that are expected to occur in the future. It appears that the position of the three players is changing. With regard to consumption of recovered paper Asia Far East is likely to become the dominant player. With regard to collection of recovered resources Western Europe is the best performing player.

Data collection

For the description of the three points of time (1990, 2002, and 2010) statistics of EU Consulting (2004) were used, focusing on future trends and developments in the use and availability of recovered paper, see Table 40. The advantage of this source above for example CEPI statistics, the European branch organisation, or FAO is that beside historical data this source also contains a forecast concerning the recovered paper and paper and board situation in the near future (2010).

Table 40 Data sources used in research setting 2

EU Consulting 2004 Globalising Recovered Fibre Markets – 2004 Edition with Forecasts through 2010

Research Setting 3: The European Paper and Board Industry

The developments at global level showed that Europe has an outstanding position with regard to recycling performance. The aim of setting 3 is to illustrate how the external factors distinguished in chapter 2 and chapter 3 have influenced the European paper and board industry through time. In this sense setting 3 contributes to all three dimensions of strategy. Attention is paid to regional scope, markets for virgin and recovered resources, and legislation. In the context of legislation, proposition C5 (see, Table 34) will be illustrated as well.

The last decades in the development the European paper and board industry have been very volatile and this period will be described in more detail. CEPI (2003a: 9) mentions the following. 'The growth in collection rate was initially modest, but jumped in

the 1990s. Sooner or later the relative growth in paper collection will level out, and amount collected and destined for recycling will grow / decrease together with paper consumption. The timing for this, and the "ultimate" collection rate level, will vary between countries and is, in parallel to the industry's effort, influenced by policies, consumer awareness, etc'. Attention is paid to the external explanatory constructs distinguished in chapter 2, i.e. regional scope, technological developments, market for virgin and recovered resources, legislation. Furthermore, a distinction is made between three stages: 1960 – 1970 where the industry relies on traditional resources, 1970 – 1995 where the use of recovered paper is driven by market mechanism, and 1995 – 2004 where recovered paper becomes a global commodity.

Data collection

For the longitudinal description of the European Paper and Board industry different sources were consulted. The data for research setting 3 was obtained via document analysis and interviews with industry experts, see Table 41. CEPI has several documents that deal with the development of the paper and board industry. EU directives, and 94/62/EC (Directive on Packaging and Packaging Waste) in particular were used to investigate what objectives the industry has to comply with. Industry experts were interviewed to get a better comprehension of the industry context and its developments. The results were presented and discussed at Kappa Packaging as well.

Table 41 Data sources used in research setting 3

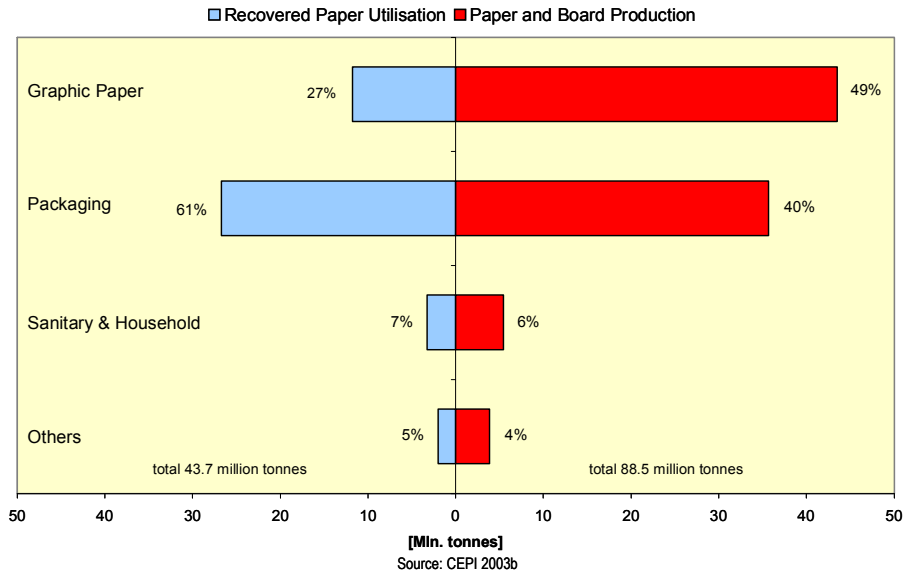
Food and Agricultural Organization of the United Nations (FAO)		
Confederation of European Paper Industries (CEPI)		
EU Directives		
European Recovered Paper Association (ERPA)		
EU Consulting		
Meetings with industry experts	*Date*	*Duration (hours)*
Attendants:	June 2003	1,5
- Managing Director Kappa Paper Recycling	October 2003	1,5
- CEO Kappa Packaging		
- Managing Director Sourcing Kappa Packaging		
Interviews with industry experts	*Date*	*Duration (hours)*
- Managing Director Kappa Paper Recycling	November 2004	1,5
- Chairman VNP (Dutch branch organisation paper and board)	July 2003	2

Research Setting 4: Comparing European Paper and Board End-use Sectors

This research setting mainly focuses on the context dimension. The aim of the fourth research setting is interested in how cross-flows between the different paper and board sectors influence the resource dependence of the different sectors. In this respect the industry level research question is addressed.

A comparative case study is executed and the paper and board industry is investigated in more detail, and more precisely the different sectors differentiated by end product. It is illustrated that the product markets (end-use sectors) can influence the factor market for recovered resources. Following the division made by Confederation of European Paper Industries a distinction is made between four sectors: 'Graphic', 'Packaging', 'Household and Sanitary' and 'Others', see Figure 18. The different purposes of the products influence the resource composition. Or to put it in the context of RRDIs, some end products are better suited for the use of recovered paper than others. The graphic sector represents the highest paper and board production (49% of the total paper and board production), the packaging sector follows close behind (40% of total paper and board production). Focussing on the paper sector as an RRDI, it appears that the packaging sector has the highest recovered paper consumption of them all (61% of the total recovered paper utilisation). This research is interested in how cross-flows between the different paper and board sectors influence the resource dependence of the different sectors.

Figure 18: Recovered paper utilisation and paper and board production in Western Europe per sector 2002



Data collection

The data for the cross-sector flow analysis were obtained from CEPI (recovered paper usage, 2002), see Table 42. Furthermore interviews with industry experts were conducted to verify the findings. The results were presented and discussed at Kappa Packaging as well.

Table 42 Data sources used in research setting 4

CEPI Recovered Paper Usage 2002		
Meetings with industry experts	*Date*	*Duration (hours)*
Attendants:	January 2004	1,5
- Managing Director Kappa Paper Recycling	June 2004	1,5
- CEO Kappa Packaging		
- Managing Director Sourcing Kappa Packaging		
Interviews with industry experts	*Date*	*Duration (hours)*
- Managing Director Kappa Paper Recycling	November 2003	1

Research Setting 5: Comparing Six European Countries

Although the European paper and board industry as a whole performs better than other parts of the world (research setting 2), there are differences at sub-levels. In order to contribute to the understanding of the performance consequences of heterogeneity, it was decided to investigate the external explanatory constructs in several European countries.

A comparative case study was conducted and six European countries were examined in more detail, in alphabetical order: France, Germany, the Netherlands, Spain, Sweden and the United Kingdom. The criteria to select these countries were diverse, see Table 43. Size has played a role in the form of paper and board production as well as recovered paper utilisation and collection. Germany and Sweden are countries with a high paper and board production. Recovered paper export of the countries has also been taken into account as well as geographic location. United Kingdom and Germany belong to the European countries that export most recovered paper. Spain and Sweden are importers of recovered paper.

For each country the price stability and the resource dependence instrument "inventory management" is analysed as an explanatory construct. The price volatility is examined in the period January 1996 until December 2003, in which two stages of four years can be distinguished: a relatively price stable period (Jan. 1996 – Dec. 1999) and a period where prices are volatile (Jan. 2000 – Dec. 2004) and two price spikes took place:

one in 2000, and one in 2002. Data on earlier prices were not available. The price fluctuations in the relatively stable period provide insight into the normal price fluctuations and the period of the price spikes gives insight into what countries are best able to buffer the peaks. Three different qualities of recovered paper are examined, mixed grade 1.02[2] and OCC and Kraft grade 1.05[3] which are mainly used by the packaging sector, and Newspapers and magazines grade 1.09[4], mainly used by the newsprint sector. The variation coefficient was used as a mean to measure the recovered paper price volatility.

In the same period the recovered paper inventories are examined for these countries. The assumption is that higher inventory levels lead to more stable prices. Furthermore, the propositions B5 (new institutional perspective, see Table 33) and C1 (resource dependence perspective, see Table 34) are illustrated.

Table 43 Comparing six European Countries (2002)

	P&B production (ktonnes) (1)	RP Collection (ktonnes) (2)	RP Utilisation (ktonnes) (3)	RP Net trade (ktonnes) (4) = (2) - (3)
France	9,938	5,907	5,783	124
Germany	19,310	13,643	12,449	1,194
Netherlands	3,341	2,360	2,376	-16
Spain	5,438	3,642	4,441	-799
Sweden	11,062	1,490	1,926	-436
United Kingdom	6,226	6,377	4,533	1,844
Total 6 countries	55,315	33,419	31,508	1,911
Total Western Europe	88,484	44,751	42,043	2,708

Source: (1), (2), (3) & (4) CEPI 2003c

Data collection

Three main sources were consulted for the analysis, see Table 44. First of all, the CEPI annual statistics 2002 covering paper and board, and recovered paper, statistics were used. The other data were also obtained for CEPI and concern monthly data per county on

[2] 1.02: Mixed papers and boards (sorted). A mixture of various qualities of paper and board, containing a maximum of 40% of newspapers and magazines (Source: EN 643).

[3] 1.05: Old corrugated containers. Used boxes and sheets of corrugated board of various qualities (Source: EN 643).

[4] 1.09: Mixed newspapers and magazines 2. A mixture of newspapers and magazines, containing a minimum of 60% of newspapers, with or without glue (Source: EN 643).

the recovered paper prices and recovered paper inventories. Furthermore the results were verified by presenting and discussing these with industry experts at Kappa Packaging.

Table 44 Data sources used in research setting 5

CEPI Annual Statistics 2002		
CEPI monthly data prices recovered paper (January 1996 – December 2003)		
CEPI monthly data recovered paper inventories (January 1996 – December 2003)		
Meetings with industry experts	*Date*	*Duration (hours)*
Attendants: - Managing Director Kappa Paper Recycling - CEO Kappa Packaging - Managing Director Sourcing Kappa Packaging	June 2004	1,5

Research Setting 6: Comparing Six Paper and Board Companies

Setting 6 addresses the firm level research question by investigating what resource dependence instruments are applied by six incumbent firms in the paper and board industry. The firms selected are: Kappa Packaging, Jefferson Smurfit, SCA, Norske Skog, UPM-Kymmene, and Stora Enso. The process dimension is addressed by investigating the renewal actions over time (1998 – 2003) Furthermore, attention is paid to the development of the organisation form of these firms by investigating the position of the recovered paper purchasing departments at two snapshots in time (1998/1999, and 2002/2003). Furthermore, proposition 1B (Table 33) and proposition 2A (Table 30) will be illustrated.

In setting 4 it was argued that the paper and board industry can be divided into four main sectors based on end product and that the dependence on recovered paper as a resource differs per sector. In this setting the interest is whether, because of the differences in resource composition, the resource dependence strategies and strategic renewal journeys of firms operating in the two major sectors (Graphic and Packaging) are different. In order to measure this, in each six incumbent firms were selected; the three major players in each sector, see Table 45. The table shows that the nine major players together constitute together about 44% of the total European recovered paper consumption, which means that the market is still highly fragmented. The three companies selected in the packaging sector are: Kappa Packaging (Dutch), SCA (Swedish), and Jefferson Smurfit (Irish). The players in the graphic sector are: Norske Skog (Norwegian), StoraEnso (Finnish/Swedish), and UPM-Kymmene (Finnish).

The period to of investigation had to be long enough to measure strategic renewal actions. The period selected is 1998-2003. 1998 is the year that Kappa Packaging was created as a result of a management buy-out, and six years was expected to be a period long

enough to trace strategic renewal patterns. Moreover, it appeared to be a volatile period. At the end of the 1990s, the influence of the Far East (export) as a recovered paper consumer became considerable. In 2000 the major European paper companies voluntary agreed upon the European declaration on paper recovery. A recycling target of 56% was set to be reached in 2005. The EU directive on Packaging and Packaging Waste was revised. Further, 1998 is the year that Kappa Packaging comes alive, documents before 1998 would consider the company in a different setting. The strategic renewal and resource dependence actions analysis applied on the aforementioned firms will provide inside in the differences in between the two sectors and the influence of the developments on top management attitude towards resource dependence.

Table 45 Company data of major players in the European recovered paper consuming market.

Company	Location Head Quarter	Sector	Recovered paper Consumption (ktonnes)	Market share (%)
SCA	Sweden	Packaging	3,300	7.1
Kappa Packaging	Netherlands	Packaging	2,900	6.2
UPM-Kymmene	Finland	Graphic	2,800	6.0
Smurfit	Ireland	Packaging	2,700	5.8
StoraEnso	Finland/Sweden	Graphic	2,500	5.4
Mayr-Melnhof Karton	Austria	Packaging	1,500	3.2
Norske Skog	Norway	Graphic	1,500	3.2
Myllykoski	Finland	Graphic	1,200	2.2
Palm	Germany	Graphic and Packaging	1,000	2.2
			19,400	44,0
Total Market			46,404	

Source: Company data, Kappa Internal Data 2004; total market CEPI 2004 statistics

Data collection:

Data was gathered in compliance with the publications by the Erasmus Strategic Renewal Centre, (Volberda et al, 2001a; 2001b). It was decided to make use of primary and secondary data sources, see Table 46. The primary source consisted of meetings with top management at Kappa Packaging to validate the findings.

As secondary data source publicly available data were examined to track down contemporaneous accounts of actions of renewal. The advantage of this approach above interviews is that the risk of retrospective sense making is eliminated (Weick, 1988; Weick and Daft, 1983). To overcome the potential biases of using just one source, reports on

actions from both inside the firm and outside the firm were chosen. Annual reports (1998-2003) provided the internal perspective and paperloop.com, an online database, served as a source to detect strategic renewal actions. With regard to the outside perspective, it was decided not to use national sources like '*Het Financieele Dagblad*' etc., because that bears the risk of differences stemming from different sources. *Paperloop* has an extended database covering the period of interest: 1998-2003. A disadvantage is that it is by origin American-oriented, however, European developments are also reported, and ever more companies in the paper and board industry operate on the American market. With regard to the internal perspective it was decided to use annual reports in the English language. The disadvantage is that not all companies are originally English speaking and during translation some details may be lost. However, seeing the explicit nature of the investigation, examining strategic action and resource dependence, this negative effect was expected to be neglected.

Gathering the data from paperloop proceeded as follows. The paperloop database can be consulted at the internet website www.paperloop.com. Advanced search provides the possibility to choose from more then one source. The following issues were selected: News archives, News archives from the past month, Sales and earnings reports, Commentary articles, and paperhelp. The maximum number of hits returned was set at 1000, sorted by date ascending. Per company (Kappa, SCA, Jefferson Smurfit, Norske Skog, UPM-Kymmene, and StoraEnso) the total number of results for the period 1998-2003 was copied in Excel. This became the raw data 'mother' database.

The remaining actions were executed by two coders individually. Because Paperloop sometimes provides duplicate records (some events are listed twice, for example with and without gold-access, other double hits come forth from different perspectives for examples 'firm A acquires firm B' versus firm 'B is acquired by firm A'.), these double hits had to be removed. Further non-company related hits had to be removed. Non-company related links arise when a company name is mentioned somewhere in the article but the actual strategic action does not concern the company under investigation. In order to be able to recognise this, the text had to be read. Also the link to the internet site was copied in Excel, in case of uncertainty, the original article could be consulted. After this, only the strategic actions remained.

The scanning of annual reports proceeded similar. The 'president's letter' and 'operations review' were evaluated on strategic renewal actions by two coders individually. For the companies in the packaging sector, the packaging related issues were investigated, and for the companies in the graphic sector, actions related to the graphic sector were selected. Some companies operate in more than one sector, for example SCA, these companies were evaluated on the sector described in Table 45. When digital versions of the

annual reports were available, the relevant text was *copied* in the excel database. When only the hard copy (paper) versions were available, the text was *typed* in excel manually.

Table 46 Consulted sources for research setting 6

Primary sources		
Meetings with industry experts	*Date*	*Duration (hours)*
Attendants:	June 2004	1,5
- Managing Director Kappa Paper Recycling	October 2004	1,5
- CEO Kappa Packaging		
- Managing Director Sourcing Kappa Packaging		
Secondary sources:		
Paperloop.com database		
Annual reports:		
- Kappa Packaging 1998 – 2003		
- Jefferson Smurfit Group 1998 – 2003		
- SCA 1998 – 2003		
- Norske Skog 1998 – 2003		
- Stora Enso 1998 – 2003		
- UPM-Kymmene 1998 – 2003		

Coding procedure

The coding was executed by two research assistants and supervised by the author. Before starting the analysis of actions from the various sources, background information of the company was gathered. This was necessary to be able to code the actions in a correct way. The paperloop and annual report results were saved as two separate files at first. Later they were put together in one file, where the double actions had to be removed. This was done by two coders separately and afterwards the results were compared and differences discussed. This resulted in the final database that was used to code all gathered company actions. The interest in this research goes towards realised actions, which can have been intended or have emerged. Only actions of which there was evidence that they had taken place were coded. Actions outside the period 1998-2003 were not considered. In case of texts like "planned to, rumours go around that, X intends to do Y" this was coded as a strategic action at the moment that the deal is closed. For example, if there is an article that a firm intends to close a mill in year X, this is a strategic action at the moment that the mill is indeed closed, which might be in year X+1. If in some cases the action happening is not documented and it is certain that the action has taken place, it is called a strategic action in the year that is most likely to have occurred. If the year that the event occurred is uncertain, additional sources have to be consulted which provide clearness. The actions were coded on the indicators as presented in Table 47.

Table 47 Overview coding of the strategic actions

			Strategic renewal indicators				Resource dependence indicators						
Company name	Year	Description action	Internal/ external (0/1)	Exploitation/ Exploration (0/1)	Retreat/ expansion (0/1)	Domestic/ International (0/1)	Substitute resources (no/yes = 0/1)	Inventories (no/yes = 0/1)	Diversification resources (no/yes = 0/1)	Diversification products (no/yes = 0/1)	Long term contracts (no/yes = 0/1)	Vertical integration (no/yes = 0/1)	Horizontal integration (no/yes = 0/1)
X	Y												

The assumption with regard the strategic renewal indicators is that an action is or the one or the other, e.g. an action is internal or external and cannot be both at the same time. The same is true with regard to exploration / exploitation, retreat / expansion, and domestic / international. For the resource dependence indicators another way of calculation was chosen. An indicator was true or not, resulting in a '0' or '1'. After both coders had coded all the strategic actions, the results of two individual coders were compared and differences were discussed. The actions that differed from each other were discussed and coded according to most likely to be true. After coding all the actions, the ratios defined in Table 38 were calculated in order to investigate the strategic renewal journeys of the firms and the resource dependence instruments employed.

Research Setting 7: Resource Dependence Management at Kappa Packaging

The aim of research setting 7 is to contribute to finding an answer to the firm level research questions, see Table 35. As will become clear from the strategic renewal actions comparison of six incumbent firms in the paper and board industry (research setting 6), Kappa Packaging is a remarkable case with regard to strategic renewal actions and use of resource dependence instruments. Setting 7 investigates Kappa Packaging in more detail by conducting a longitudinal case study covering the period 1970 until 2004.

Attention is paid to two issues. First of all the presence of Kappa Packaging in the markets in which it is active in 2004 will be described. This situation describes the present time. The next issue is a longitudinal description of Kappa Packaging providing insight into the strategic renewal journey that Kappa Packaging has followed through time and the resource dependence instruments employed. Proposition B1, B2, B3 (Table 33) dealing

with resource dependence instruments and proposition C3 (Table 34) dealing with recovered-resource dependence will be illustrated as well.

Data collection

The description of the present (2004) situation, primarily use is made of the Kappa Packaging 20F Form, see Table 48. For the recovered paper data, use was made of internal documents. For the longitudinal description company documents were consulted, but also external sources, the internet and semi structured interviews were conducted with different respondents. The last was necessary because not all of the developments under investigation were documented. To verify the results these were presented and discussed at Kappa Packaging.

Table 48 Data sources used in research setting 7

Company documents		
Kappa internal data regarding inventories and market share major players		
Kappa Packaging annual reports 1998 – 2003		
Kappa Packaging 20F Form 2004		
Websites		
www.kappapackaging.com		
www.kappa-roermondpapier.com		
www.Buhrmann.com		
Meetings with industry experts	*Date*	*Duration (hours)*
Attendants:	June 2004	1,5
- Managing Director Kappa Paper Recycling	October 2004	1,5
- CEO Kappa Packaging		
- Managing Director Sourcing Kappa Packaging		
Interviews with industry experts	*Date*	*Duration (hours)*
- Managing Director Kappa Paper Recycling	February 2004	1
	November 2004	1
- Controller Kappa Paper Recycling	October 2004	1,5
	November 2004	1,5
- Former Managing Director Kappa Roermond Papier	October 2004	1,5
	November 2004	1,5

Research Setting 8: In-Depth Analysis Kappa Paper Recycling

The aim of the last research setting of this thesis is to provide more insight into the management processes and the change of incumbent firms' organisation form in the context of strategic renewal. Setting 8 discusses Kappa Paper Recycling and its changing role and position in the organisation. This setting mingles with research setting 7 because from about 2002 on the position of Kappa Paper Recycling, and recovered paper in particular,

starts to shift higher in the organisation. Recovered paper purchasing changes from a decentralised activity to a centrally coordinated activity in the areas where Kappa Packaging is most active. The role of Kappa Paper Recycling changes from profit centre towards recovered paper knowledge centre. In research setting 8 proposition B4 (Table 33) and proposition C4 (Table 34) will be illustrated.

Data collection

The data collection for Kappa Paper Recycling was to a large extent similar to research setting 7, see Table 49. Use was made of internal company documents and company statistics on recovered paper. Interview with respondents (industry experts) were conducted in order to describe the developments that had not been documented before. The results were presented at industry experts at Kappa Packaging.

Table 49 Data sources used in research setting 8

Company documents		
Kappa internal data regarding inventories and market share major players		
Kappa Packaging annual reports 1998 – 2003		
Kappa Packaging 20F Form 2004		
Meetings with industry experts	*Date*	*Duration (hours)*
Attendants:	October 2004	1,5
- Managing Director Kappa Paper Recycling	November 2004	1,5
- CEO Kappa Packaging		
- Managing Director Sourcing Kappa Packaging		
Interviews with industry experts	*Date*	*Duration (hours)*
- Managing Director Kappa Paper Recycling	June 2004	1
	June 2005	2
- Former Managing Director Kappa Roermond Papier	October 2004	1,5 (twice)
- Controller Kappa Paper Recycling	October 2004	2

TRIANGULATION OF SOURCES OF EVIDENCE

The aim of empirical research is either to expand current theory or to test hypotheses derived from current theory. Important considerations when choosing a proper method for the purpose at hand are the validity and reliability of constructs and measures. The aim of this study is expanding resource dependence theory. Both case study research and Strategic Renewal Actions Analysis were used. To improve the strength of the main conclusions that can be drawn from all methods, triangulation is an important issue (Denzin, 1978; Flick, 1992; Jick, 1979).

Following Denzin's (1978) classic distinctions, three types of triangulation relevant to this study can be discerned. The first is data source triangulation, which has three subtypes: time, space and person. That is, data should be collected at a variety of times, in different locations and from a range of persons and collectivities. The second is investigator triangulation, i.e. using multiple rather than single observers of the same objects. Finally, the third methodological triangulation has two sub-types: within-method and between-method triangulation. Within-method triangulation is achieve by using for example, in a questionnaire, a combination of attitude scales, forced choice items and open ended questions. Between-method triangulation involves the use of various methods, and is generally considered to be the most important (Jick, 1979).

These three types of triangulation were all pursued in this study. Data source triangulation was made possible by using different kind of sources: company documents, annual reports, publications of branch organisations, paperloop.com database, etc., see the tables labelled consulted sources for research setting 1 to 8 for more details. Furthermore, multiple respondents were interviewed at different times and different parts in the organisation about the same phenomena. Investigator triangulation was taken into account when executing the strategic renewal actions analysis. Different coders, supervised by the author, investigated the data individually and the differences were discussed. Finally, method triangulation was made possible in using both qualitative and quantitative research methodologies. Longitudinal case studies, comparative case studies, and a strategic renewal actions analysis were conducted in the study. Moreover, the chapters were presented at Kappa Packaging at five occasions presentations where different board members of Kappa Packaging were present.

CONCLUSION

The multi-level, multiple dimensions research design described above allowed for the uncovering resource dependence management in recovered-resource dependent industries at multiple levels of analysis: cross-industry, industry, cross-firm, and firm level. Table 50 presents an overview of the structure of the empirical chapters, including the position of the research settings, the issues addressed, and the propositions that will be illustrated.

The comparative case study of three different recovered-resource dependent industries incorporates the institutional and industry level of analysis and allows for an analysis of external factors impacting RRDIs (setting 1). In this way the industry level research question is addressed.

Insight into the dynamics and strategic renewal in the paper and board industry was facilitated by conducting longitudinal case studies at both industry level (setting 3) and

firm level (setting 7). Moreover, the global paper and board industry was analysed at three points in time (setting 2), and a strategic renewal and resource dependence actions analysis was conducted (setting 6) in order to gain insight into the dynamics and performance differences between the major players in the recovered paper consuming industry.

Comparative case studies were conducted at different levels of analysis. To contribute to the understanding of external explanatory constructs a country comparison chosen (setting 5). To gain insight into the influence of cross industry sector flows on the different sectors, an industry sector analysis was conducted (setting 4). An in-depth case study was selected to contribute to the understanding of resource dependence management at operating company level and to illustrate the role of the organisation form in the context of strategic renewal (setting 8). Table 50 presents an overview of the structure of the empirical chapters and the research settings.

Table 50 Structure empirical chapters: issues addressed and propositions illustrated

Chapters addressing the industry-level research questions	**Chapters addressing the firm-level research questions**
Chapter 5: Cross Industry	***Chapter 7: Cross-Firm***
Setting 1: Comparing Three European RRDIs Paper and Board, Aluminium, and Plastic - Resource Recycling Characteristics - Market for virgin and recovered resources - Regional scope - Legislation (Proposition C5)	*Setting 6: Comparing six incumbent firms in the European Paper and Board Industry* - Resource dependence instruments (Proposition A1) - Strategic renewal journeys (Proposition A2, A4) - Organisation structure development (Proposition C4)
Chapter 6: Focal Industry	***Chapter 8: Focal Firm***
Setting 2: Global Paper and Board Industry - Market for virgin and recovered resources - Regional scope	*Setting 7: Kappa Packaging* - Resource dependence instruments (Proposition B1) - Management (Proposition B2) - Dynamic and combinative capabilities (Proposition B3, C3)
Setting 3: European Paper and Board Industry - Resource Recycling Characteristics - Market for virgin and recovered resources - Regional scope - Legislation (Proposition C5)	*Setting 8: Kappa Paper Recycling* - Organisation form (Proposition B4, C4)
Setting 4: Comparing Four Paper and Board Sectors - Market for virgin and recovered resources	
Setting 5: Comparing Six European Countries - Regional scope - Inventories (RD instruments) (Proposition A5, C1)	

CHAPTER 5

COMPARING THREE EUROPEAN RECOVERED RESOURCE-DEPENDENT INDUSTRIES: PAPER & BOARD, ALUMINIUM, AND PLASTIC

INTRODUCTION

This chapter aims to contribute to answering the industry-level research questions: "Which external factors constrain firms in recovered-resource dependent industries?" and "To what extent are external explanatory constructs associated with these external factors able to explain differences in performance of recovered-resource dependent industries?". The research questions will be addressed at cross-industry level; three European recovered-resource dependent industries are compared: the Paper and Board industry, the Aluminium industry, and the Plastic industry (research setting 1, Table 36).

The industry comparison of this chapter contributes to multiple dimensions. The dominant dimension in this chapter is the context, for the primary role of this chapter is to illustrate that external factors matter. In chapter 2 different external factors or "characteristics of factor and product markets" were distinguished (see Table 14). Special attention will be paid to the following constructs: Market for virgin and recovered resources, resource recycling characteristics, and legislation. The process dimension is addressed by briefly describing the evolution of the three recovered-resource dependent industries. The content dimension is covered by analysing the performance of the industries, i.e. the recycling rate. Furthermore proposition C5 (see Table 51) will be illustrated in this chapter. Most of the propositions developed concern firm-level. This proposition can be investigated at industry level as well.

Table 51 Proposition to be investigated in Chapter 5

	In the context of the transition from a traditional towards a recovered-resource dependent industry:
C5	From a *new institutional perspective*, it is expected that in order to maintain legitimate legislation will increase incumbent firms' recovered-resource dependence.

Source: Table 34

The structure of this chapter is as follows. First the history of the three selected recovered-resource dependent industries is briefly described with attention for external construct influencing the development. After this the performance of the three industries is compared. Finally three external factors are investigated in more detail: Market for virgin and recovered resource, resource recycling characteristics, and legislation.

A BRIEF HISTORY OF THREE RECOVERED-RESOURCE DEPENDENT INDUSTRIES

In order to contribute to the process dimension the development from traditional industry towards recovered-resource dependent industry of each of the three selected industries is examined. It appears that each journey has evolved quite differently. The paper and board industry knows the longest history, aluminium the shortest. However, there are also similarities. The following paragraphs present a brief overview of the development of the three industries and it is shown that the external explanatory constructs (legislation, regional scope, resource recycling characteristics, technology and markets for virgin and recovered resources) introduced before play a role in all three cases.

Brief History of the Paper and Board Industry

The origins of paper making lead back to the Nile river Valley in Egypt[5] 3000 BC. The Egyptians used thin strips from the stem of the Cyperous Papyrus grass which were layered in right angles and formed into a mat. This mat was pounded to a thin sheet and left in the sun to dry. The name *paper* derives from this *papyrus*. The Egyptian papyrus is one of the predecessors of paper[6] but looked quite different.

According to Chinese historical accounts[7] paper as we know it today was invented in 105 AD by Ts ‘ai Lun, a Chinese court official in the Eastern Han Dynasty. It is believed that Ts ‘ai Lun’s paper was made of mulberry bark, hemp and textile waste (rags) mixed with water. After this invention, literature and arts flourished in China[8]. It took several centuries before the technique was spread all over the world. The art of paper making slowly went westward and reached Samarkand, in central Asia, in 751. In 793 the first paper was made in Baghdad during the time of Harun ar-Rashid, with the golden age of Islamic culture that brought papermaking to Europe. In 1150 Europe’s first paper mill was

[5] www.hqpapermaker.com/paper.htm (21 7 2003)
[6] www.paperonline.org/history/ (consulted 21 7 2003)
[7] http://www.geocities.com/Tokyo/Island/3268/invention/paperinvention.html (consulted 21 7 2003)
[8] www.mead.com/docs/facts/history.html (consulted 21 7 2003)

built[9] and by the 14th century a number of paper mills existed in Europe particularly in Spain, Italy, France and Germany[10].

Paper being used as a practical everyday item did not occur until the 15th century[11]. The invention of printing in the 1450s brought a vastly increased demand for paper. The tremendous upsurge in paper making in and after the 16th century (reformation, printing with moveable type) soon led to a serious shortage of raw materials and to regulations governing the trade in rags. Paper mills were increasingly confronted with shortages. In the 18th century they even advertised and solicited publicly for rags. It was evident that the process for utilising a more abundant material was needed[12].The paper making process remained essentially unchanged, with linen and cotton rags furnishing the basic raw materials. In fact, nearly all paper manufactured in Europe in this period could be considered as produced of recovered fibres. The systematic search for substitute materials in and after the 18th century met with little success[13]. Large scale production became possible when the paper machine was invented. Until that time only paper sheets could be produced with limited sizes. In 1798 Nicolaus-Louis Robert constructed a machine with a moving belt that could deliver an unbroken sheet of wet paper to a pair of squeeze rolls. The French government granted Robert's work with a patent. Until the machine was improved by two English Engineers Henry and Sealy Fourdrinier in 1807, the paper machine did not become a practical reality. From these beginnings, modern paper machines evolved.

In the 19th century, wood gradually became the main raw material source for paper making. Several major pulping processes developed that relieved the paper industry of dependency upon cotton and linen rags and made modern large scale production possible. Two different directions developed in the pulping process (1) separating fibre and fibre fragments from the wood structure by mechanical means, and (2) exposing wood to chemical solutions that removed lignin (the substance that makes that paper becomes yellow when exposed to light) and other wood components leaving cellulose behind. The groundwood pulp made by mechanical methods contains all the components of wood and is thus not suitable for papers in which high whiteness and permanence are required. Groundwood pulp was first made in Germany in 1840 but did not come into extensive use until 1870. When high brightness, strength and permanence are required, chemical wood pulps as soda and sulphite pulp are used. Soda pulp was first manufactured from wood in

[9] www.geocities.com/tokyo/island/3268/invention/paperinvention.html (consulted 21 7 2003)
[10] www.indiapapermarket.com/history.asp#pmprocess (21 7 2003)
[11] www.hqpapermaker.com/paper.htm (21 7 2003)
[12] www.indiapapermarket.com/history.asp#pmprocess (21 7 2003)
[13] www.paperonline.org/history (21 7 2003)

1852 in England, and in 1867 a patent was issued in the United States for the sulphite pulping process.

Only in the nearby decades, recovered paper has become an increasingly important raw material source[14]. By using greater quantities of recovered paper, the need for virgin fibre is reduced, and the problem of solid waste disposal is minimised. 'The amount of paper collected and recycled in Europe increased by almost two thirds during the 1990's. As a result, paper has the highest recycling rate of any industry' (CEPI REC/091/03, 2003: 3).

Table 52: Development paper and paper resources longitudinally

Year	Main resource	Motivation, enabler	Level Playing Field
3000 BC	Cyperous Papyrus grass		Egypt
105 – 1600 AD	Rags, Linen	Quality	China
600 – 1200	Animal Skin	Quality	
1600 – 1850	Linen and Cotton Rags	Quality	Europe
1850 – 1970	Wood pulp	Availability, Quality	Global level
1970 – present	Recovered Paper	Price, availability, Sustainability, waste problems	Global level

Source: Adapted from Indiapapermarket.com, and "Kleine Papiergeschichte" by Dieter Freyer.

Brief History of the Aluminium Industry

Compared to paper, but also compared to tin, lead and copper which have been used for thousands of years, the history of aluminium is very short (IAI website). In 1808 Sir Humphry Davy (Britain) established the existence of aluminium and named it alumium. This name was soon replaced in Aluminum and in 1829 the International Union of Pure and Applied Chemists adopted the name aluminium in to conform to the "ium" ending of most elements. Halfway through the nineteenth century, both names were in use.

At that time the price of aluminium was higher than that of gold and platinum, which is remarkable when one realises that aluminium is the third most abundant element on earth, constituting 8% of the earth crust by mass. Major areas where the resource is found are: Australia, West-Africa, Jamaica, and Brazil. The problem is that it only exists in stable combinations with other materials. The technique to unlock the material from its ore took time. The first commercial process of aluminium starts in 1854 when Henri Sainte-Claire Deville (France) improves Wöhler's method. The applications of the material look promising.

[14] www.paperonline.org/cycle/recycling/recycling.html (21 7 2003)

However, it took some time before the technique to produce aluminium on a large scale had evolved. In 1886 the Hall-Héroult process is invented which still forms the basis for all modern primary aluminium smelting plants. Essentially it is the electrolysis of alumina prepared from bauxite and dissolved in fused cryolite. But the alumina or pure aluminium oxide available and necessary for the primary smelting was limited. This changed in 1889 when Karl Josef Bayer invented what became known as the Bayer process which made large scale production of alumina from bauxite possible. At the present rate of mining the reserves are estimated to last roughly 300 to 400 years more (IPAI, 2000).

During the last decades public opinion about sustainability and resource depletion has changed. The use of aluminium in constructions and in the automotive branch has become ever more popular mostly because of its light weight compared to conventional construction metals like steel. By using aluminium in cars, the weight of the car is reduced and by consequence the fuel consumption of the car is reduced too. In the 1990's the recycling of end-of-life aluminium products starts to increase more profound. Nevertheless, there is still a shortage of secondary aluminium in Europe. The imports of recycled aluminium from non-EU countries amounted to 450 ktonnes in 2001, mainly from Russia, Czech Republic, Ukraine, and Poland. In view of the principles of sustainability, aluminium scrap has to be recovered, collected, and recycled without fail. '… an increasingly number of primary aluminium producers are becoming aware of the fact that it will be the amount of recycled aluminium arising that determines how much primary aluminium will be produced' (OEA, 2002: 5).

Brief History of the Plastics Industry

Modern life without plastics is almost unthinkable. Plastics are used in many appliances around us everywhere and are used ever more. The material can be produced in almost any thinkable shape and plastics save weight and reduce energy consumption. Plastic used as a substitute material in cars (bumpers) makes the car lighter and more energy-efficient.

Plastics can be divided into two main groups according to their physical properties: thermoplastics and thermosets. Thermoplastics can be remoulded many times when heated; thermosets cannot be remoulded when the material has set. Most of the plastics produced are thermoplastics. In 2002 the consumption of thermoplastics in Europe was almost four times higher than the consumption of thermosets (Plastics*Europe*, 2004). The thermoplastics were invented during the latter part of the 19th century; the thermosets at the beginning of the 20th century.

The plastics journey begins in the mid-1800s when the first plastics were created from plant-based material *cellulose*, i.e. from wood flour or cotton fibre. At the Great

International Exhibition in London in 1862, Alexander Parkes unveiled the first man-made plastic. It was derived from organic material and could be carved into thousands of different shapes and looked like ivory or horn. His Parkesine Company that was founded to produce products from his new material failed in 1868. Due to the high raw material costs for the production process, investors pulled the plug on the product. Meanwhile billiards had become very popular and because the billiard balls were made from ivory, this caused the death of thousands of elephants (American Plastics Council website). In 1866 John Wesley Hyatt comes with *celluloid*, a substitute material for the ivory. By using collodian and camphor (a derivate of the laurel tree) - this addition was necessary because the highly brittle nature of collodian made the balls shatter when they hit each other - the first *thermoplastic* was made.

In 1907 Leo Baekeland created the first *completely synthetic* man-made substance that he named *Bakelite*. The liquid resin hardened into a solid material that would not burn, boil, or melt or dissolve even in acid (American Plastics Council website). Bakelite was the first *thermoset* plastic. Once it was firmly set, it would never change which was a major difference with the previous celluloid-based substances which could be melted down innumerable times and reformed. Bakelite was soon found in electrical insulation, jewellery, and the dial telephone.

The period 1930-1940 was an era in which the commercial development of today's major thermoplastics: polyvinyl chloride, low density polyethylene, polystyrene, and polymethyl methacrylate took place. In 1933 polyethylene was invented and in 1936 Imperial Chemical Industries developed a large-volume compressor that made the production of vast quantities of polyethylene possible and had some impact on history (American Plastics Council website). During World War II it was used as light weight substitute radar insulation material and the low weight made it possible to place radars on airplanes. After the war it became a tremendous hit with consumers for all kinds of purposes.

From that time on the plastics industry has grown into a major industry and in ever more purposes that affect our lives, plastics can be found: chairs, television sets, cars, etc. Only since the 1990's recycling of plastics starts to become common. Landfilling is losing popularity as an option for disposing of municipal waste, since stacking and never recovering waste material is the worst option from both economic and environmental viewpoints (Jenseit, 2003). Recycling of plastics has therefore increased dramatically over the past 20 years. In 2000, recovery of plastics showed substantial growth and gained 11 per cent compared to 1999 (APME website). Recent years have seen a growing number of applications for recycled plastic. However, there are still difficulties. It is difficult to automate the sorting of plastic waste, making it labour-intensive. Consumer products can be made of a dozen small parts of different kinds of plastics. Overall European countries

recover no more than around 36% of their plastic waste arisings (APME, 2002). There is a great variation in the recycling performance in plastics across countries, and many have a hard time meeting the minimum target of 15% for packaging waste (APME website). Actual recycling levels strongly lag behind what's technically possible in the recycling of polymers. Products such as automobiles are now being designed to make recycling easier.

Table 53 Polymer types, full name and application

Polymer type	Full name	Application
PET or (PETE)	Polyethylene terapthalate	Fizzy drink bottles and oven-ready meal trays.
HDPE	High-density polyethylene	Bottles for milk and washing-up liquids.
PVC	Polyvinylchloride (flexible and rigid types)	Food trays, cling film, bottles for squash, mineral water and shampoo.
LDPE	Low-density polyethylene	Carrier bags and bin liners
PP	Polypropylene	Margarine tubs, microwaveable meal trays.
PS	Polystyrene	Yoghurt pots, foam meat or fish trays, hamburger boxes and egg cartons, vending cups, plastic cutlery, protective packaging for electronic goods and toys.
Other	Any other plastics	Do not fall into any of the above categories. – An example is melamine, which is often used in plastic plates and cups.

Source: http://www.wasteonline.org.uk/resources/InformationSheets/Plastics.htm (Consulted July 2005)

Conclusion brief history three industries

The external constraining constructs introduced in this research appear to affect all three industries. *The resource recycling characteristics* of the material influence the recycling rate and, as will become clear later in this chapter, also the industry legislation. One of the similarities between the industries is that from the 1990's all three recovered-resource dependent industries show a dramatic increase in the intensity of recycling triggered by *legislation*. The factor markets show changes and dynamics for all three industries. The resources that were used in the traditional industry are ever more substituted by recovered resources. *Regional scope* in the form of availability in a certain region is changing through time. And in all three examples technological developments enabled industries to grow. Later technological developments served to increase the recycling of end-of-life products.

COMPARING THE RECYCLING PERFORMANCE OF THE PAPER AND BOARD, ALUMINIUM, AND PLASTIC INDUSTRY

A brief comparison of the three selected recovered-resource dependent industries shows that that with regard to size (in weight) the European paper and board sector is the

largest of the three, see Table 54. The recycling rate was chosen as an indicator of the performance of a RRDF. With a recycling rate of 53% the paper and board industry is the best performing RRDI compared to aluminium (25%) and plastic (7%). Or in the words of the Confederation of the European Paper Industry: 'The paper industry is the leading recycling industry in Europe…' (CEPI 2003: 2). As well in the paper and board industry as in the plastic industry the collection of end-of-life products is higher than the consumption, which makes Europe a net exporter of these products. For aluminium the situation is different. The demand for secondary aluminium is higher than the collection.

Table 54 Comparison Recycling rates of Recovered-Resource Dependent Industries in Western Europe

		Paper and Board (2002) (1)	**Aluminium (2001)** (2)	**Plastics (2002)** (3)
Production	ktonnes	88,484	6,054	41,000*
Consumption	ktonnes	78,986	8,782	38,966
Collection	ktonnes	44,751		7.480
Utilisation	ktonnes	42,043	2.236	2.772 (=330 feedstock + 2.442 mechanical recycling)
Net trade	ktonnes	2,705 (exported)	450 (imported)	342 (exported)
Recycling rate	%	53%	25%	7% [13.6%**]

Source: (1) CEPI 2002, (2) OEA, 2002, (3) Plastics*Europe*, 2004
* 2003 figure, BASF 2004
** 13.6% (1.6% feedstock recycling and 12% mechanical recycling) in 2002 according to Plastics*Europe* calculations which are based on total collectable available post-user plastic waste, 20,607 ktonnes in 2002.

The comparison described above shows that the paper and board is the best performing industry of the three in terms of recycling rate. To provide insight into why this is the case and to address the industry-level research question "To what extent are external explanatory constructs associated with these external factors able to explain differences in performance of recovered-resource dependent industries?" three external explanatory constructs will be investigated in more detail: influence of end-use markets on recovered resources, resource recycling characteristics, and legislation.

COMPARING THE INFLUENCE OF END-USE MARKET ON RECOVERED RESOURCES

This section aims to illustrate that the presence of different end-use markets influences the market for virgin and recovered resources and the industry performance. Table 55 presents an overview of the three selected RRDIs, their presence in different end-use markets, and the time that the end products are in use. A distinction is made between mostly longer than one year and mostly shorter than one year. The reason is as follows. The recycling rate in this research is expressed as the ratio of recovered resources utilised for production relative to the consumption *in a certain year*. When the time in use of products is long, i.e. longer than a year, that end-of-life product will not be available for recycling in the same year and therefore negatively influences the recycling rate. For material that are long in use, the arisings or recoverable residues are largely governed by consumption of the material several – perhaps many – years ago. PlasticsEurope therefore measures the recycling rate as percentage of collectable waste, which in general tends to result in higher figures than if rates were calculated as percentage of products put on the market (PlasticEurope, 2003: 12).

Table 55 Consumption per end-use sector (by weight) for three RRDIs

End-use sector	Duration of use (Long > 1 year, short < 1 year)	Paper and board industry (2002)	Aluminium Industry (2001)	Plastic industry (2002)
		(1)	(2)	(3)
- *Graphic*	Mostly short	48%		
- *Packaging*	Mostly short	41%	18%	38%
- *Household and Sanitary*	Mostly short	7%		
- *Other household/ Domestic*	Mostly short			22%
- *Transport and Automotive*	Mostly long		33%	7%
- *Building and Construction*	Mostly long		26%	18%
- *Engineering*	Mostly long		15%	
- *Electrical and Electronic*	Mostly long			7%
- *Other*		4%	8%	8%
TOTALS	*Mostly short*	*96%*	*18%*	*60%*
	Mostly long		*74%*	*32%*
	Other	*4%*	*8%*	*8%*

Source: (1) CEPI, (2) EAA, (3) APME Website

The paper and board industry is most dominantly active in the graphic sector, a business where both other industries are not represented. In the packaging sector all three industries are present. For the paper and board industry this segment constitutes 41% of the total end-use market, for plastic this is the most important sector with 38% of the total end-use, for the aluminium industry packaging comes on the third place with 18% of the total end use. Both the paper and board industry and the packaging contribute to the household sector. Contrary to the paper and board industry, the aluminium and plastic industry contribute to the transport and automotive sector, building and construction sector. For aluminium these constitute the major end-use sectors. Aluminium is getting ever more important as a lightweight substitute resource in constructions and the automotive branch. Due to its light weight considerable energy savings in the transportation sector can be achieved. It is estimated that the use of aluminium instead of steel in a car saves four times the amount of energy that was originally used to produce the aluminium (EAA, 1997). The same is true for plastic. 'It is estimated that 100 kilograms of plastics have typically replaced 200-300 kilograms of conventional materials in today's vehicles…' (PlasticsEurope, 2004: 4). These weight savings also reduce toxic emissions that fall under increasingly harsh scrutiny of international legislation. The aluminium industry is further active in the engineering sector and the plastic industry in the electrical and electronic sector.

Table 55 shows that products in the paper and board sector are mostly short (96% of al end-uses) in use and products in the aluminium sector are mostly long (74% of all end-uses) in use. Plastics is somewhere in between but most of the products are mostly short in use (60% of all end-uses). This shows that the presence in a certain end-use sector influences the recycling rate. However, on the base of this argument it would mean that paper and board has the highest recycling rate and Aluminium the lowest. The latter is not true. This suggests that there might be a relationship but other aspects play a role as well.

COMPARING RESOURCE RECYCLING CHARACTERISTICS

The previous paragraph has shown that the end-use markets of the resources and their duration in use influence the recovered resources that become available. Resource recycling characteristics influence the extent to which materials will be recycled. The differences between each of the three selected recovered-resource dependent industries will be set out.

Paper

The technological process of paper recycling allows paper products to be recycled only a limited number of times. Each time the paper gets recycled the fibres shorten and when they become too short they are not useful anymore. The number of times the paper can be recycled is still under investigation but seems to vary between five and seven times (www.genmill.com/paper).

The price of recovered fibres is considerably lower than that of virgin fibres which is a stimulus for the industry to use recovered fibres. However, there are (technical) limitations to the use of recovered fibre. The colour of recovered fibres is less bright than virgin fibres as sulphite and sulphate pulp. When the end product must be white paper, the recovered fibres have to be washed or de-inked. Techniques to make recovered fibres have improved but for the production of for example high quality glossy magazines, virgin fibres are still the preferred resource.

Paper can be incinerated as well, also known as energy recovery. However, the industry is not enthusiastic about this idea for it limits the availability of recovered paper for paper and board production.

Aluminium

One of the attractive physical aspects of aluminium is that it can be infinitely recycled without quality loss in principle. Another major advantage of secondary aluminium above primary aluminium is the lower energy consumption. Due to the low melting point (660°C) the energy consumption for processing recycled aluminium is only 5% of the amount when using primary aluminium. This of course is a major incentive to use the recovered resource (Dahlström et al, 2004).

Unfortunately there is a disadvantage as well. Producers cannot always prevent undesirable impurities entering the recycling chain. The impurities have to be removed from the melt. If this problem could be solved, it would dramatically impact the structure of the aluminium industry. 'The differentiation between primary aluminium and recycling aluminium would at once become obsolete' (OEA, 2002: 6).

Recycling rates for material are in this research expressed as the ratio of secondary to primary materials in current consumption. Because the duration of use for aluminium products is often high, the availability of secondary aluminium in the same year is relatively low. The arisings or recoverable residues are largely governed by consumption of the material several – perhaps many – years ago, which makes reduces the recycling rate.

Plastics

Plastics are polymers. According to the American Plastics Council the simplest polymer definition is 'something made of many units' (American Plastics Council website). A bit more specific, polymers can be regarded as many units of hydrocarbonates or derivates joined together in distinct repeating patterns (American Plastics Council, 2005). Plastics carry significant ecological potential after their consumption phase. Plastics account for just a small proportion of waste in terms of weight (5-7%), but occupy large volumes of landfill sites.

For plastics several *recovery* methods are available: Mechanical recycling, feedstock recycling and energy recovery, see Table 56. Optimum recovery is often achieved by using a combination of these (APME, 2001: 6). In 2002 of the total collectable available post-user plastic waste 1,6% was feedstock recycled; 12% was mechanical recycled; and 22,7% was energy recovery (Plastics*Europe*, 2004). Mechanical recycling is the only option where the chemical structure of the plastic remains unchanged. It is the European plastics industry's preferred recovery technique but only possible when plastics are collected separately. Feedstock recycling chemically changes the structure of the plastic waste so as to prepare it for further processing into new plastic products. This technique is particularly applicable to less homogeneous and more contaminated waste streams (VROM, 2001). The last method of plastics waste recovery is energy recovery by incineration, also known as thermal recovery. Plastics have such a high calorific value that they are particularly suitable for energy recovery by incineration (BASF website). Plastics have a caloric value at least equal to coal and with lower CO_2 emissions. Plastic waste incineration is found in municipal solid waste incinerators, cement kilns and power plants (Tukker, 2002). Although thermal recovery does not result in new plastic products directly, it generates energy and saves oil or coal that would otherwise be needed to run the cement kilns or power plants. This recovery method is especially suitable for miscellaneous mixtures of different plastic types that cannot be economically recycled (APME, 2002).

Table 56 Recovery options for plastic waste

Mechanical recycling	Material reprocessing of waste plastics by physical means into new plastic products
Feedstock recycling	Material reprocessing into basic chemicals, monomers for plastic use as reductant in blast furnaces
Energy recovery	Replacing fossil fuels in production processes and municipal waste generators

Source: adapted from APME, 2001:6

COMPARING THE IMPACT OF LEGISLATION

New institutional theory predicts isomorphism (DiMaggio and Powell, 1983; Scott, 2001); firms that are operating in the same industry will behave similarly. This section is guided by proposition C5: "In the context of the transition from a traditional towards a recovered-resource dependent industry, from a new institutional perspective, it is expected that in order to maintain legitimate legislation will increase incumbent firms' recovered-resource dependence".

A review of recent directives and acts on RRDI's shows that legislation impacting the three selected recovered-resource dependent industries has grown substantially in recent decades. Table 57 shows an overview of the impact of the different directives and acts and the consequences for the individual industries. The legislation influences different aspects of RRDI's; a distinction is made between: packaging, landfill of waste, incineration of waste, waste electric and electronic equipment, end-of-life vehicles, and paper and board industry-specific, the declaration on paper recovery. The legislation concerning RRDIs (see Table 57) will now be investigated in more detail.

Table 57 EU Legislation impacting the recycling rate in three selected RRDI´s

Legislation concerning RRDIs	Variable	Consequences for Paper and board industry	Consequences for Aluminium Industry	Consequences for Plastics industry
Directive 1994/62/EC on Packaging and Packaging Waste (PPWD) amended by directive 2004/12/EC	Recycling Rate	30/6/01: min 15% 31/12/08: min 60%	30/6/01: min 15% 31/12/08: min 50%	30/6/01: min 15% 31/12/08: min 22,5%
Council Directive 1999/31/EC on the landfill of waste	Biodegradable waste going to landfill	2006: 75% of 1995 2011: 50% of 1995 2016: 35% of 1995		
Directive 2000/53/EC end-of-life vehicle directive (ELV)	Reuse/recycling		1/1/2006: 80% 1/1/2015: 85%	1/1/2006: 80% 1/1/2015: 85%
	Reuse recycling and energy recovery		1/1/2006: 85% 1/1/2015: 95%	1/1/2006: 85% 1/1/2015: 95%

Table 57 EU Legislation impacting the recycling rate in three selected RRDI´s (continued)

Legislation concerning RRDIs	Variable	Consequences for Paper and board industry	Consequences for Aluminium Industry	Consequences for Plastics industry
Directive 2002/96/EC on waste electrical and electronic equipment (WEEE) amended by directive 2003/108/EC	Cat 1 and 10			
	Recovery		80%	80%
	Reuse and Recycling		75%	75%
	Cat. 3 and 4			
	Recovery		75%	75%
	Reuse and Recycling		65%	65%
	Cat 2, 5, 6, 7 and 9			
	Recovery rate		70%	70%
	Reuse and Recycling		50%	50%
Declaration on Paper Recovery 2004	Recycling rate	2005: 56%		

The EU Directive on Packaging and Packaging Waste (1994)

The packaging and packaging waste directive (PPWD) concerns all three industries but impacts paper and board and plastic most because their end markets consist for respectively 41% and 38% of packaging. Overall recycling target of the PPWD (94/62/EC) was set between 25% and 45% with a material specific minimum of 15%. The overall recovery target was set between 50% and 65%. The amendment of the PPWD set new targets for member states that are considerably higher. The overall recycling target was raised to between 55% and 80% and the overall recovery target was set at a minimum of 60%. This means that the paper and board industry must have reached a recycling rate of 60% for packaging in 2008. The aluminium industry must have reached a recycling rate of 50% for packaging by 2008. And the plastic industry finally must have reached a recycling rate of 22.5% for packaging by 2008. Table 54 shows that the recycling rate of plastics is very low compared to the other two industries, only 7.4% (or 13.6% when based on total collectable post-user plastic waste). This has to do with the resource recycling characteristics. It is difficult to recycle plastics at a high rate. The PPWD sets a target for 22.5% in 2008 for the total of plastics.

Table 58 presents an overview of the current performance of the three selected RRDI's and the implications of the recycling targets set in the PPWD (2004/12/EC) for the

industries. One should realise that the end-use markets of the material largely influence how easy or difficult it is for an industry to reach the targets set in the PPWD. One industry, plastics, will be discussed to illustrate this point.

The total plastics consumption was about 39 million tonnes in 2002. 38% of the total consumption was packaging, i.e. about 15 million tonnes. According to the recycling target for 2008, 22.5% of the packaging products must be recycled which is about 3.3 ktonnes. In 2002 2.7 ktonnes of plastics were recycled, including packaging and non-packaging, which means that the industry performance lacks behind the targets set. The paper and board industry and the aluminium industry do reach the targets set by the PPWD. But for the paper and board industry the target is most difficult to obtain for the recycling target of 60% is highest of all of them and the end-use market packaging is with 41% of the total paper and board consumption also the largest of all of them.

Table 58: Implication of PPWD for Three RRDIs and Their Current Performance

		Paper and board industry (1)	**Aluminium Industry** (2)	**Plastics industry** (3)
Total consumption	Ktonnes	78,986 (2002)	8,782 (2001)	38,966 (2002)
Total packaging	Ktonnes	32,384 (41% total)	1,581 (18% total)	14,807 (38% total)
Recycling target 2008	%	60%	50%	22.5%
To be recycled according to target in 2008	Ktonnes	19,431	790	3,332
Current situation recycling*	Ktonnes	42,043	2,236	2,772
Difference	Ktonnes	22,614	1,446	-560

Source: (1) CEPI 2003b, (2) worldaluminium.org statistics 2001 (3) PlasticsEurope, 2004
* Recycling data of total industry, including packaging and non-packaging end-use markets

The EU Landfill Directive (1999)

Landfill directive (99/31/EC) sets targets for biodegradable waste going to landfills. Biodegradable waste means any waste that is capable of undergoing anaerobic or aerobic decomposition, such as food and garden waste, and paper and board (1999/31/EC Art 2.m), which means that this directive only impacts the paper and board industry. The targets set in article 5 of this directive are as follows. In 2006, biodegradable municipal waste going to landfills must be reduced to 75% of the total amount (by weight) of biodegradable municipal waste produced in 1995. Not later than 2011 biodegradable waste going to landfills must be reduced to 50% of the total amount by weight of 1995 levels and not later than 2016 biodegradable waste going to landfills must be reduced to 35% of the

1995 level. The impact on the recycling rate of paper and board industry is positive for if less paper and board products become land filled, more recovered paper is available for paper and board production.

The EU Directive on End-of-Life Vehicles (2000)

The end-of-life vehicle directive (2000/53/EC), abbreviated ELV, impacts two of the three industries: aluminium and plastic. Both products are ever more used in cars in order to reduce the weight, which is beneficial for the environment because less weight means less energy consumption. The ELV directive sets targets reuse and recycling and reuse, recycling and energy recovery. Reuse and recycling of materials in end-of-life vehicles must have reached 80% by 2006 and 85% by 2015. For reuse, recycling and energy recycling the levels are even higher. The target for 2006 is 85% and the target for 2015 is 95%. Because the amount of plastics and aluminium per car is still increasing this impacts both industries ever more.

The EU Directive on waste electric and electronic equipment (2002)

The directive on waste and electric and electronic equipment (2002/96/EC) relates to the aluminium and plastic industry and covers ten categories of equipment, see Table 59. It leads to far here to discuss them all. Like the ELV, the directive on waste electric and electronic equipment (WEEE) concerns two industries: aluminium and plastic. Some of the articles of the directive relevant for this study will be briefly discussed.

Table 59 Categories distinguished in WEEE

Category	Description
1	Large household appliances
2	Small household appliances
3	IT and telecommunications equipment
4	Consumer equipment
5	Lighting equipment
6	Electrical and electronic tools
7	Toys, leisure and sports equipment
8	Medical devices (with the exception of all implanted and infected products)
9	Monitoring and control instruments
10	Automatic dispensers

Source: EU Directive 2002/96/EC

One of the issues covered by the directive is that in the design stage of the product the possibility to dismantle, recover and recycle should be taken into account. “Member States should encourage the design and production of electrical and electronic equipment which take into account and facilitate dismantling and recovery, in particular the re-use are recycling of WEEE, their components and materials” (art. 14). “Developing for the future” can be regarded as a form of resource dependence management as well, for if products can more easily be recovered the performance of the RRDI is expected to increase.

Separate collection of end-of-life products is another issue encouraged by this directive. “Separate collection is the precondition to ensure specific treatment and recycling of WEEE and is necessary to achieve the chosen level of production of human health and the environment in the community. Consumers have to actively contribute to the success of such collection and should be encouraged to return WEEE. For this purpose, convenient facilities should be set up for the return of WEEE, including public collection points, where private households should be able to return their waste at least free of charge” (Art 15). Separate collection is also an example of managing resource dependence. This shows that managing the loop is an issue that concerns many players. They all players in the chain have to take part in the game otherwise the target cannot be reached.

CONCLUSION

In this chapter a cross-industry comparison was conducted and in doing so insight was provided in external factors influencing three selected recovered-resource dependent industries. In this way the industry-level research question, “to what extent are external explanatory constructs able to explain differences in performance of recovered-resource dependent industries”, was addressed. Table 60 presents an overview of the topics discussed and the findings.

The brief description of the history of the three selected industries illustrates that the external factors distinguished in chapter 2 play a role during the evolution of the industry. With regard to recycling quantities, the paper and board industry appears to be the largest RRDI; about 18 times larger than aluminium that comes on the second place. It is also the industry with the highest recycling rate. In other words, this suggests that the Paper and Board industry is the best performing RRDI.

Three external factors influencing the performance were investigated: End-use markets influencing recovered resources, resource recycling characteristics, and legislation. It appeared that the different end-use sectors influence the availability and the performance of the industry. Paper and board products become sooner available than aluminium and plastics, and therefore can be recycled sooner as well. This positively influences the industry performance. Resource recycling characteristics appear to influence the

performance of the industry as well. Proposition C5: "In the context of the transition from a traditional towards a recovered-resource dependent industry, from a new institutional perspective, it is expected that in order to maintain legitimate legislation will increase incumbent firms' recovered-resource dependence" was partly illustrated. Although differences exist in legislation, all three industries are confronted with legislation at European and country level impacting the recycling rate.

The issues discussed could of course be investigated in more detail. The influence of technology has not been discussed and regional scope has not been addressed either. The results show that the Paper and Board industry is the best performing recovered-resource dependent industry, and will therefore be investigated in more detail in the next chapter. Also the overall research question has been partly addressed; internal factors that influence the strategies enabling the reduction of resource dependence have been neglected here and will be discussed in chapter seven and eight focusing on firm and management level.

Table 60 Topics and Findings Chapter 5

Topics discussed	Findings
- A Brief history of three RRDIs	- In the evolution of three RRDI's the external explanatory constructs: legislation, regional scope, resource recycling characteristics, technology, and markets for virgin and recovered resources, all play a role
- Comparison the performance of three RRDIs	- The paper and board industry is the best performing industry with regard to recycling performance
- End-use markets influencing recovered resources	- Paper and board industry is dominantly active in markets where end-of-life products become available within one year. - Aluminium products are mostly long in use (i.e. > 1 year) - About 60% of the plastic end-of-life products become available within one year.
- Resource recycling characteristics	- Number of times that products can be recycled differs per industry. - The major advantage to use recovered paper and aluminium is the lower price. The reuse and recycling of plastics saves other fuels.
- Legislation	Proposition C5 was partly illustrated - All three RRDIs deal with legislation influencing the recycling rate. The recycling targets set differ per industry. - The PPWD sets the highest recycling rate for the paper and board industry. - The landfill directive prevents paper going to landfill sites but does not affect the other two RRDIs. - The ELV-directives and WEEE impact the plastic and aluminium industry and sets high targets for reuse and recycling. - Declaration on paper recovery is an initiative of the paper and board industry and does not impact the other industries.

CHAPTER 6

FOCAL INDUSTRY: PAPER AND BOARD AT GLOBAL, EUROPEAN, AND COUNTRY LEVEL

INTRODUCTION

The findings in the previous chapter suggested that the Paper and Board Industry is one of the best performing industries with regard to recycling rates. Seeing the research question, this industry provides a fruitful research context and will, therefore, be investigated in more detail. Like the previous chapter, the chapter aims to provide more insight into external factors influencing RRDIs and in doing so it contributes to the industry-level research questions: "Which external factors constrain firms in recovered-resource dependent industries?" and "To what extent are external explanatory constructs associated with these external factors able to explain differences in performance of recovered-resource dependent industries?" Four different research settings, illuminating different units of analysis of the Paper and Board industry are addressed (research setting 2, 3, 4 and 5, Table 36).

To contribute to the process dimension at global level (research setting 2), the performance of the three main regions – North America, Western Europe, and Asia Far East – is investigated at three snap shots in time: 1990, the nearby pre-regulation period; 2002, representing the present situation; and the expectations for the near future 2010 according to EU Consulting (2004). It will be shown that the market for virgin and recovered resources has changed. Virgin resources are ever more substituted by recovered resources, in other words, the industry is becoming more recovered-resource dependent.

Europe will appear to be the best performer with regard to collection of end-of-life paper and board products and the utilisation of recovered resources, therefore the next level of analysis is Europe (research setting 3). The developments in the European paper and board industry will be described and a distinction is made between three stages of development. In this way this paragraph contributes to the process dimension, but the context dimension is addressed as well by investigating the impact of changes in the exogenous context. Proposition C5 (see Table 61) will be investigated, as well.

The paper and board industry is not homogenous. To illustrate the impact of the construct end-use sectors on recovered-resource dependence, the performance and

dependence on recovered paper as a resource of four end-use sectors in the European paper and board industry will be compared (research setting 4).

The last level of analysis that will be paid attention to is country level (research setting 5). The performance of six European countries will be examined. In alphabetical order: France, Germany, the Netherlands, Spain, Sweden and the United Kingdom. For each country the price volatility (market for virgin and recovered resources) and inventory management as a resource dependence instrument are investigated. The propositions B5 and C1 (see Table 61) will be investigated. The structure of the chapter follows the order of the topics described above.

Table 61 Propositions to be investigated in Chapter 6

	In the context of the transition from a traditional towards a recovered-resource dependent industry…
B5	From a *new institutional perspective*, incumbent firms are likely to behave isomorphic with regard to resource dependence instruments.
C1	From a *resource dependence perspective*, incumbent firms are likely to employ resource dependence instruments that increase their recovered-resource dependence.
C5	From a *new institutional perspective*, it is expected that in order to maintain legitimate legislation will increase incumbent firms' recovered-resource dependence.

Source: Table 33 and Table 34

THE GLOBAL PAPER AND BOARD INDUSTRY

This section addresses two external explanatory constructs. First of all, it aims to show that at global level in the last decades the *markets for virgin and recovered resources* have changed from a high dependence on virgin fibres towards an increasing dependence on recovered resources. Furthermore, it will be shown that *regional scope* leads to performance differences in recovered-resource dependent industries.

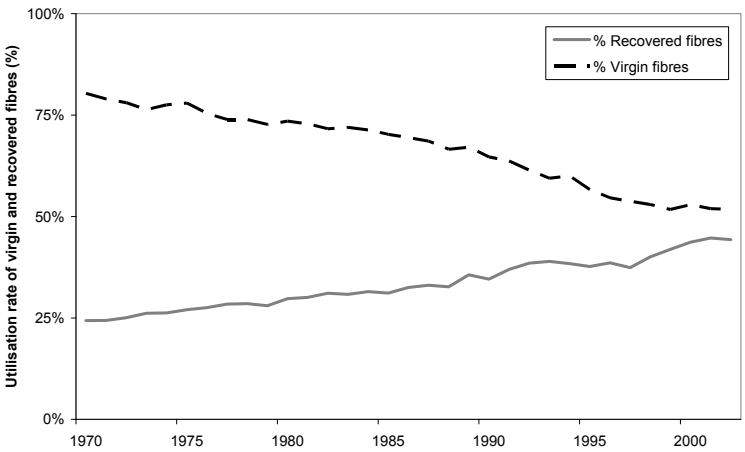
The Paper and board production and consumption at global level has increased substantial during the last decades and recovered paper is ever more used as a substitute for wood pulp, see Figure 19. In 1970 the total paper and board consumption at global level amounted about 125 million tonnes and virgin fibres were the primary resource used, about 80%. The utilisation of recovered fibres for paper and board production amounted considerably less; only 24%[15]. In the following decades the paper and board production

[15] Data are abstracted from FAO website http://faostat.fao.org/faostat (consulted July 2003). The utilisation percentages of virgin and recovered fibres can add up to more than 100% because of losses during the production process.

grows towards 325 million tonnes in 2002, i.e. 2.5 times the production in 1970. Recovered paper utilisation for paper and board production amounts 44% by 2002, which means that the demand for recovered paper has grown at a much higher pace than paper and board consumption itself or in resource dependence terms, the paper and board industry has become less dependent on wood pulp and more dependent on recovered paper. In terms of resource dependence instruments an example of substitute resources.

Although at global level consumption and production of paper and board equal out more or less, when the regional scope is narrowed, production and consumption are not at equal. The difference between production and consumption influence the product and recovered resource flows at continent-level. To illustrate this, in the remainder of this paragraph the developments in the three major regions: North America, Western Europe and Asia Far East will be investigated at three snapshots in time: 1990 the nearby pre-regulation period in Europe, 2002 where legislation is impacting the industry, and the expectations for 2010 according to EU Consulting 2004. It is shown that Europe has become one of the best performing players in the global paper and board industry. Therefore, in the next section Western Europe will be investigated in more detail.

Figure 19: Global development of virgin and recovered fibre utilisation for paper and board production



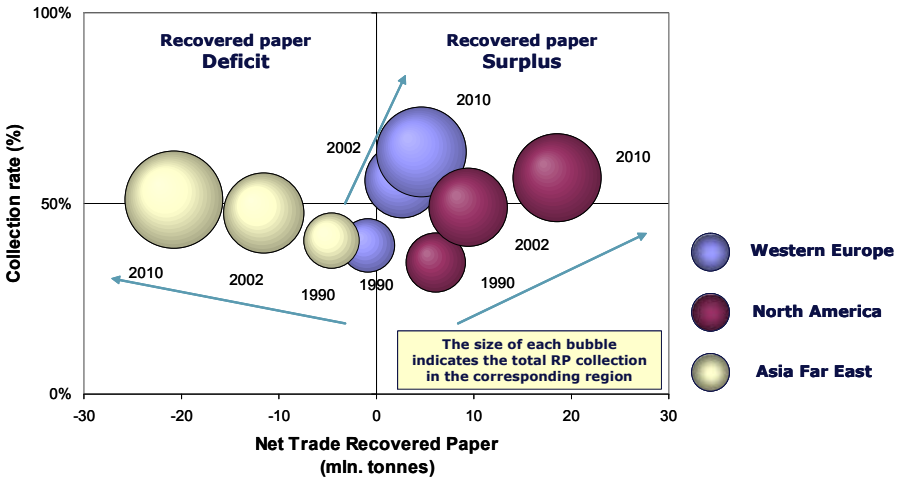
Source: FAO 2004

Snapshot 1: 1990 the nearby pre-regulation period in Europe

In 1990 North America has the highest paper and board production and consumption. Western Europe comes on the second place with regard to production and Asia Far East Follows on the third place. Europe and North America are net exporters of paper and board products, which means that production is higher than the consumption. The Asia Far East countries are net importers of paper and board.

In 1990, unlike Western Europe and Asia Far East, North America has a surplus of recovered paper, i.e. collection is higher than utilisation. The collection of recovered paper in Asia Far East and Western Europe is almost the same, resp. 24 and 23 million tonnes; however, utilisation is higher in Asia Far East. With regard to the recovery of resources, about 34% of the consumed paper and board products are collected and 27% of the paper and board consumption is reused again for paper and board production. In Western Europe and Asia Far East the recycling and collection rate are considerably higher than in North America. When the recycling rate, collection rate and utilisation rate are compared, Asia Far East appears to be the best performer.

Figure 20 Recovered paper developments at Global level 1990, 2002, and 2010



Source: EU Consulting 2004

Snapshot 2: 2002 the present situation

In 2002 the situation has changed dramatically compared to 1990. The paper and board production of Asia Far East equals that of North America with 100 million tonnes, an

increase of about 80%. North America and Western Europe are still net exporters of paper and board.

At the recovered resource side, changes are even more substantial. In all areas collection of recovered paper increased. Europe is no longer a net importer but has become a net exporter of recovered paper. Not only the production of paper and board has risen enormously in Asia Far East, also the demand for and collection of recovered paper has risen. The recycling and utilisation rate is highest in Asia Far East, however, this to a large extent enabled by importing recovered paper from North America and Western Europe. Western Europe is the continent with the highest collection rate 56%, which means that in Western Europe most of the consumed resources are collected again.

Snapshot 3: Expectation for 2010

How will these developments continue? EU Consulting 2004 provides data regarding the expected situation in 2010. The growth of paper and board production and consumption in North America is expected to be moderate compared to the rise between 1990 and 2002, about 10 million tonnes. The growth in paper and board consumption and production in Western Europe is expected to be more substantial, about 20 million tonnes, but growth will be highest in Asia Far East.

The recovered paper deficit in Asia Far East is expected to grow even further to about 20 million tonnes in 2010. The main cause of this will be China, with a deficit of more than 15 million tonnes. The deficit is expected to be supplied with recovered paper imports mainly from North America and for a part from Western Europe. It is expected that Europe will remain the area with the highest collection rate and a high recycling rate. The utilisation rate and recycling rate is expected to stay highest in Asia Far East.

Conclusion Developments at Global Level

The description of the three continents at three points in time shows that in a relative short period of time, the markets for virgin and recovered resources have changed dramatically. Wood as a resource for paper and board is ever more substituted by recovered paper. Differences in production and collection at regional level have lead to shifts in demand and challenges new ways of resource dependence management.

North America used to have a surplus of recovered paper and still has. Here the paper and board production capacity and collection of end-of-life products have developed balanced. Western Europe shows a substantial growth in paper and board capacity but recovered paper collection and utilisation has increased at an ever higher pace. That's why Western Europe has turned from a net importer to a net exporter of recovered paper. Asia

Far East is the region capacity expansions are tremendous and where demand for recovered paper has increased at an unprecedented rate. The recovered paper deficit in Asia Far East has grown significantly. For this reason Asia Far East has become more dependent on recovered paper Western Europe and North America in particular.

The comparison of the three major continents suggests that Western Europe is the continent that is best able to manage growth paper and board industry and collection of end-of-life paper and board products. Therefore, in the next paragraph the development of the paper and board industry in Europe will be investigated in more detail.

EUROPEAN LEVEL: DISCERNING THREE STAGES IN THE DEVELOPMENT OF THE PAPER AND BOARD INDUSTRY

Western Europe has become the best performing player in a relatively small time span. In the description of the European paper and board industry, three stages are distinguished, see Table 62. In this research attention will be paid to the last decades of the European paper industry where Europe turned from a net importer into a net exporter of recovered paper. In this chapter the focus will be on the change in external factors; internal factors will be discussed in chapter eight.

Table 62 Development of the European Paper and Board Industry

	Stage 1 1960 – 1970	**Stage 2 1970 – 1995**	**Stage 3 After 1995**
Characteristics	Dependence on traditional resources, i.e. wood pulp	Usage of recovered paper driven by market mechanism; later legislation regarding recovered resource	Recovered resource becomes a global commodity
Explanatory Constructs			
Markets for recovered resources	Low volatility	Dynamic, high volatility	Dynamic, high volatility
Regional Scope	Local market	Local, national, and European , market	Local, national, European, and Global market
Technological developments	Moderate	Substantial	Substantial
Regulation regarding recovered resources	Limited	Limited to substantial	Substantial

The *first* stage is here restricted to the period 1960 until 1970. Wood pulp is the most important raw material for paper and board production. Recovered paper is used for

paper and board production on a more limited scale. The *second* stage starts at the beginning of the 1970s and lasts until halfway the 1990s. It is the period in which the template shift takes place. In the beginning of this stage the use of recovered paper is still largely dependent on the price level. However, in the 1990s new stringent legislation at national and European Communion level with regard to packaging waste comes into force. The *third* stage starts about 1995. Legislation is becoming more stringent and recycling rates are further increasing. Amendments to different directives are made, introducing for example the *polluter pays principle*. This makes the producer, i.e. industry responsible for carrying the costs of collecting and recycling instead of the citizen.

To analyse the developments in these three stages, the following external explanatory constructs are investigated: regional scope, technological developments, regulation, and markets for virgin and recovered resources. Resource recycling characteristics are not discussed here, for they do not change that much. Where they do, they are discussed under the caption technological developments. Further attention is paid to the industry perspective (management) on the developments.

Stage 1: Dependence on traditional resources

The first stage concerns the period from 1960 until 1970 see Table 62. During this stage the paper and board industry could be regarded as mainly traditional industry, for wood pulp is the main resource for paper and board production. However, recovered paper is used as well and the share of recovered paper for paper and board production is increasing.

The level playing field, as indicated in Table 62, is mostly local. Unfortunately, no detailed data with regard to recovered paper export and import were available for this stage. Differences regarding recovered paper utilisation in Europe stem from availability of recovered resources and virgin resources. CEPI (1999) mentions the influence of population density. In countries that are densely populated, it is economically more attractive to collect used paper than in countries with a lower density. The presence of forestry is another factor: trees are used for wood pulp which on its turn is used for paper and board production.

During stage 1 the national government did not pay any particular attention to recovered paper as a resource: legislation related to recovered paper could not be found. Also statistics on recovered paper during this stage are not well documented. The Food and Agricultural Organization of the United Nations (FAO) provides production data on recovered paper and paper and board from 1961 on. But the export and import data for recovered paper become only after 1970s.

The market for recovered resources is driven by market mechanism. When demand is high enough, recovered paper is collected and sold. When prices are low, the

paper is just disposed of. Technological developments have always taken place in the paper and board industry. However, there is no major drive for new technologies. Involvement of higher levels of management in the buying process is moderate.

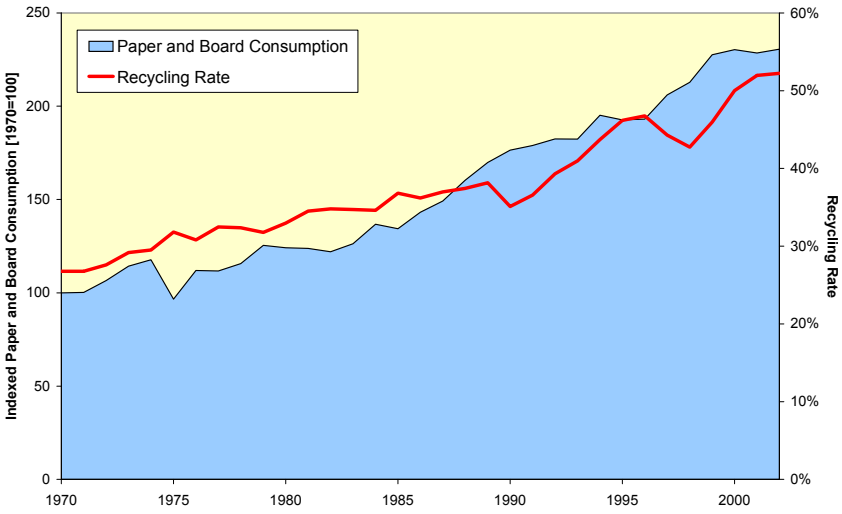
Stage 2: Shift from market-driven to regulation

Stage two is the template shift stage. Changes take place in different explanatory factors. Recovered paper as a resource for paper and board production becomes ever more popular. The regional scope expands further from the local and national level to the national and international level, see Table 62. In the beginning of stage 2 the recovered paper trade concentrates merely on Europe. During the 1980s, Asia Far East starts playing a role as an export market for recovered paper. Multinationals move their production units to these low labour cost countries and paper and board production capacity are expanded in Asia Far East. Modern paper mills are built that to a large extent depend on recovered paper as a resource. Because the infrastructure to collect paper in these countries is poorly developed, the mills have to import recovered paper. Most of the paper that is transported to Asia Far East comes from North America. Western Europe is still a net importing country of recovered paper by then.

Substantial technical innovations take place in the paper and board industry which make it possible to use higher quantities of recovered paper. Recovered paper as a resource becomes ever more common. The paper and board production in the period from 1970 to 1995 almost doubles and the collection rate, i.e. the collection of recovered paper relative to the paper and board production, increases from 27% in 1970 to 48% in 1995, see Figure 21. This means that the collection of recovered paper grows at a higher rate than the paper and board production itself. CEPI (1999: 2) mentions '... the evolution of material recycling of paper products from 1970-1998 has been a success story'.

When in the 1970s environmental issues like pollution and sustainability start playing a role, the attitudes of governments gradually change from low intervention to a more active involvement, first at national level and later at European level. A European approach starts in the 1990s. Germany, at that time the country with the most stringent policy towards packaging waste, introduced the German Packaging Ordinance in 1992 triggering the EU Packaging and Packaging Waste Directive of 1994 (94/62/EC). This Directive required the Member States to introduce systems for the return and collection of used packaging. The Directive concerns all packaging placed on the market in the Community and all packaging waste, whether it is used or released at industrial, commercial, office, shop, service, household or any other level, regardless of the material used. The objective of the European Union's PPWD was to harmonise national measures concerning the management of packaging and packaging waste to provide a high level of environmental protection and to ensure the functioning of the internal market (94/62/EC).

Figure 21: European Paper and Board Consumption and Recycling Rate 1970 – 2002 (FAO 2004 data)

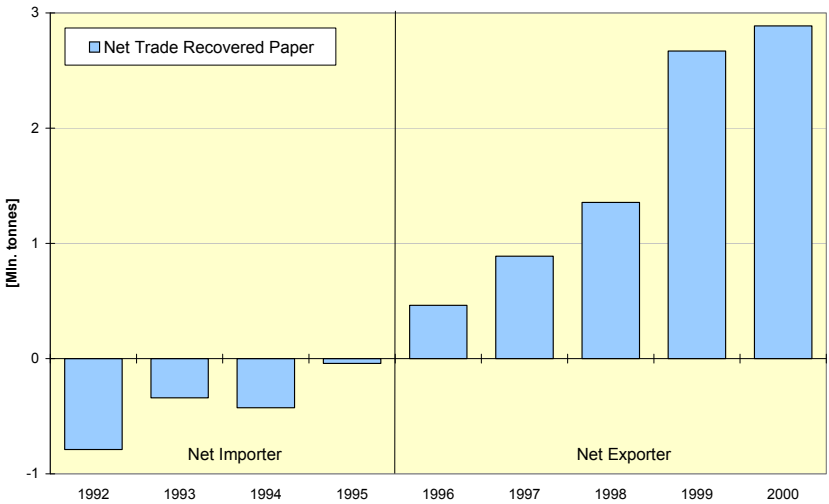


The Directive obliges Member States to introduce systems for the return and collection of used packaging and set targets to be attained by 2001: Recovery of between 50% - 65% by weight of packaging waste, recycling of 25% - 45% by weight of packaging material, of which a minimum of 15% by weight of each material is to be recycled. The Member States are free to choose the systems to reach the targets. Germany for example introduced its green dot system and the Netherlands chose a covenant system to meet the requirements. Due to the legislation on recovered paper the collection rate increases and this leads to the fact that in 1996 Western Europe is no longer a net importer but becomes a net exporter of recovered paper, see Figure 22. This illustrates the earlier proposition that legislation influences the performance of an industry.

In the period from 1970 until the early 1990s the supply of the recovered paper market was still dependent on markets for virgin and recovered paper prices. However, after the PPWD coming into force in 1994 this changed. In Germany legislation regarding packaging collection and recycling started even earlier when the Packaging Ordinance (also known as Töpfer Decree) came into force in 1992. This Decree obliged the collection of recovered paper independently from the demand. Soon after this the availability of recovered paper became so high relative to the demand that prices for recovered paper became even negative temporarily, i.e. the industry had to pay money to get rid of the secondary resource, see Figure 23. The implications for the paper and board industry were major because of its high production of packaging (cf. chapter five). The paper industry

reacts by adapting its mills in order to be able to consume higher amounts of recovered paper. Prices for recovered paper change dramatically from this time onwards, see Figure 23.

Figure 22 Trade balance recovered paper in Europe 1992 - 2000



Source: CEPI 2002

Stage 3: Recovered paper regulation era and international commodity

The Level playing field is further expanding in stage three, see figure 3. Asia Far East is playing a greater role than ever. In 2002 the total export to non Western European Countries amounted 10% of the total paper collection in Western Europe. The Major part of this concerned export to Asia Far East.

At the beginning of the 21st century production capacities further expand, especially in Europe and in China (see Table 63), and the availability of recovered paper becomes a major challenge. CEPI (2003a: 9) points out: 'The question is less whether the industry can recycle all the recycled paper that is collected, but more whether the paper industry can get all the recovered paper the new investments in paper recycling capacities would require while maintaining an adequate quality level. The global development is definitely not making the task easier for the European paper industry'. Until recently, apart from old newspapers and magazines, most recovered paper was collected from industrial and commercial sources, because it was the easiest, cleanest and most economical to collect. But demand for recovered paper is set to grow substantially, so additional sources

need to be tapped. 'Successful paper recycling depends largely on receiving good quality recovered paper and board. Therefore quality of recovered paper in addition to quantity has become a critical issue. Quantity and quality tend to be linked: The increased collection of paper in total, and especially the increasing share of recovered paper coming from households, would, if not addressed adequately, result in higher levels of impurities' (ERPA annual report 2003: 6).

Table 63 Estimated capacity expansions 2000 - 2007

Year	Europe konnes	North America ktnnes	China ktonnes	Japan Konnes
2000	1,695	192	1,135	100
2001	1,355	320	1,305	60
2002	1,478	338	1,685	440
2003	1,095	-1,642	3,173	-231
2004	1,676	103	4,236	-117
2005	1,279		1,976	
2006	820		790	
2007			400	
Total 2000-2007	*9,398*	*-689*	*14,700*	*252*

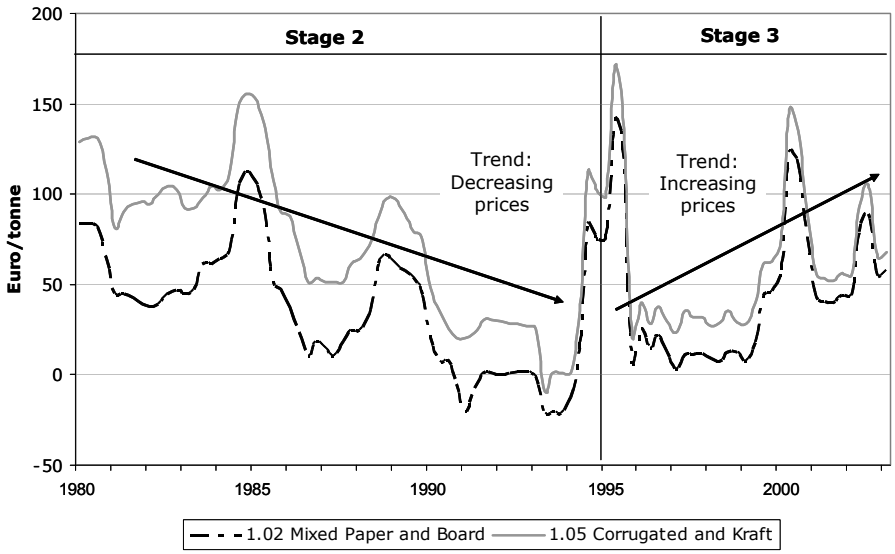
Source: 2000-2002 adapted from EU Consulting 2002; 2003-2007 adapted from EU Consulting 2004

Amendments of different directives around the beginning of the 21st century set the targets yet a level higher. In the latest revision of the EU Packaging and Packaging Waste Directive this rate is increased to 60% in 2008. Further discussions go around the polluter pays principle which makes the industry responsible for carrying the costs of pollution (amendment of the ELV directive and the directive on packaging and packaging waste).

The markets for recovered resources become more volatile than ever. The Töpfer Decree and later the PPWD gave rise to an increase of recovered availability which in the beginning led to a decrease in recovered paper prices even leading to ambivalence on the recovered paper market (Baumgärtner and Winkler, 2003). Industry reports of those days expect that there will be sufficient cheap recovered paper until at least 2010. However, things evolved differently, as shown in Figure 23. Until 1995 there is a general trend in Germany towards lower prices, however in 1995 this trend is brutally interrupted and one of the highest price spikes in history occurs. From this time on prices go up again with high price spikes at irregular intervals. The predicted sufficient availability of cheap recovered paper was disturbed by actions in the industry. In Europe production capacities were expanded and furthermore, increasing quantities of recovered paper were exported to Asia

Far East. This made that the surplus of recovered paper became less substantial than expected.

Figure 23 Price Volatility in the German recovered paper market



Source: Kappa Packaging internal data

In the second half of the 1990s the recycling rate in Europe seemed to stagnate, due to a rapid increase of paper and board consumption and an increasing export to outside Western Europe. This triggers a new phenomenon which can be characterised as self regulation. The European paper and board industry and the recovered paper collectors and merchants take the initiative to further improve long-term environmental protection and to close the paper loop (European Recovered Paper Council, 2001). This results in the signing of the European Declaration on Paper Recovery in 2000 by aforementioned organisations by doing this they voluntarily commit themselves to achieving a recycling rate of 56% by 2005. This illustrates proposition C5 that is concerned with legitimacy and legislation. The cooperation with different parties was necessary because the issues involved extended beyond the boundaries of the paper industry. Moreover, knowledge of recovered paper plays a role. If the producer of recovered paper knows the composition, segregating trouble-causing substances at the source is possible. Much depends on good cooperation and communication among the paper maker, dealer, packer and producers so that all may understand what is and what is not acceptable. CEPI (2003a: 4) wrote: 'The paper industry alone cannot provide constant improvements in paper recycling – support from the whole

recycling chain including converters, printers, packers/fillers. Publishers, manufacturers of adhesives, inks, etc., distributors, local authorities, final consumers, and recovered paper collectors is needed'. CEPI considers the quality of recovered paper as a big challenge for the future: ' …increasing collection rates puts pressure on recovered paper quality, as paper from households has a tendency to be of worse quality than that from business and industry sources. In response to this trend the European Paper Industry has universally adopted the European standard EN643 - the European List of Standard Grades of Recovered Paper and Board - which forms a cornerstone of the recovered paper quality management system in Europe' (2003a: 9).

Conclusion three stages in the European Paper and Board industry

The development of the European paper and board industry shows that the traditional paper and board industry mainly relied on wood pulp as main raw material for paper and board production has shifted towards a more dynamic situation where recovered paper has become a major raw material and where resource dependence has become substantial more difficult because of dynamic markets, and increasing level playing field and more players play a role.

It was shown that external factors played a prominent role in these developments. Regional scope has extended from local operations to recovered paper as a global commodity. Europe has grown from a net importer of recovered paper to a net exporter of recovered paper and the role of Asia Far East as a consumer of European recovered paper has become ever more substantial. The technology to use recovered paper for different purposes has improved; where in the early days recovered paper was used mainly for the packaging end-use sector, nowadays the graphic sector also consumes considerable amounts of recovered paper. The role of regulation has grown from low intervention to high regulation with ambitious recycling targets of 60% in 2008. This illustrates proposition C5: "In the context of the transition from a traditional towards a recovered-resource dependent industry, from a new institutional perspective, it is expected that in order to maintain legitimate legislation will increase incumbent firms' recovered-resource dependence".

Due to a change in the industry context prices for recovered paper have become volatile. Until 1995 there was a decreasing trend in the prices but after this prices tend to go up again. Management has become ever more involved in managing recovered paper. The industry realises that sustainability is an issue that the industry as a whole is responsible for. The influence of the different end-used markets on the recovered paper market was introduced briefly already; in the following section more details about the resource dependence of the different sectors and impact of cross-flows between sectors will be illustrated.

EUROPEAN LEVEL: END-USE SECTORS IN PAPER AND BOARD INDUSTRY

As discussed in the previous chapter the paper and board industry consists of different paper and board end-use sectors which have their own specific resource mixture, prescribed by the demands, or specific application of the end product. In this section it will be examined to what extent resource dependence in the different end-use sectors of the paper and board industry differs. Following CEPI (2003b) four main sectors are distinguished: graphic paper, packaging paper, household and sanitary paper, and others, see Table 64. The graphic sector produces newspapers, glossy magazines, white machine printing paper etc. The packaging sector produces packaging paper and board. For example corrugated boxes but also displays. Sanitary sector includes tissues, toilet paper, kitchen paper, diapers.

Analysis of the data in Table 64 shows that the Graphic and Packaging sector together constitute a paper and board production of almost 80 million tonnes, which is about 90% of the total West European paper and board production. The other two sectors lag far behind with regard to production quantity. From a recovered-resource dependent perspective we are interested in the sector that consumes most recovered paper. The packaging sector has the highest recovered paper utilisation rate with 75%. In the graphic sector the utilisation rate is considerably lower with 24% (with exception of the newsprint sub sector). The difference can be explained when one bears in mind the different demands and applications for the different kinds of paper. Producing high quality clear, white paper is more difficult with recovered paper than with virgin fibres. The availability of white recovered paper that is suitable for the purpose is limited and making other qualities of recovered paper suitable for the production process via de-inking, makes the resource more expensive. In the packaging sector the white surface of the paper is less an issue; a corrugated box has to protect its content and needs not necessarily be a product of beauty. Therefore the packaging sector traditionally could permit a higher utilisation of recovered paper, keeping the costs lower. However, it also means that of all sectors it is most dependent on recovered paper as a resource.

In the remainder of this section the sectors and recovered paper utilisation of the sectors will be examined in more detail. Recovered paper qualities are standardised in the European list of standardised recovered paper, EN 643. In this list a distinction is made between more than fifty different recovered paper grades. It leads too far here to examine all these individual qualities; instead a division into four main groups, also followed by CEPI and FAO, will be used. These groups are: Mixed grades, Corrugated and Kraft grades, Newspapers and Magazines, and High grades. In Table 64 the utilisation of the different recovered paper groups per paper and board sector is presented. These data however, give limited insight into the origin of recovered paper and inter-sector recovered

paper flows. Is the recovered paper used by the packaging sector from graphic origin or of packaging origin? Or put differently, to what extent are the sectors dependent on their produced products, or are they dependent on other sectors?

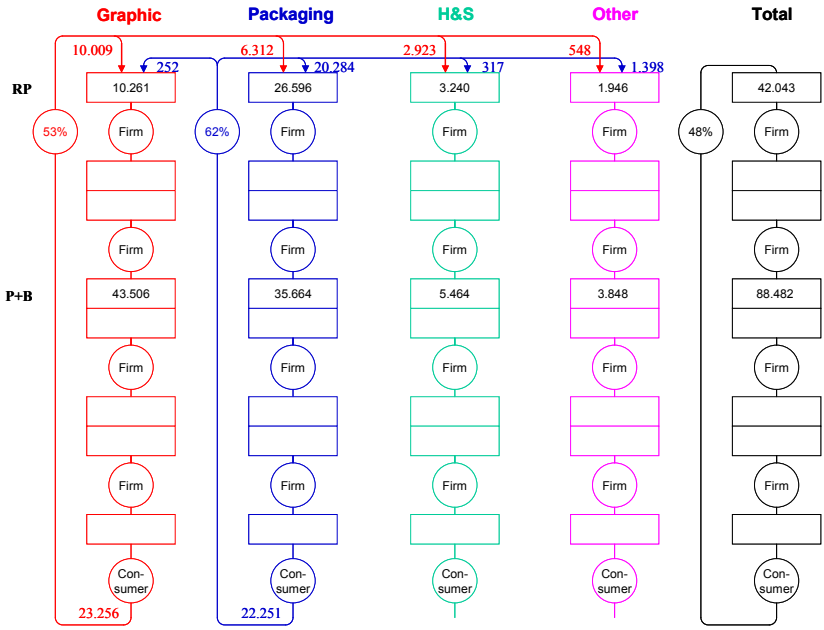
Table 64 End-use sectors and recovered paper utilisation in Western Europe 2002

	A	B	C	D	E (=A+B+C+D)	F	G (=E/F *100%)
End-use Sector	Mixed Grades (ktonnes)	Corrugated and Kraft grades (ktonnes)	Newspap & Mags. (ktonnes)	High Grades (ktonnes)	Total use of Recovered Paper (ktonnes)	Prod. Paper & Board (ktonnes)	Util. rate (%)
Total graphic	**300**	**72**	**8,909**	**980**	**10,261**	**43,506**	**24**
Newsprint	187	6	7,020	125	7,338	9,976	74
Other gr. Paper	113	66	1,889	855	2,923	33,530	9
Total Packaging	**7,601**	**15,723**	**1,234**	**2,038**	**26,596**	**35,664**	**75**
Case materials	4,033	13,721	246	648	18,648	20,398	91
Carton Boards	1,663	633	547	856	3,699	7,848	47
Wrappings, Other pack.. Paper	1,905	1,369	441	534	4,249	7,418	57
Household & Sanitary	**384**	**87**	**711**	**2.058**	**3,240**	**5,464**	**60**
Others	**375**	**1,173**	**117**	**281**	**1,946**	**3,848**	**51**
Total W. Europe	***8,660***	***17,055***	***10,971***	***5,357***	***42,043***	***88,482***	***48***

Source: CEPI 2003b

To transform Table 64 into Figure 24 the following assumptions were made. The first assumption is that all collection takes place from products produced in the graphic and packaging sector. The argument behind this is that products from the household and sanitary sector are not collectable. The production of paper and board products in the sector "other" can be collected but the amount is relatively low (less than 5% of total paper and board production) and impact on collection of recovered paper from this sector is therefore neglected. With regard to the recovered paper groups, corrugated and kraft grades are produced in the packaging sector. Newspapers and magazines are produced in the graphic sector. Mixed grades is composed of a mixture of various qualities of paper and board. In the European list of standard grades of recovered paper and board (EN 643), sorted mixed paper and board (quality 1.02) contains a maximum of 40% of newspapers and magazines. Assumption is that for the other mixed grades this percentage will not differ greatly, therefore the group mixed grade is assumed to contain 40% graphic paper and 60% packaging paper. The last recovered paper group, high grades, are expected to be mainly produced by the graphic sector. Import and export flows are neglected, which is not fully correct, but net trade is less than 5% of the total utilisation of recovered paper in Europe. These assumptions lead to the recovered paper flows presented in Figure 24.

Figure 24: Flow diagram paper and board sectors



Source: Adapted from CEPI 2003b

Figure 24 shows that 62% of all packaging produced is collected and utilised again. Moreover, most of the packaging becomes packaging again (57% =20.284/35.664). Collection and recycling of products from the graphic sector is less, 53%. Moreover a lot of graphic origin paper does not become graphic paper again but is used by producers in the other sectors. Only 23% (=10.009/43.506) of all graphic board becomes graphic board again. This means that dependence on the own sector is relatively high for the packaging sector. When the recovered paper utilisation in the Graphic sector increases, this will influence the availability of (Graphic paper) for the Packaging sector, and probably lead to volatility in the prices. In the newsprint sector (part of the graphic sector) this tendency for more use of recovered paper is already going on. In 1993 the recovered paper utilisation of recovered paper for newsprint production was about 43% and in 2002 this has increased to 73% (source CEPI 1994, 2003c). So, adequate management of recovered paper is of strategic importance for paper and board industry and for the packaging sector in particular. This makes the packaging sector and the Graphic sector (newsprint) the most interesting case from a recovered-resource dependent perspective and is also the reason that in the next chapter the strategic renewal actions of three major players in both sectors will be investigated.

COUNTRY LEVEL: INVENTORY MANAGEMENT AS A RESOURCE DEPENDENCE INSTRUMENT

Where the previous sections focused on the external *explanatory constructs* at global and European level, and differences between paper and board sectors, this section examines inventory management as a *resource dependence instrument*. In this way this section contributes to proposition C1 and B5 (see Table 61). Recovered paper inventories will be investigated for six European countries (in alphabetical order): France, Germany, the Netherlands, Spain, Sweden, and United Kingdom. Aforementioned six countries were selected on multiple aspects e.g. price stability of recovered paper, paper and board production and consumption, recovered paper collection and consumption, net trade of recovered paper, location, use of inventories as a resource dependence attribute, collection system, legal aspects. The previous section has shown that recovered paper qualities and paper and board sectors are different. Here three different recovered paper qualities are investigated: 1.02 (Mixed grades), 1.05 (OCC & Kraft grades), and (1.09) Newspapers & Magazines. After briefly presenting an overview of the paper and board production and consumption and recovered paper collection and utilisation attention will be paid to the price levels in the six countries and differences will be discussed.

Overview Paper and Board Production and Consumption.

The six countries together represent a paper and board production of 54 million tonnes and a recovered paper collection of almost 33 million tonnes, which is about 75% of the total West-European recovered paper collection, see Table 65. They therefore are of major importance for the European recovered paper consuming sector.

Germany is by far the country with the highest paper and board production and also the highest collection. Of all European countries, Germany has most inhabitants and also highest paper and board consumption. In most of the selected countries the paper and board consumption is a little higher than the production. In Sweden, however, the paper and board production is dramatically higher than consumption. This can be explained from a resource dependence perspective. Traditionally wood pulp is a major resource for paper and board production and this is the reason that the major part of paper and board products are wood-based and use of recovered paper is relatively low. The surplus of paper and board products are exported.

Table 65: Paper and Resources in six selected European countries 2002

	A P&B Prod. (ktonnes)	B P&B Cons. (ktonnes)	C RP Coll. (ktonnes)	D RP Util. (ktonnes)	E (=D/B *100%) Recycl. rate (%)	F (=C/B *100%) Coll.\ rate (%)	G (=D/A *100%) Utilisation rate (%)
France	9,798	11,241	5,588	5,705	51	50	58
Germany	18,526	18,984	13,709	12,038	63	72	65
Netherlands	3,338	3,549	2,300	2,372	67	65	71
Spain	5,365	6,948	3,617	4,370	63	52	81
Sweden	10,723	2,155	1,483	1,861	86	69	17
United Kingdom	6,217	12,411	5,905	4,610	37	48	74
Western Europe	*88,484*	*78,966*	*44,751*	*42,043*	*53*	*57*	*48*

Source: CEPI 2003c

With regard to collection of recovered paper, Germany, the Netherlands and Sweden belong to the European countries with the highest collection rates, all above 60%, in Germany even 72%. This means that more than 60% of all the consumed paper and board products are collected. United Kingdom and Germany both have a surplus of recovered paper, i.e. collection is higher than consumption, and together they are responsible for a surplus of almost 3 million tonnes (in 2002). This gives them an advantage. The Netherlands, France, and Sweden have a minor recovered paper deficit, in Spain it is a little higher, which makes that these countries are dependent on other countries for the resources they themselves require.

Price volatility in six selected European countries

The graph with German prices in Figure 23 shows that in the period until 1995 price spike occurred at regular intervals and the price level had a decreasing trend. Mixed grades were considerably less expensive than OCC and kraft grades. Through time the differences in price between the two groups are getting smaller. Legislation, as discussed before, changes the availability of recovered paper dramatically in the beginning of the 1990s. Prices become even negative for a small time, which means that firms have to pay to get rid of their recovered paper. Rather soon after 1992 prices go up, price spikes are high and do no longer occur at predictable moments anymore, intervals seem to shorten as well in 2000 as in 2002 a price spike occurs. Price differences between the quality groups, mixed grades and OCC & kraft grades are getting smaller. These prices have a major impact on the costs of the paper and board products, especially in the packaging and newsprint sector for these are to a large extent dependent on recovered paper as a resource. In the remainder of this section the price volatility of the six selected countries is investigated, see Table 66.

Table 66: Price variations for three different qualities in six selected European countries

		Mixed Grades		OCC & Kraft Grades		Newspapers & Magazines	
		1.02		1.05		1.09	
		Jan. '96 –Dec.'99	Jan. '00 – Dec. '03	Jan. '96 – Dec.'99	Jan. '00 – Dec. '03	Jan. '96 – Dec.'99	Jan. '00 – Dec. '03
France	N	44	48	44	48	5	44
	Mean (€/tonne)	10	46	30	68	*	81
	Std. Dev (€/tonne)	7	27	9	30	*	27
	V.C. (=Std. Dev/mean)	0.75	0.59	0.30	0.44	*	0.34
Germany	N	44	48	n.a.	5	45	32**
	Mean (€/tonne)	7	61	n.a.	*	41	89**
	Std. Dev (€/tonne)	12	21	n.a.	*	10	20**
	V.C. (=Std. Dev/mean)	1.79	0.34	n.a.	*	0,25	0.22**
Netherlands	N	44	37**	44	37**	44	37**
	Mean (€/tonne)	13	57**	30	67**	38	95**
	Std. Dev (€/tonne)	12	17**	9	19**	10	15**
	V.C. (=Std. Dev/mean)	0.92	0.30**	0.30	0.28**	0.26	0.16**
Spain	N	47	48	47	48	5	48
	Mean (€/tonne)	32	47	54	72	*	78
	Std. Dev (€/tonne)	6	16	7	20	*	22
	V.C. (=Std. Dev/mean)	0.17	0.33	0.12	0.28	*	0.29
Sweden	N	n.a.	34**	48	45	48	45
	Mean (€/tonne)	n.a.	37**	53	67	65	67
	Std. Dev (€/tonne)	n.a.	2**	5	9	3	4
	V.C. (=Std. Dev/mean)	n.a.	0.06**	0.10	0.14	0.04	0.05
United Kingdom	N	42	n.a.	47	47	41	47
	Mean (€/tonne)	14	n.a.	42	81	37	49
	Std. Dev (€/tonne)	8	n.a.	10	20	13	9
	V.C. (=Std. Dev/mean)	0.61	n.a.	0.24	0.24	0.35	0.18

Source: CEPI Recovered paper prices January 1996 – December 2004
* not enough values for valid predictions
** 2000 data missing

For this purpose attention will be paid to the period January 1996 until December 2003 (earlier data were not available), in which two stages of four years can be distinguished: a relatively price stable period (Jan. 1996 – Dec. 1999) and a period where prices are volatile (Jan. 2000 – Dec. 2004) and two price spikes took place: one in 2000, and one in 2002, see Figure 23.

The price fluctuations in the relatively stable period provide insight into the normal price fluctuations and the period of the price spikes gives insight into what countries are best able to buffer the peaks. Three different qualities are examined, mixed grade 1.02[16] and OCC and Kraft grade 1.05[17] which are mainly used by the packaging sector, and Newspapers and magazines grade 1.09[18], mainly used by the newsprint sector. After discussing the price behaviour in the countries, inventory management of the different counties is examined.

Findings January 1996 until December 1999

Examining the mixed grades, quality 1.02 in Table 66 shows that of the six selected countries in the period from January 1996 until December 1999 Spain has the highest average price (32 euro) and also the lowest variation coefficient (0,17). This makes Spain the country with the most stable prices during this period. With an average of 7 euro for quality 1.02, Germany is the country with the lowest average price. Price volatility on the other hand is highest all of countries with a V.C. of 1.79.

For quality 1.05 the same tendency is noticeable. Spain and Sweden both have a relative high average price and low variation coefficient. France and the Netherlands have an average price of 30 euro/tonne and a variation coefficient of 0.30. German data are missing. United Kingdom has the lowest average price and the lowest price volatility with a V.C. of 0.24.

For quality 1.09 unfortunately most of the monthly data for France and Spain are missing, which makes it invalid to do predictions. Sweden has the highest average price and lowest variation coefficient. Germany and the Netherlands are comparable with a variation coefficient of respectively 0.25 and 0.26, only the average price in Germany is slightly lower. In United Kingdom the average price is slightly lower than in Germany and the Netherlands and the V.C. slightly higher.

In summary, Spain and Sweden are the countries with the lowest price volatility for the three different grades. The average price in these countries is remarkably higher. Other countries have significant higher variation coefficients and in most cases lower average prices.

[16] 1.02: Mixed papers and boards (sorted). A mixture of various qualities of paper and board, containing a maximum of 40% of newspapers and magazines (Source: EN 643).

[17] 1.05: Old corrugated containers. Used boxes and sheets of corrugated board of various qualities (Source: EN 643).

[18] 1.09: Mixed newspapers and magazines 2. A mixture of newspapers and magazines, containing a minimum of 60% of newspapers, with or without glue (Source: EN 643).

Findings January 2000 until December 2003

Unfortunately the mixed grade 1.02 data for the period January 2000 until December 2003 were not available for United Kingdom. For the Netherlands and Sweden the 2000 data were not available, in 2000 a price spike occurred, which makes that the calculated average prices for these countries will be lower than the real average price and makes these values difficult to compare with France, Germany, and Spain. For all countries the average price increase compared to the period 1996-2000 is significantly higher. Prices in France increased from 10 to 46 euro/tonne. In Germany the prices increased from 7 to 61 euro/tonne and in Spain the prices increased from 32 to 48 euro/tonne, which means that based on the average price increase, the price spike in Germany was highest. In France price volatility is highest with a V.C. of 0.60.

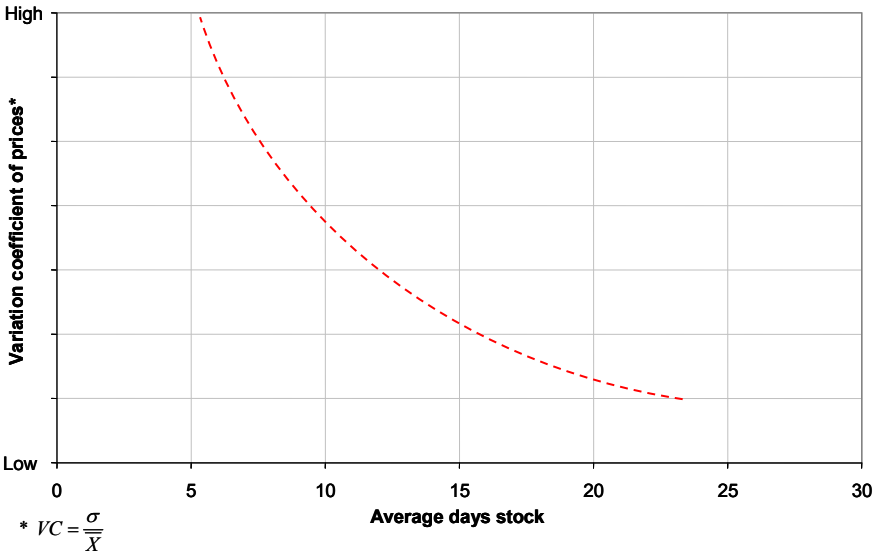
With regard to quality 1.05 for Germany insufficient data were available to do valid predictions and for the Netherlands the 2000 data, where a price peak occurred, were missing. In all countries the price increase compared to the previous period is relatively high. The countries with the lowest price increase are Spain and Sweden. In Sweden the V.C. lowest of countries with a value of 0.14. United Kingdom has the highest average price (81 euro/tonne) and France the lowest V.C. (0.44).

For Germany and the Netherlands the 2000 data for quality 1.09 are missing, which makes these countries difficult to compare with the other countries. Of all countries United Kingdom has the lowest average price (49 euro/tonne) and a low price volatility (V.C. of 0.18). The price increase in Sweden compared to the previous period is low from 65 to 67 euro/tonne.

Recovered paper inventories and price volatility in six European countries

Resource dependence theory (Pfeffer and Salancik, 1978) proposes inventories as a mean to reduce resource dependence. Proposition B5, "In the context of the transition from a traditional towards a recovered-resource dependent industry, from an institutional perspective incumbent firms are likely to behave isomorphic with regard to resource dependence instruments", suggests that countries that are subjected to the same industry legislation will use recovered paper inventories as a resource dependence instrument. Whether this is the case will here be investigated. Figure 25 presents the expected relationship between stocks (in days) and the variation coefficient of recovered paper prices. The lower the stock, the higher the variation coefficient, and the higher the stocks, the lower the variation coefficient.

Figure 25: Expected relationship between stocks and variation coefficient prices



This relationship between the variation coefficient and the stock level will now be investigated for the six selected countries mentioned before. The first thing that becomes obvious when comparing the average values of the period 96/99 and 00/04 is that the average number of days stocks has decreased for all selected qualities, see Table 67. Mixed grades decreased from an average of 17 days stock to 14 days stock. OCC and Kraft grades decreased from 22 days stock to 17 days stock. For the newspaper and magazines grades the decrease was lower; from 15 days stock to 14 days stock. This general tendency supports the view that higher stocks lead to lower price volatility. However it does not illustrate Proposition C1 "In the context of the transition from a traditional towards a recovered-resource dependent industry, from a resource dependence perspective, incumbent firms are likely to employ resource dependence instruments that increase their recovered-resource dependence", because a decrease in inventories would negatively influence recovered-resource dependence.

France is the only country where recovered paper stocks have increased in the period 96/99 to 00/04. For all three qualities the stock levels increased and for OCC and Kraft grades most dramatically, from 9 days to 21 days. For mixed grades the stocks doubled, from 9 to 18 days. For newspaper and magazine grades the increase was smaller; from 12 to 14 days. In Germany stock levels decreased most dramatically for the OCC and Kraft grades; from 35 to 12 days. Mixed grades decreased from 14 to 11 days. Newspaper and magazines remained at a constant level of 12 days.

Table 67: Average Inventories in Days of several grades period January 1996 – December 2003

		Mixed Grades (=stocks tonnes/ utilisation)		OCC and Kraft Grades		Newspapers and magazines	
		Jan. '96 – Dec.'99	Jan. '00 – Dec. '03	Jan. '96 – Dec.'99	Jan. '00 – Dec. '03	Jan. '96 – Dec.'99	Jan. '00 – Dec. '03
France	N	40	48	40	48	40	48
	Average days stocks	9	18	9	21	12	14
	Std. Dev.	11	6	6	7	3	2
Germany	N	43	48	43	48	43	48
	Average days stocks	14	11	35	12	12	12
	Std. Dev.	3	2	15	2	3	3
Netherlands	N	n.a.	24	n.a.	24	n.a.	24
	Average days stocks	n.a.	10	n.a.	10	n.a.	14
	Std. Dev.	n.a.	3	n.a.	3	n.a.	10
Spain	N	46	48	46	48	46	48
	Average days stocks	24	17	29	21	29	26
	Std. Dev.	7	7	4	4	5	8
Sweden	N	48	45	48	44	48	45
	Average days stocks	23	12	21	20	9	7
	Std. Dev.	13	5	9	7	4	2
United Kingdom	N	46	48	46	48	46	48
	Average days stocks	16	11	15	12	15	11
	Std. Dev.	7	5	4	3	5	3
Average Countries	Average days stocks	17	14	22	17	15	14

Source: CEPI Monthly statistics January 1996 – December 2003

For the Netherlands, not enough data were available for the period 96/99, therefore the developments could not be compared with the period 00/04. In Spain, the general tendency of decreasing stocks also took place, however, stocks remained at relative high levels compared to other countries, supporting the view that higher stock levels lead to lower price volatility, as Spain appeared to be a country where price levels were relatively stable. Sweden saw a decrease in stocks most dominantly in mixed paper decreasing from 23 to 12 days. OCC and Kraft grades remained at almost the same level; from 21 to 20

days. Newspaper and magazines grades decreased from 9 to 7 days stock. United Kingdom finally has lower than average stock levels over both periods. Mixed paper stocks decreased form 16 to 11 days. OCC and Kraft stocks lowered from 15 to 12 days and newspaper and magazines grades decreased from 15 to 11 days stock. This suggests that proposition B5 is partly illustrated, all countries have decreased their recovered paper inventories, however, there are considerable differences between the European countries that were investigated.

What not was mentioned before, but need not be neglected, in absolute value recovered paper stocks increased for all grades. However, because recovered paper utilisation for paper and board production increased at a higher rate, the average days of inventory decreased. This is especially the case for mixed grades and OCC and kraft grades, the grades most consumed by the packaging sector.

Beside the stock levels there are of course other issues that play a role too. One of these aspects is for example the presence of deep-sea harbours in a country. Recovered paper is ever more becoming a global commodity and in countries with such harbours recovered paper prices are more influenced by external buying behaviour. Via Hamburg, Rotterdam, and Southampton for example, large quantities of recovered paper are exported to Asia Far East. Spain and Sweden, do not have deep-sea harbours, which makes them more isolated and less vulnerable for price fluctuations.

CONCLUSION

This chapter has characterised the context in which paper and board companies are operating and in this way contributed to major theme 1 of resource dependence theory (Pfeffer and Salancik, 1978). Furthermore attention was paid to the process dimension by describing the Global paper and board industry at three snapshots in time and the European paper and board industry longitudinally for the period 1960 until 2003. A summary of the topics discussed and the findings of this chapter is provided in Table 68.

The research question is addressed in more than one way. Developments at global level have shown that recovered resources are becoming ever more important in the paper and board industry. Paper and board production has increased and recovered paper collection and consumption have increased at a considerable higher rate. At global level the utilisation of recovered paper has increased from about 25% in 1970 until almost 50% in 2003. By consequence, recovered-resource dependence management has become more important.

The continent comparison has shown that Europe is the best performer when it concerns managing the return of end-of-life products and using these for paper and board production. In a longitudinal description the European paper and board industry was investigated. Three different stages were distinguished: the period before 1970; the period

from 1970 until 1995; and 1995 until present. Proposition C5: "In the context of the transition from a traditional towards a recovered-resource dependent industry, from a new institutional perspective, it is expected that in order to maintain legitimate legislation will increase incumbent firms' recovered-resource dependence" was partly illustrated. During the first stage, the industry relies mainly on traditional resources; recovered paper is used but not in large quantities. During stage 2, recovered paper consumption is driven by market forces and later legislation regarding recovered paper is arising. In the last stage, regulation becomes more stringent, recycling targets are set higher and recovered paper becomes a global commodity.

Following CEPI (2003c), four end-use sectors are distinguished in the paper and board industry: Graphic, Packaging, Household & Sanitary, and others. It appears that in the different end-use sectors the dependence on recovered paper differs. Traditionally recovered paper consumption in the packaging sector is highest; however in the newsprint sector (part of the graphic sector) utilisation has increased dramatically during the 1990s. This increase in consumption impacted the availability of recovered paper.

The country level comparison has shown that prices for recovered paper, or markets for virgin and recovered resources, are different per country. In resource dependence terms, when prices are stable, there is less uncertainty and resource dependence management is easier than when prices are more volatile. Finally the relationship between price volatility and inventories was investigated, giving the opportunity to illustrate proposition B5: "In the context of the transition from a traditional towards a recovered-resource dependent industry, from an institutional perspective incumbent firms are likely to behave isomorphic with regard to resource dependence instruments", and proposition C1. "In the context of the transition from a traditional towards a recovered-resource dependent industry, from a resource dependence perspective, incumbent firms are likely to employ resource dependence instruments that increase their recovered-resource dependence". A comparison of the period 1996-2000 and 2000-2004 showed that on average recovered paper inventories were decreased (see Table 67) and prices had become more volatile (see Table 66). This does not illustrate proposition C1; lower inventories do not positively influence recovered-resource dependence. Proposition B5 was partly illustrated, all countries showed lower recovered paper inventories and in this respect they behaved isomorphic with regard to resource dependence instruments. There were however differences at country level. Moreover, it appeared that higher inventories do not necessarily lead to lower price volatility which implies that other aspects play a role as well.

Table 68 Topics and Findings Chapter 6

Topics discussed	Findings
- The global paper and board industry	- At global level the utilisation of recovered paper as a resource has increased substantial from 1970 towards 2003. Recycling rate has increased from 24% in 1970 to 44% in 2003 - In the period 1990 towards 2010 the US had a recovered paper surplus. Western Europe turned from a deficit towards a surplus. The deficit in Asia is increasing ever more. This suggests that in Western Europe recovered paper collection is best managed
- Three stages in the European paper and board industry	- During the three stages the external context of the industry has changed. - Regional scope has shifted from local to local, national, European and international - Technological developments have shifted from moderate to substantial - The markets for virgin and recovered resources have shifted from low volatility towards dynamic markets Proposition C5 was partly illustrated: - Regulation has shifted from limited to substantial, aiming at an increase of recycling rate.
- End-use markets in the paper and board industry	- The end-use markets of the paper and board industry influence the dependence on recovered paper. - The packaging sector is more dependent on recovered resources than the graphic sector.
- Country level: Inventory management as a resource dependence instrument	Proposition C1 was not illustrated Proposition B5 was partly illustrated: - Price volatility of recovered paper differs per country. - Inventory management is applied by different countries however, the impact of this resource dependence instrument can not be shown to be significant.

CHAPTER 7

STRATEGIC RENEWAL JOURNEYS OF SIX INCUMBENT FIRMS IN THE EUROPEAN PAPER AND BOARD INDUSTRY

INTRODUCTION

The previous two chapters focused on external factors influencing recovered-resource dependent industries. This is the first of two chapters focusing on internal factors influencing recovered-resource dependence management. Besides contributing to the overall research question, this chapter aims to answer the firm-level research question: Which resource dependence strategies and resource dependence instruments are applied and why is this the case? In addition to the context dimension of the previous two chapters, this chapter contributes to the process dimension by investigating the strategic renewal actions of six incumbent firms and, moreover, adds to the content dimension by investigating the resource dependence instruments employed by these firms (research setting 6). The selected firms are: Kappa Packaging, SCA, Jefferson Smurfit, Norske Skog, StoraEnso, and UPM-Kymmene.

Because this chapter is interested in strategic renewal of incumbent firms, several propositions related to strategic renewal will be illustrated, see Table 69. Proposition C4 (see Table 69) will be investigated as well. Due to lack of data availability, for this purpose the organisation structure of one company (Kappa Packaging) will be examined. To provide additional insight into the importance of resource dependence management of recovered paper, the position of recovered paper purchasing in the organisation will be investigated at two points in time: 1998 and 2003.

The structure of the chapter is as follows. It starts with an overview of the general characteristics of the six selected companies. After this the strategic renewal actions for the six companies will be executed whereby end-use sectors and companies are compared. The next issue is an investigation of the resource dependence instruments employed during the strategic renewal journeys and the last issue addressed is a comparison of the development of the organisation form of the six companies.

Table 69 Propositions to be investigated in Chapter seven

	In the context of the transition from a traditional towards a recovered-resource dependent industry…
A1	From a *resource dependence* perspective, incumbent firms using mainly inter-firm resource dependence instruments are likely to be associated with an emergent or directed renewal journey.
A2	From a *resource-based view of the firm* perspective, incumbent firms in which both top, and middle and frontline management have a low involvement in managing resource dependence are likely to follow an emergent renewal journey.
A4	From a *knowledge-based view of the firm* perspective, incumbent firms with a low exploration ratio are likely to follow an emergent renewal journey.
C4	From a *knowledge-based view of the firm* perspective, incumbent firms are likely to adapt their organisation form (including knowledge processes) enabling an increase of recovered-resource dependence.

Source: Table 30 and Table 34

DESCRIPTION AND COMPARISON OF SIX INCUMBENT FIRMS: KAPPA PACKAGING (NL), JEFFERSON SMURFIT (IE), SCA (FI), NORSKE SKOG (NO), STORAENSO,(FI/SE) AND UPM-KYMMENE (FI)

This paragraph presents a general comparison of six major players in the paper and board industry. Because of the focus on recovered resources, the companies were selected on the amount of recovered paper consumption, see Table 70. The three major players in the packaging sector are: Kappa Packaging, SCA, and Jefferson Smurfit; the three major players in the graphic sector are: UPM-Kymmene, Norske Skog, and StoraEnso. Each of the companies will now be further investigated with attention to size and degree of diversification or, end-use sectors.

With regard to size, SCA and StoraEnso are the biggest players with respectively 49,900 and 43,800 employees, see Table 71. Jefferson Smurfit and UPM-Kymmene follow with 30,300 and 33,400 employees and Norske Skog and Kappa Packaging are the companies with least employees, respectively 7,300 and 15,500. With regard to turnover, StoraEnso is the biggest followed by UPM-Kymmene and SCA. Jefferson Smurfit follows on the fourth place and Norske Skog and Kappa Packaging have least turnover. It appears that on average the players in the graphic sector (UPM-Kymmene, Norske Skog, and StoraEnso) are bigger than the players in the packaging sector (Kappa Packaging, SCA, and Jefferson Smurfit).

Traditionally the Nordic countries are producers of paper and board products because of the presence of natural resources in the form of forestry. Four of the selected countries are Nordic: SCA, UPM-Kymmene, Norske Skog, and StoraEnso. The other two

companies have their origin in the Netherlands (Kappa Packaging) and Ireland (Jefferson Smurfit), see Table 71. This difference in availability of natural resources can be found back in the end-use sectors that are served by the companies and the resource composition. UPM-Kymmene and StoraEnso are both active in the Graphic end-use sector and the forest products end-use sector. Norske Skog is active solely in the Graphic sector. The Graphic end-use sector relies to a larger extent on virgin resources than the packaging sector.

Table 70 Recovered paper consumption of the major players in the European recovered paper consuming market.

Company	Location Head Quarter	Sector	Recovered paper Consumption (ktonnes)	Market share (%)
	(1)	(2)	(3)	(4)
SCA	Sweden	Packaging	3.100	6.7
Kappa Packaging	The Netherlands	Packaging and Graphic	3,000	6.5
Smurfit	Ireland	Packaging	2,600	5.6
UPM-Kymmene	Finland	Graphic	2,400	5.2
StoraEnso	Finland/Sweden	Graphic	2,100	4.5
Mayr-Melnhof Karton	Austria	Packaging	1,300	2.8
Norske Skog	Norway	Graphic	1,250	2.7
Myllykoski	Finland	Graphic	1,040	2.2
Palm	Germany	Graphic and Packaging	1,000	2.2
			17,790	38.3
Total Market			46,404	

Source: (1) annualreports.info; (2) Company data, annual reports; (3) Company recovered paper consumption: EU Consulting 2004, Total market CEPI 2004 statistics; (4) Based on (3).

Kappa Packaging, SCA and Jefferson Smurfit are all active in the packaging end-use sector, and consume considerably smaller amounts of virgin resources, and relative high amounts of recovered paper. Therefore their dependence on recovered paper for paper and board production is high compared to the companies in the graphic sector. It appears that Kappa Packaging and Smurfit depend most on recovered paper. For SCA the dependence is on equal level at first site, however, the presence in the forest products and hygiene products end-use sector changes the resource dependence. All companies in the graphic sector have a lower dependence on recovered paper. This means that from a resource dependence perspective the companies in the packaging sector are likely to be more active in managing resource dependence than the companies in the graphic sector.

Diversification is one of the resource dependence instruments that Pfeffer and Salancik (1978) propose to reduce resource dependence, and more specifically to reduce

resource importance. As mentioned in chapter 2, diversification buffers the organisation against the potential effects of dependence by putting the organisation into another set of relationships that are presumably different (Pfeffer and Salancik, 1978). Relating the degree of diversification and the operating profit, supports this view; all more diversified companies have a higher net profit. It seems that the companies that rely most on recovered paper, i.e. companies where the consumption of recovered paper relative to the total paper and board production is highest, and that are active the packaging end-use sector, have the lowest net profit. Further it appears that both companies that are owned by venture capitalists have a negative net profit.

Table 71 Overview six Europe-based paper and board companies

	Kappa Packaging	**SCA**	**Jefferson Smurfit**	**Norske Skog**	**StoraEnso**	**UPM Kymmene**
Country HQ	Netherlands	Sweden	Ireland	Norway	Finland	Finland
Turnover (10^6 €)*	2,786 (2004)	9,863 (2004)	4,746 (2003)	3,013 (2003)	12,395 (2004)	9,820 (2004)
Net profit (10^6 €)*	-79 (2004)	399 (2004)	-67 (2003)	51 (2003)	740 (2004)	958 (2004)
*Employees (*1000)*	15.5 (2004)	49.9 (2004)	30.3 (2003)	7.3 (2003)	43.8 (2004)	33.4 (2004)
Listing	* 2Venture capitalists: - CVC Capital Partners - Cinven	London, Stockholm	* Venture capitalist: - Madison Dearborn Partners	Oslo	Helsinki, New York, Stockholm	Frankfurt, New York, Helsinki, München, Stuttgart
Main end-use sectors:	Packaging, Graphic (only board)	Packaging, Hygiene, Forest	Packaging	Graphic	Graphic, Forest	Graphic, Forest
Total RP consumption (ktonnes)	3,000 (2003)	3,600 (2003)	3,400 (2003)	2,200 (2003)	2,100 (2003)	2,400 (2003)
RP consumption Europe (ktonnes)	3,000 (2003)	3,100 (2003)	2,600 (2003)	1,250 (2003)	2,100 (2003)	2,400 (2003)
P&B Capacity in Europe (ktonnes)	3,400 (2004) [of which 1,150 graphic]	8,847 (packaging: 4,695)	3,000	3,775 (2004)	12,765 (2004)	10,950 (2004)
Dependence on RP for production	High	High	High	Moderate	Moderate	Moderate

Source: Annualreports.info (consulted April 2005); EU Consulting 2004

The strategic renewal journeys of the six selected companies will be examined with attention for the three dimensions of strategic renewal and for the resource dependence instruments used during the renewal journey. Price spikes (cf. chapter 2) can highly impact the profitability of the firms that depend on recovered paper, especially the firms in the

packaging sector for which it is the most consumed raw material for the production process. Therefore, it seems plausible that after the price spikes firms have taken measures, in the form of a new resource dependence instrument configuration, to become less vulnerable for price spikes in the future. Or in terms of Proposition C4: "In the context of the transition from a traditional towards a recovered-resource dependent industry, from a knowledge-based view of the firm perspective, incumbent firms are likely to adapt their organisation form (including knowledge processes) enabling an increase of recovered-resource dependence.".

COMPARING STRATEGIC RENEWAL ACTIONS OF SIX SELECTED INCUMBENTS

During their strategic renewal journeys, firms go through a series of multilevel changes (Volberda et al., 2001a). In this research the complexity of this is reduced by focusing on the most important renewal actions undertaken by firms. In order to get insight into these, the Annual reports of the companies were scanned and relevant reports in paperloop.com. As mentioned in the introduction, the strategic renewal construct will be considered as a three dimensional construct, consisting of content, context, and process.

The content or 'what' dimension will be addressed by paying attention to exploration versus exploitation-type actions. Exploration actions are aimed at entering new markets and innovation, whereas exploitation actions increase efficiency and rationalise activities. Finding a good balance between exploitation and exploration is a challenging task. Furthermore the expansion ratio (number of actions aimed at growth versus total number of renewal actions) contributes to the content dimension. The context dimension gives insight into the 'where' of strategic renewal. For this purpose the number of internal and external actions are examined and the number of local and international actions. The process dimension finally is given insight into by examining the total number of actions in the selected period of time.

Some remarks have to be made with regard to the methodology and the interpretations of the findings. All strategic renewal actions are valued as follows. A takeover representing a small value is one strategic renewal action and a takeover representing a high value is also one strategic action, in other words, all takeovers have the same weight. The disadvantage of this method is that a firm that accomplishes many small low cost strategic renewal actions will be regarded as a more active firm than a firm that accomplishes one major high costs strategic action. Attempts have been done to 'weigh' the actions by considering the costs involved for each strategic action. Unfortunately, it appeared not possible to trace the costs of all the strategic renewal actions. By consequence the results presented below must be interpreted with care.

Packaging Company comparison

Of the three selected companies in the packaging sector, SCA represents most strategic renewal actions in the period 1998-2003; 83 versus 55 and 54 for respectively Kappa Packaging and Jefferson Smurfit, see Table 72. This suggests that SCA is most active with regard to strategic renewal.

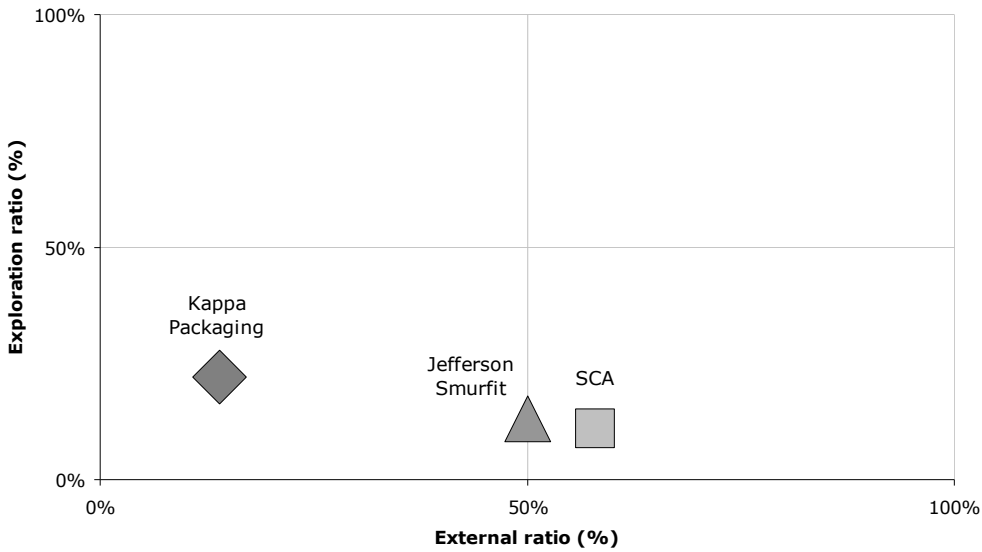
Table 72: Strategic renewal actions for three major players in the Packaging Sector

Company	Year Action	SRA's	External ratio	Exploration ratio	Expansion ratio	International isation ratio
		#	%	%	%	%
Kappa Packaging	'98 – '99	6	0	0	100	33
	'00 – '01	27	14	33	93	63
	'02 – '03	22	18	14	95	82
	'98 – '03	55	14	22	95	67
SCA	'98 – '99	23	48	9	100	83
	'00 – '01	30	87	20	87	90
	'02 – '03	30	37	3	70	83
	'98 – '03	83	58	11	84	86
Jefferson Smurfit	'98 – '99	19	53	21	53	79
	'00 – '01	20	50	10	70	90
	'02 – '03	15	47	7	60	93
	'98 – '03	54	50	13	61	87
Total Packaging	'98 – '03	192	43	15	81	81

Kappa appears to be most internal oriented of the three with an external ratio of 14% of average, see Figure 26. The other two companies are substantial more external oriented. In the first year (1998) the Kappa Packaging annual report hardly mentions anything that could be regarded as a strategic renewal action. At that time Kappa Packaging is considerably smaller than the other two companies. Also paperloop.com does not mention any references about Kappa Packaging. The annual report of 1999 actually is the first source that mentions strategic renewal actions. Smurfit has the most constant external ratio through time with an average of 50%, see Table 72. SCA is the firm with most variation in this; a very high level in '00/'01 and considerably lower levels in the period before and after. Kappa shows an increase in time from 0% to 18%. In 1998, Jefferson Smurfit Corporation ("JSC") and Stone Container Corporation merged to form the world's largest producer of containerboard and corrugated containers. In 1998, JSG acquired a 50% holding in Smurfit MBI (formerly MacMillan Bathurst), the remaining 50% being owned

by SSCC. Smurfit MBI is the second largest Canadian producer of corrugated containers (Annual Report 2004). In September 2002, the Group was acquired by Madison Dearborn Partners and its 29.4% owned associate SSCC was spun off to JSG shareholders.

Figure 26 External versus Exploration actions in the period 1998-2003 for three major players in the packaging end-use sector



The average exploration ratio – i.e. the number of exploration actions relative to the total number of exploitation and exploration actions – for the three representatives of the packaging sector is 15% over the period 1998-2003, which means that there is a strong focus on exploitation actions. Kappa Packaging scores above average with a mean value of 21% versus 11% and 13% for respectively SCA and Jefferson Smurfit, see Figure 26. This suggests that Kappa Packaging is the more innovative company of the three. The level of exploration shows quite some variation for all companies, see Table 72. For Kappa Packaging it starts with 0% in 98/99 increases to 33% in ’00/’01 (acquisition Assi Domän) and goes down to a level of 14% in 02/03. SCA starts at a higher level than Kappa Packaging, 9%, also increases in ’00/’01 and goes down again in ’02/’03. Jefferson Smurfit finally starts at the highest level in ’98/’99 (21%) and decreases the following years towards 7% in ’02/’03. In other words, the strategic renewal actions that are related to *investing for the future* vary in quantity though time.

With regard to the expansion ratio, Jefferson Smurfit is the company that differs most form the others. With 61% it has least actions that are related to expansion. Kappa Packaging has an average of 95% and for SCA 84% of the actions are related to growth. The reason for Jefferson Smurfit's lower number can partly be explained by its acquisition strategy. 'The Group's key strength has been the ability to identify, acquire and rationalise underperforming assets at the right time and at the right price. The Group is known within the paper and forest products industry (and by Wall Street) as an astute acquirer - it has been the strategy which has propelled Jefferson Smurfit from a small locally based Irish company to become a world leader. Jefferson Smurfit continues to grow, to buy and build value… not machines!' (Smurfit website). After acquisition parts are disposed of so the initial growth is moderated by the closing and selling of businesses that were part of the deal. As well Kappa Packaging as SCA show 100% reported actions that deal with expansion in '98/'99. In the following years these amounts diminish. Jefferson Smurfit shows less expansion actions than the other two companies during all years.

It appears that SCA and Jefferson Smurfit are more or less at the same level with regard to internationalisation, i.e. actions that have taken place outside the country in which the head office is located. Kappa stays below with an average of 67%. In 98/99 Kappa used to be a more local player however, in '02/'03 the degree of internationalisation has increased to a similar level as that of SCA.

What do these findings suggest with regard to the strategic renewal journeys followed by the three companies? Kappa Packaging appears to be the more local, internal oriented and innovative company of the three. SCA and Jefferson Smurfit are the more international players, more external oriented and with a lower exploration ratio.

Graphic company comparison

With 63 actions StoraEnso has the largest number of strategic renewal actions in the period 1998-2003, followed by UPM-Kymmene with 46 and Norske Skog with 41 actions, see Table 73. StoraEnso and UPM-Kymmene show most of the actions in the period '98/'99, while Norske Skog has most in 00/01.

Comparing the external ratio of the three selected companies in the graphic sector with the selected companies in the packaging sector shows that the strategic renewal actions, with a value of 21% on average for the period 1998-2003, of the graphic companies are more internal oriented than those of the packaging companies, with a value of 43%. Of the three packaging companies Norske Skog is most external oriented with an external ratio of 39%. The other two companies follow at a distance with 11% and 17% on average for respectively StoraEnso and UPM-Kymmene, see Figure 27.

The exploration ratio for the three players in the graphic sector is on average at a higher level than the value for the companies in the packaging sector. The values for the graphic companies vary from 17% for UPM-Kymmene to 29% for Norske Skog, see Figure 27. All three companies have in common that in '98/'99 the ratio is highest and decreases from that time on. However, for Norske Skog the ratio stays at a considerable higher level than for the other companies, see Table 73.

Table 73: Strategic renewal actions for three players in the graphic end-use sector

Company	Year Action	SRA's #	External ratio %	Exploration ratio %	Expansion ratio %	Internationalisation ratio %
Norske Skog	'98 – '99	11	27	45	82	27
	'00 – '01	18	39	22	61	50
	'02 – '03	12	50	25	42	75
	'98 – '03	41	39	29	61	51
StoraEnso	'98 – '99	28	14	21	89	50
	'00 – '01	17	6	18	82	41
	'02 – '03	18	11	22	67	39
	'98 – '03	63	11	21	81	44
UPM-Kymmene	'98 – '99	30	17	27	73	23
	'00 – '01	6	33	0	100	50
	'02 – '03	10	10	0	50	40
	'98 – '03	46	17	17	72	33
Total Graphic	'98 – '03	150	21	22	73	42

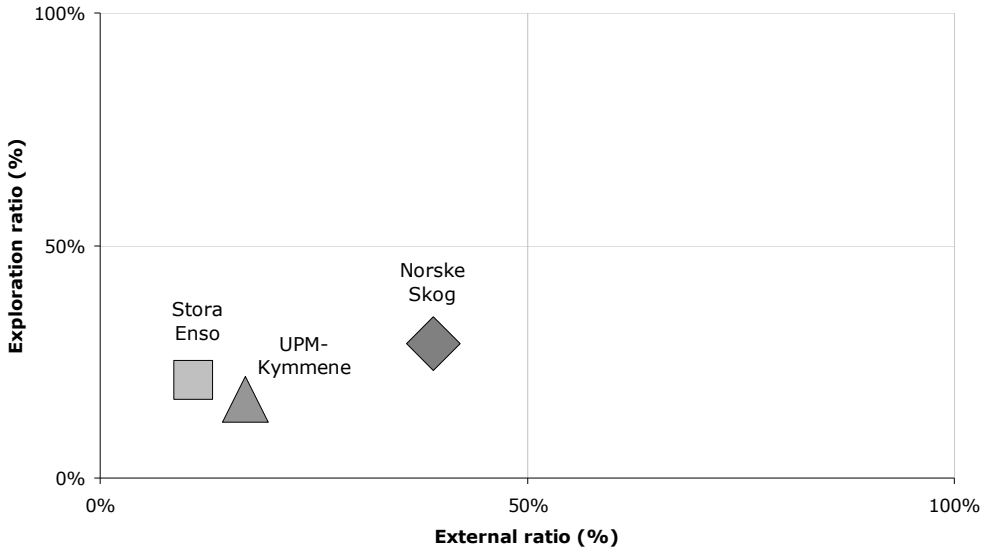
The expansion ratio is at a high level for all of the three companies. 81% for StoraEnso; 61% for Norske Skog and 72% for UPM-Kymmene for the period 1998/2003. In '98/'99 the level is highest for Stora, in '00/'01 the level is highest for UPM-Kymmene, but the number of strategic actions is relatively low in this period for UPM-Kymmene. All three companies have the lowest expansion ration in the period '02/'03.

The strategic renewal actions of UPM-Kymmene were with 33% least international-oriented, or in other words, most local during the period 1998-2003. Norske Skog had most international actions with 51% and StoraEnso followed close behind with an average of 44%. With regard to the time dimension, Norske Skog shows the largest increase form 27% in '98/'99 to 50% in 00/01 to 75% in '02/'03. StoraEnso is most stable through time with a ratio varying between 43% and 50%. UPM-Kymmene follows a similar increase as Norske Skog from '98/'99 to '00/'01 but shows a decrease again in '02/'03.

Of the three companies in the graphic sector on average Norske Skog is most external oriented, most international and the most explorative company. As shown in

Figure 27, StoraEnso and UPM-Kymmene are most alike, although StoraEnso shows more expansion actions. UPM-Kymmene is with regard to exploration on a similar level as StoraEnso, but a bit more external oriented. The expansion ratio of UPM-Kymmene is on a level that is between Norske Skog and StoraEnso.

Figure 27 External versus Exploration actions in the period 1998-2003 for three major players in the graphic end-use sector



Sector comparison

Before discussing the totals of the companies in the packaging and the graphic sectors, it must be mentioned that the findings of these need to be handled with care; the players represent just a fraction of the total market, see Table 74. The three players in the packaging sector represent 24.6% of the total market when valuated on the recovered paper consumption and 28.1% of the total market when valuated on the paper and board production. For the graphic sector, the values are higher. The three main players represent 48.7% of the total market when valuated on the recovered paper consumption, and 56.3% of the total market when valuated on the paper and board production. Generalising findings that are based on the results of the three main players is risky. They represent just a part of the total sector. The market is highly fragmented. Consolidation of the market is still taking place.

The totals of the three companies of the packaging sector show the following, see Table 75. In total there are 192 strategic renewal actions in the packaging sector and 150 in the graphic sector in the period 1998 until 2003. The Packaging sector shows more external actions with an external ratio of 43% versus 21% for the graphic sector.

Table 74 Positioning six major players in the packaging and graphic end-use sector

	RP consumption (ktonnes) (1)	**% of total** (2)	**P+B Capacity (ktonnes)** (3)	**% of total** (4)
Kappa Packaging	3,000	8.5%	3,395	8.6%
SCA	3,100	8.8%	4,695	11.9%
Jefferson Smurfit	2,600	7.3%	3,000 (estimate)	7.6%
CR3	8,700	24.6%	11,090	28.1%
Total packaging market	35,400	100%	35,400	100%
UPM-Kymmene	2,400	20.3%	10,590	22.0%
Norske Skog	1,250	11.6%	3,775	7.8%
StoraEnso	2,100	17.8%	12,765	26.5%
CR3	5,750	48.7	27,130	56.3%
Total graphic market	11,800	100%	43,400	100%

Source: (1) Company data: EU Consulting 2004, market data: RP usage CEPI 2002; (2) based on (1); (3) Company data: company websites, market data: RP usage CEPI 2002, (4) based on (3) and 90% efficiency of capacity.

The companies in the graphic sector appear to be more explorative oriented than the players in the packaging sector, seeing the exploration ratio of 22% versus 15% for the packaging companies (see Table 75). Regarding it the other way round, the players in both sectors are mostly focused on exploitation. Seeing the relatively low exploration ratio for the sectors and for the Packaging sector in special, this suggests that the companies are likely to have followed an emergent renewal journey (Proposition A4, Table 69).With regard to strategic renewal actions related to expansion the difference is limited. The expansion ratio for the packaging sector is 81% and for the Graphic sector this value is just a little lower with 73%. With regard to internationalisation the difference between the players are considerable. The players in the graphic sector are operating considerably more local than the players in the packaging sector seeing the internationalisation ratio of 42% versus 81% for the companies operating in the packaging sector.

Table 75 Strategic Renewal actions in the packaging and graphic sector (1998-2003)

Sector	Year Action	SRA's	External ratio	Exploration ratio	Expansion ratio	Internationalisation ratio
		#	%	%	%	%
Packaging	'98 – '03	192	43	15	81	81
Graphic	'98 – '03	150	21	22	73	42

It can be concluded that the strategic renewal journeys of both sectors have evolved differently. The graphic sector appears to be more internal, more explorative and less international oriented than the packaging sector. Can these differences be explained by the explanatory constructs of the managerial model constructed in chapter three? At least two of the explanatory constructs shed some light on this: regional scope and markets for virgin and recovered resources.

The availability of natural resources for the Nordic countries, and the high dependence on these, appears to lead to a more local approach. Strategic renewal actions are more internal and more explorative. The players in the packaging sector rely to a high extent on recovered paper as a resource. As mentioned earlier, contrary to natural resources recovered resources 'arise'. Recovered paper is available in every country in Europe and is mostly influenced by the size of the 'urban forest'. This explains the more external-oriented nature of the packaging companies. The environment of recovered paper has become more turbulent, with volatile prices, and recovered paper has become a global commodity. The main players in the packaging sector are smaller than those in the graphic sector. Production capacity of the main players varies around the 3.500 ktonnes, versus more than 12.000 ktonnes for StoraEnso, the largest player in the graphic sector. Therefore the need or external actions that lead to growth is more important for players in the packaging sectors than in the graphic sector where the three main players together already possess more than half of the total market, see Table 74.

COMPARING THE RESOURCE DEPENDENCE INSTRUMENTS EMPLOYED DURING THE STRATEGIC RENEWAL JOURNEYS

The strategic renewal actions have provided some insights about the strategic renewal behaviour of the selected incumbent firms, however, remained silent about the resource dependence instruments employed during their journey. In the remainder of this section the emphasis will be on the resource dependence instruments used during the strategic renewal journeys. The distinction made in chapter 3 will be followed: intra-firm resource dependence instruments, inter-firm resource dependence instruments, and

institutional field resource dependence instruments. In this way proposition A1 (see Table 69) will be illustrated. The use of resource dependence instruments to a certain extent also provides insight into who is active in managing resource dependence for some resource dependence instruments will only by used by top management, others can be used by top management and middle and frontline management, cf. Table 29. In this sense proposition A2 (see Table 69) is addressed.

Not all of the strategic renewal actions coded in the previous part were regarded as a resource dependence action. Closures of business units, which can influence a firm's resource dependence, were not coded as a resource dependence management action. The same is true with regard to cost efficiency programmes, they are not coded as a resource dependence management action either. Table 76 shows that the amount of resource dependence management actions varies between 39% (Norske Skog) and 76% (Kappa Packaging) of the strategic renewal actions. Further it appears that for the companies in the graphic sector the number of resource dependence actions is lower than for the companies in the packaging sector.

Table 76 Strategic Renewal Actions and Resource Dependence Actions 1998 - 2003

	# Strategic renewal actions	**# Resource dependence actions**	**% Resource dependence actions**
Packaging			
- *Kappa Packaging*	55	42	76%
- *SCA*	83	60	72%
- *Jefferson Smurfit*	54	31	57%
	192	*133*	*69%*
Graphic			
- *Norske Skog*	41	16	39%
- *StoraEnso*	63	36	57%
- *UPM-Kymmene*	46	22	48%
	150	*74*	*49%*
TOTAL	**342**	**207**	**61%**

The companies show a large diversity in the use of resource dependence instruments, see Table 77, which is different from what proposition 2A (Table 69) suggests. First of all there is the diversity between intra-firm, inter-firm, and institutional field resource dependence instruments. The findings suggest that institutional field resource dependence instruments are used by none of the firms in both end-use sectors. Some more words about this later in this section. The ratio between intra-firm and inter-firm resource dependence instruments employed per firm differs considerable. Jefferson Smurfit almost solely mentions the use of inter-firm resource dependence instruments. StoraEnso, on the

other hand, mostly uses intra-firm resource dependence instruments. Generally speaking, firms with a low external ratio, i.e. a relative high amount of internal actions, show a relative high intra-firm ratio, i.e. high level of intra-firm resource dependence instruments employed. The variation between intra-firm and inter-firm resource dependence instruments in the two sectors is such that it can't be said that graphic or packaging makes more use of intra-firm or inter-firm resource dependence instruments.

Table 77: Resource dependence actions of six selected companies 1998 - 2003

	Packaging Sector			Graphic Sector			Total
Resource Dependence Instrument	**Kappa**	**SCA**	**Smurfit**	**Norske Skog**	**StoraEnso**	**UPM-Kymmene**	
Intra-firm	**67%**	**33%**	**10%**	**19%**	**80%**	**58%**	**46%**
- *Substitute Resources*	5%				3%	18%	3%
- *Inventories*	5%						1%
- *Diversification (entering different lines of business)*	19%	23%		6%	11%	14%	14%
- *Organic growth*	38%	10%	10%	13%	67%	27%	28%
Inter-firm	**33%**	**67%**	**90%**	**81%**	**20%**	**42%**	**54%**
- *Diversification*		2%					
- *Vertical Integration*	19%	60%	61%			14%	32%
- *Horizontal Integration*	7%		29%	81%	14%	23%	17%
- *Long term Contracts*	5%				6%	5%	2%
- *Cooptation*							
- *Social coordination*	2%	5%					2%
Institutional Field	***n.a.**	***n.a.**	***n.a.**	***n.a.**	***n.a.**	***n.a.**	***n.a.**

* n.a.: not available in data sources used for strategic renewal and resource dependence actions analysis

Intra-firm RD instruments Packaging firms

Assumption is that the firm with the largest diversity in the use of resource dependence instruments is most active with regard to managing resource dependence. Kappa Packaging shows the highest diversity with regard to use of resource dependence instruments, substitute resource, inventories, diversification and intra-firm growth, i.e. organic growth or growth other than by means of acquisition or alliances. SCA makes use of diversification and intra-firm growth. Jefferson Smurfit only mentions intra-firm growth.

Inter-firm RD instruments Packaging firms

Before discussing the inter-firm resource instruments employed by the different firms, first some remarks regarding the difference between vertical and horizontal integration. The paper and board mills are chosen as focal firm. Therefore, the acquisition of paper and board mills is regarded as horizontal integration, doing more of the same. Converting plant or corrugated plants are one level further in the production chain. Acquisitions of converting plants are therefore coded as vertical integration. More specifically forward integration, because it concerns a process one level further in the chain. Buying of recovered paper plants would be backward integration, one level backwards in the process.

Of the inter-firm resource dependence instruments, vertical integration is mostly used. Most of the acquisitions concern corrugated and converting plants. Jefferson Smurfit also acquired some mill, or extended its share in mills. The same is true for Kappa Packaging, but to a smaller extent. Of the packaging firms, Kappa Packaging is the only firm that mentions the use of long-term contracts in its annual report. Coordination is used as a resource dependence instrument by Kappa Packaging and SCA. In summary, Jefferson Smurfit uses most inter-firm resource dependence instruments (90% of all resource dependence actions) and in particular vertical and horizontal integration. Kappa Packaging uses the largest diversity of inter-firm resource dependence instruments. This suggests that Kappa Packaging is most active with regard to managing resource dependence.

Intra-firm RD instruments Graphic firms

Like in the packaging sector, in the graphic sector use of intra-firm resource dependence instruments relative to inter-firm resource dependence instruments differs substantially between the three firms. StoraEnso uses most intra-firm resource dependence instruments (80% of all resource dependence actions), and Norske Skog least, 19%. For UPM-Kymmene 58% of the resource dependence actions concerned the use of intra-firm resource dependence instruments. It appeared that in the graphic sector substitute resource mostly concerned the shift from virgin resources to recovered resources, in other words from wood pulp towards recovered paper. The use of inventories of raw materials (wood pulp or recovered paper) was not mentioned. Diversification was used as a resource dependence instruments and mostly concerned presenting different ranges of paper qualities. Intra-firm growth concerned capacity expansions of paper mills; growth with other means than acquisition or alliances. Especially StoraEnso mentioned many references that concerned expanding existing capacities.

Inter-firm RD instruments Graphic firms

Vertical integration (backward and forward) appeared not to take place very often. Only UPM-Kymmene shows activity related to this in the form of expanding activity (stake) in a converting plant. Most of the inter-firm resource dependence actions concern horizontal integration, buying of paper mills, or enhancing stake in paper mills. Further StoraEnso and UPM-Kymmene both mention the use of long-term contracts to manage resource dependence.

Generally speaking growth in the graphic sector is enabled via expanding current activities via horizontal integration. Product lines are expanding and mills are converted to be able to consume larger amounts of recovered paper. Norske Skog has the lowest diversity of resource dependence instruments and UPM-Kymmene the highest diversity of resource dependence instruments. StoraEnso mostly relies on intra-firm resource dependence instruments and the diversity is somewhere in between that of Norske Skog and UPM-Kymmene.

Strategic renewal journeys, Resource dependence instruments, and Management involvement

Based on the findings with regard to strategic renewal actions and resource dependence instruments (Table 77), the following can be said with regard to proposition A1 (Table 69). First the companies in the packaging sector will be discussed. Kappa uses least inter-firm resource dependence instruments, only 33% of the resource dependence actions, see Table 77. SCA and Smurfit both use mainly inter-firm resource dependence instruments, respectively 90% and 67% of all resource dependence actions, see Table 77. Following proposition A1 this suggests that SCA and Smurfit are likely to be associated with an emergent or directed renewal journey. With regard to companies in the graphic sector, Stora Enso uses least inter-firm resource dependence instruments, only 20% of the resource dependence actions concern inter-firm resource dependence instruments, see Table 77. Norske Skog mainly uses inter-firm resource dependence instruments, 80% of all resource dependence actions, see Table 77. UPM-Kymmene sits in between with 42% inter-firm resource dependence instruments. Following proposition A1, this suggests that Norske Skog is likely to be associated with an emergent or directed renewal journey.

For Kappa Packaging and SCA, most of the renewal actions are resource dependence actions, so it can be argued that these companies are most active with regard to resource dependence management, see Table 78. The analysis on base of the annual reports and paperloop.com shows that for Norske Skog least of the renewal actions are associated with resource dependence actions, this suggests that management of Norske Skog is least involved with managing resource dependence when strategic renewal occurs. Or as phrased in Proposition A2: “From a resource-based view of the firm perspective, incumbent firms in

which both top, and middle and frontline management have a low involvement in managing resource dependence are likely to follow an emergent renewal journey."

By evaluating each of the resource dependence instruments employed by the different firms (Table 77) and the actors that can be involved in managing resource dependence (Table 29), Table 78 can be compiled. It suggests that SCA, Jefferson Smurfit and Norske Skog are most alike. All three of them use mainly resource dependence instruments that are mostly enabled by top management, respectively 67%, 90% and 81%. Kappa Packaging, StoraEnso and UPM-Kymmene use a higher degree of intra-firm resource dependence instruments.

Table 78 Actors involved in managing resource dependence and strategic renewal journey.

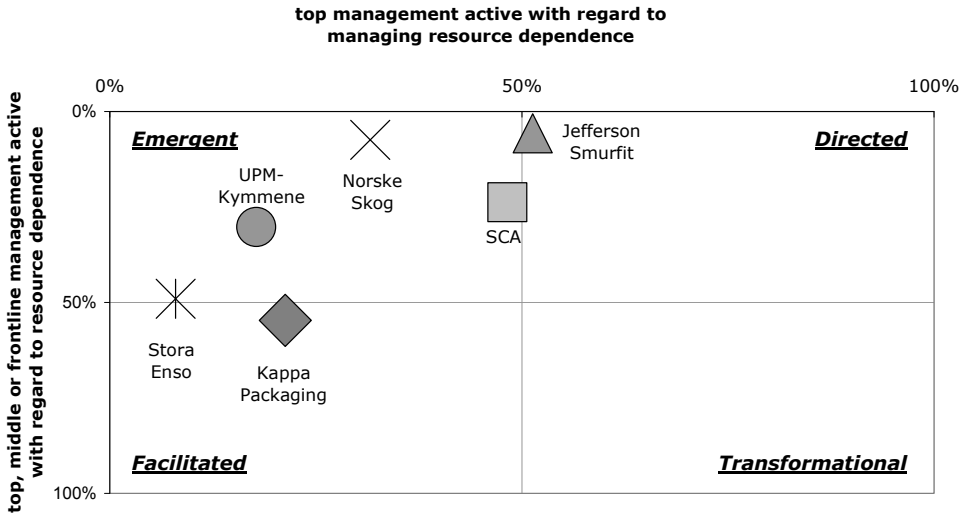
	Packaging Sector				Graphic Sector	
Resource Dependence Instrument	**Kappa**	**SCA**	**Jefferson Smurfit**	**Norske Skog**	**StoraEnso**	**UPM-Kymmene**
Resource dependence actions as percentage of total renewal actions	76%	72%	57%	39%	57%	48%
Top Management involved in managing Resource dependence	28%	67%	90%	81%	14%	37%
Top management or front line and middle management active in managing resource dependence	72%	33%	10%	19%	86%	63%

What are the implications of these two issues for the strategic renewal firms followed by the two firms? The answer to this question is presented in Figure 28. The following assumptions were made. The activity of management towards resource dependence is represented by the number of resource dependence actions as percentage of total strategic renewal actions, see Table 78. Further Table 78 shows the percentage of actions in which top management is active, and the percentage in which top, frontline, or middle management are active.

To position the players in the framework, the percentage of resource dependence actions were multiplied with the actions made by the different levels of management. An example: for SCA 72% of the renewal actions were resource dependence actions. In 67% of the actions top management was active, this gives a value on the X-axis of 48% (=72% x 67%). In 33% of the actions top, middle or frontline management was active in managing

resource dependence, which gives a value for the Y-axis of 24% (=76% x 33%). The results suggest that most of the major players follow an emergent renewal journey. Jefferson Smurfit slightly tends to a directed renewal journey and Kappa Packaging slightly tends to a facilitated renewal journey.

Figure 28 Strategic renewal journeys and managing resource dependence



Institutional Field Level Resource Dependence Instruments

The results shown in Table 77 could be interpreted in a way that none of the firms is concerned with influencing the industry regulation to its advantage. However, this needs not to be true. Actually it only means that the company annual reports and paperloop.com do not mention the use of this resource dependence instrument. When the composition of the branch organisation CEPI is investigated, it appears that all of the six selected companies are represented in one or more roles, see Table 79.

The Confederation of European Paper Industries is involved in influencing the legislation impacting the industry in several ways. Table 80 shows an overview of issues that CEPI has achieved or is dealing with at the moment. In summary, although institutional field resource dependence instruments are not mentioned in the company annual reports and paperloop.com, the paper and board companies are involved in influencing the industry regulation, however, not individually but via the branch organisation CEPI, or organisations at country level.

Table 79 Overview CEPI Board Members (31 December 2004)

Company	Name	Function
Jefferson Smurfit Group, Ireland	Dermot Smurfit	Representative from effective members
Kappa Packaging, the Netherlands	Frits Beurskens	Vice-Chairman CEPI Board, CEO
Kappa Packaging, the Netherlands	Henri Vermeulen	Chairman Recycling Committee
Norske Skogindustrier	Jan Oksum	CEO
SCA	Jan Aström	CEO
SCA Forest Products, SFIF, Sweden	Kenneth Eriksson	
SCA Hygiene Products, VNP, the Netherlands	Willem Emmen	Representative from effective members
SCA Packaging, Danish Paper, Board and Pulp Makers Association	Rob J. Renders	Representative from effective members
StoraEnso	Björn Hägglund	CEO
StoraEnso, COPACAL, France	Jerôme Grassin	Representative from effective members
UPM-Kymmene	Jussi Pesonen	CEO

Source: CEPI Annual Report 2004: 38

Table 80 Examples of CEPI being involved in influencing industry regulation

Knowledge and understanding of the EU institutions' machinery is essential to successfully communicate the industry's viewpoints (CEPI Annual report 2003 p10).

In the policy areas relevant to the paper chain CEPI has continued making positive contributions which convey the interests of its members. Throughout the years CEPI has successfully established itself as the pulp and paper industry centre for networking and exchange of information (Michael Gröller, Chairman CEPI, CEPI Annual Report 2003 p5).

The European Recovered Paper Council (ERPC) was set up in 2000 to monitor the progress in meeting the targets set out in the Declaration openly and transparently. The ERPC gather the three signatories as well as the supporters – the European Federation of Waste management and Environmental Services (FEAD), the European Paper Merchants Association (EUGROPA) and the International Confederation for Printing and Allied Industries (INTERGRAF) and observers – the European Commission Directorates General, Enterprise and Environment (CEPI Annual report 2003 p26).

The Forest-Based Industry Forum on 18 February 2003 launched an appeal to the Commission and other stakeholders not to encourage the burning of renewable resources in a way that they may distort the raw materials market (Teresa Presas, Managing Director CEPI, CEPI Annual Report 2003 p7).

CEPI has tried to ensure that unnecessary incentives to burn recovered paper are not created through Community actions. It was therefore a major step forward when the Commission mandate for CEN to develop a set of standards for Solid Recovered Fuels (i.e. fuels derived from waste) was clarified in such a way that recovered paper, when classified according to the EN 643 document, would not be part of this standardisation project (CEPI Annual report 2003 p28).

Source: CEPI Annual report 2003

COMPARING THE DEVELOPMENT OF THE ORGANISATION FORM

In order to get more insight into the development of the organisation form of the six selected companies, and whether it was changed in order to increase recovered-resource dependence, the organisation form is investigated at two points in time: 1998/1999 and 2003/2004 (depending on data available). The analysis will provide evidence for proposition C4: "In the context of the transition from a traditional towards a recovered-resource dependent industry, from a knowledge-based view of the firm perspective, incumbent firms are likely to adapt their organisation form (including knowledge processes) enabling an increase of recovered-resource dependence".

Recovered paper is of higher importance in the Packaging sector than in the Graphic sector (see Table 64), from this point of view it is expected that Kappa Packaging, Jefferson Smurfit and SCA who are mainly active in the Packaging sector will be more active with regard to recovered-resource dependence management than Norske Skog, StoraEnso, and UPM-KYmmene who are mainly active in the Graphic sector. Table 82 presents an overview of the findings. It appears that most of the companies have changed their organisation structure over the period 1998/1999 until 2003/2004, however, the impact of this adaptation on recovered-resource dependence could not be found in al cases. Due to limited data availability, not all companies could be examined at the desired depth. The company of which most data is available, Kappa Packaging, will now be analysed more extendedly. Based on the available data, the development of the organisation form of the other companies (Jefferson Smurfit, SCA, Norske Skog, UPM-Kymmene, and StoraEnso) is discussed in Appendix 4, and predictions are done about the recovered-resource dependence management and knowledge processes. Future research could contribute to more insight into the development of the organisation form of these companies and the impact on firms' absorptive capacity and recovered-resource dependence.

Table 81 Comparing six companies: Change of organisation form and implications for recovered-resource dependence

Company	Paper and Board Sector	Change in organisation form in the period 1998/1999 – 2003/2004	Implications of the change in organisation form for recovered-resource dependence
Kappa Packaging	Packaging, Graphic (only board)	Yes, see Figure 29 and Figure 30	More coordination across mills and countries.
Jefferson Smurfit	Packaging	No, see Appendix 4 Figure 43 and Figure 44	No evidence could be found.
SCA	Packaging, Hygiene	Yes, see Appendix 4 Figure 45 and Figure 46	Recovered paper from independent business activity to Packaging sector.

Table 81 Comparing six companies: Change of organisation form and implications for recovered-resource dependence (continued).

Company	Paper and Board Sector	Change in organisation form in the period 1998/1999 – 2003/2004	Implications of the change in organisation form for recovered-resource dependence
Norske Skog	Graphic	Yes, see Appendix 4 Figure 47 and Figure 48	No evidence could be found.
StoraEnso	Graphic	Yes, see Appendix 4 Figure 49 and Figure 50	No evidence could be found
UPM-Kymmene	Graphic	Yes, see Appendix 4 Figure 51 and Figure 52	No evidence could be found.

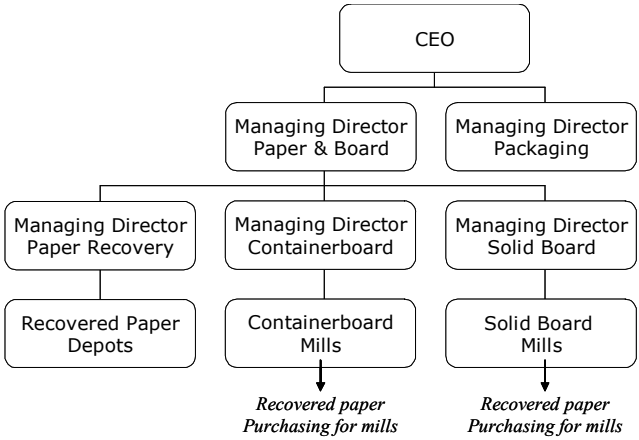
Kappa Packaging

In 1998 the supply of recovered paper is managed at mill level. Every Kappa mill is responsible for its own recovered paper supply, see Figure 29. Containerboard, solid board, and recovered paper are three different business units that all belong to the paper and board segment. The mill purchasers are free to choose their recovered paper suppliers and Kappa Paper Recycling is just one of the potential sources. Within the paper and board segment, the role of Kappa Paper Recycling is to make profit by buying recovered paper in the market and selling the resource to its customers, which can be paper mills or waste companies.

At the end of 2004 the organisation form is changed, see Figure 30. Kappa Packaging has increased substantial in size, to a large extent due to acquisition of Assi Domån in 2001. The company has become active in more geographical regions. Because of this larger European coverage and local differences a *buying region* approach is followed with regard to recovered resources. The recovered supply is managed taking into account the local circumstances (see chapter 8 for more details on this issue). In the buying region covering the Netherlands, Belgium, and Germany coordinated purchasing is chosen. In this area many companies are "fishing in the same pond" (internal document, recovered paper strategy 2004) and therefore adjustment between the Kappa mills has become important. The mills are no longer free in their choice where to buy recovered paper; the steering committee coordinates what recovered paper is bought and to which mills it will be distributed. Authority regarding the supply of recovered paper is placed at a higher level in the organisation. The steering committee is represented by the CEO of Kappa Packaging, the managing director of Kappa Paper Recycling, and the managing directors of the paper and board mills. The role of Kappa Paper Recycling has changed as well. It is no longer a profit centre but has become a coordinating organ, where knowledge regarding recovered paper is concentrated. In other words, the organisation has been adapted to be better able to

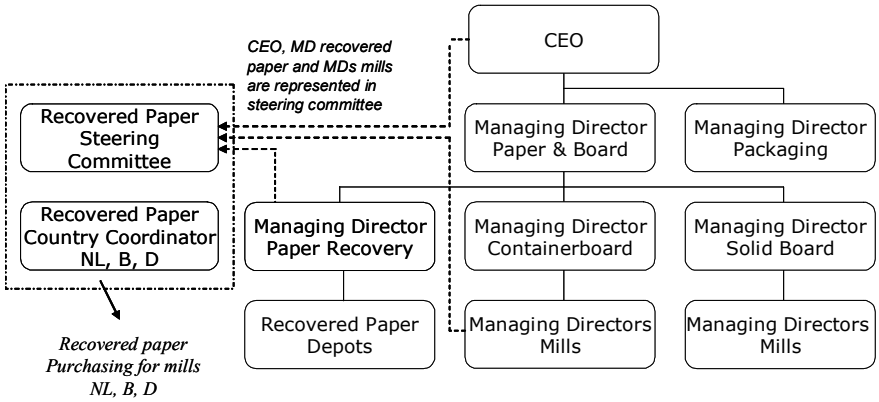
manage recovered-resource dependence. In the next section the impact of this change in organisation form on absorptive capacity will be investigated.

Figure 29 Organisation Structure Kappa Packaging 1998: Recovered paper purchasing at mill level



Source Kappa Packaging company data

Figure 30 Organisation Structure Kappa Packaging 17 September 2004: Coordinated recovered paper purchasing



Source: Kappa Packaging company data

In chapter 2 three dimensions of knowledge absorption were distinguished: efficiency, scope, and flexibility of absorption, and related to three different organisation forms, see Table 22. Here these dimensions will be applied on the organisation form of Kappa Packaging in 1998 and 2004, see Table 82. It was argued that "efficiency refers to how firms identify, assimilate, and exploit knowledge from a cost and economies of scale

perspective. Scope of knowledge absorption refers to the breadth of component knowledge a firm draws upon. Flexibility of knowledge absorption refers to the extent to which a firm can access additional and reconfigure existing, component knowledge" (Van den Bosch et al., 1999: 552).

When the efficiency of absorption of the organisation form in 1998 and 2004 is compared, it appears that in 1998 the efficiency is low from a company as a whole perspective. The mill buyers manage the supply for one paper mill, which can lead to sub-optimal behaviour. In 2004, Kappa has introduced coordinated recovered paper purchasing, which offers advantages with regard to economies of scope and scale. Because recovered paper is purchased for the whole buying region, Kappa bargaining position towards suppliers improves. Logistics can be optimised by transporting recovered paper from the source to the nearest mill.

The scope of knowledge absorption has increased as well. In 1998 each mill focused on the supply of recovered paper qualities belonging to the recipe of the mill. In 2004 these different mill demands for recovered paper qualities are brought together and discussed in the steering committee, enlarging the breath of component knowledge on recovered paper for the company as a whole.

Table 82 Kappa Organisation form 1998 versus 2004 and the impact on Knowledge Absorption and Absorptive Capacity

Dimensions of knowledge absorption[a]	**Organisation Form 1998**	**Organisation Form 2004**
Efficiency of Absorption	Low	High
Scope of Absorption	Low	High
Flexibility of Absorption	Low	High
Impact on Absorptive Capacity[a]	Moderate	Positive

H: high
L: low
[a]Assumption: both scope and flexibility of knowledge absorption have a positive influence on the level of absorption capacity, while efficiency has a negative impact.

Source: adapter from Van den Bosch et al., 1999

Finally the flexibility of knowledge absorption has increased. The coordination of recovered paper purchasing in 2004 offers the possibility to exchange knowledge regarding recovered paper suppliers (e.g. delivery conditions, prices) and experiences with recovered paper recipes. The different mills have different recipes for containerboard production. Best practices with different qualities of recovered paper can be exchanged. The presence of managing directors of the different mills, the CEO of Kappa, and the managing director of Paper Recycling in the steering committee moreover offers cross-learning opportunities,

e.g. it offers the opportunity to exchange experiences on local market developments and to anticipate on these.

The analysis of the three determinants of knowledge absorption suggests that for Kappa Packaging absorptive capacity has increased. All three determinants have increased. Two of them (scope and flexibility) are expected to be positively related to absorptive capacity and one (efficiency) is expected to be negatively related to absorptive capacity. This suggests that Kappa has adapted its organisation form in such a way that an increase in recovered-resource dependence is enabled, which illustrates proposition 4C.

CONCLUSION

This chapter has contributed to the industry-level research question: "Which resource dependence strategies and resource dependence instruments are applied and why is this the case?" by investigating strategic renewal journeys of incumbent firms operating in the paper and board industry, and the resource dependence instruments employed to manage resource dependence. Moreover, four propositions have been illustrated. Table 83 presents an overview of the topics discussed in this chapter and the findings.

The analysis of strategic renewal actions shows that of the three packaging companies SCA has most strategic renewal actions in the period of investigation, i.e. 1998 – 2003. SCA is most external oriented. The exploration ratio is highest for Kappa Packaging, and so is the expansion ratio. SCA appears to be most international and global oriented. An investigation of the same attributes for the companies in the graphic sector, shows that in this sector in general the external ratio is lower. Norske Skog is the player that is most external oriented. The exploration ratio in the graphic sector is higher than in the packaging sector, and for Norske Skog the exploration ratio is highest. Expansion ratios are lower in the graphic sector whereby again Norske Skog scores highest. With regard to internationalisation the same tendency occurs. For all companies the exploration ratio is relatively low, see Table 75. When this is related to proposition A4 it is expected that the companies are likely to have followed an emergent renewal journey.

Looking at the resource dependence related renewal actions, shows that SCA has by number the most actions, see Table 76. Kappa follows on the second place and Smurfit on the third place. This suggests that in the Packaging sector companies are more active in managing recovered-resource dependence. Inter-organisational resource dependence attributes like vertical and horizontal integration are used most, see Table 77. Product diversification comes on the second place. Direct means as inventories, long-term contracts and diversification of resources follow on the third place. This contributes to proposition A1: From a resource dependence perspective, incumbent firms using mainly inter-firm resource dependence instruments are likely to be associated with an emergent or directed

renewal journey. Kappa is the only company that mentions the use of intra-organisational resource dependence instruments like inventories and top management involvement. These results suggest that Kappa Packaging belongs to the more active players with regard to managing resource dependence.

Based on the findings with regard to management involvement, the six incumbent firms appear to follow mostly an emergent renewal journey, see Figure 28. Jefferson Smurfit inclines slightly towards a directed renewal journey and Kappa Packaging inclines slightly towards a facilitated renewal journey. Proposition A2 "From a resource-based view of the firm perspective, incumbent firms in which both top, and middle and frontline management have a low involvement in managing resource dependence are likely to follow an emergent renewal journey" is partly addressed this way.

With regard to the development of the organisation structure of the six companies, based on the limited data that was available, proposition C4 was partly illustrated. It appears that most of the firms have changed their organisation structure. In some cases recovered paper purchasing is placed higher in the organisation compared to 1998, or at a place deals most with the resource, which partly illustrates proposition C4 (Table 69). The discussion of the development of the organisation form of Kappa Packaging shows that the change in organisation form leads to an increase in absorptive capacity, enabling an increase in recovered-resource dependence. Unfortunately it was not possible to access data about recovered paper sourcing for all companies which makes it hard to do predictions about recovered-resource dependence management in general. Future research could contribute to more insight into the role of the organisation structure and knowledge processes influencing recovered-resource dependence management.

Table 83 Topics and Findings Chapter 7

Topics discussed	Findings
- Company Comparison General	- The companies differ in size and dependence on recovered paper. - Companies in the packaging sector tend to be more dependent on recovered paper than companies in the graphic sector. - Diversification of the companies differs as well and also affects resource dependence
- Strategic Renewal actions for Six Selected Companies (Sector Comparison)	- The packaging sector shows more strategic renewal actions than the graphic sector during the same period. - Companies in both sectors are more internal oriented than external. Packaging is more external oriented than graphic Proposition A4 was partly illustrated: - Exploration ratio is relatively low in both sectors. Graphic sector seems to show more explorative activities than the packaging sector. - Both sectors have a relatively high expansion ratio - Packaging sector is substantial more international than graphic

Table 83 Topics and Findings Chapter 7 (continued)

Topics discussed	Findings
- Strategic Renewal actions for Six Selected Companies (Company Comparison)	Packaging - Kappa: most internal oriented, and highest exploration ratio, highest expansion ratio, lowest level of internationalisation - SCA: most actions, highest external ratio, lowest exploration ratio, high expansion ratio, and high level of internationalisation - Smurfit: low exploration ratio, lowest expansion ratio, highest level of internationalisation.
- Strategic Renewal actions for Six Selected Companies (Company Comparison)	Graphic - Norske Skog: Highest external ratio, highest exploration ratio, lowest expansion ratio, and highest internationalisation ratio. - Stora Enso: most actions, most internal oriented, average exploration ratio, highest expansion ratio, average internationalisation ratio - UPM-Kymmene: internal oriented, relative low exploration ratio, average expansion ratio, low level of internationalisation.
- Resource Dependence Instruments Employed During Strategic Renewal Journeys	Packaging - Kappa uses most intra-firm resource dependence instruments (67%) relative to the total number of instruments employed. High diversity of RD instruments. - For SCA one third of the actions constitute are intra-firm RD actions, the rest is inter-firm. - Smurfit mostly employs inter-firm RD instruments, only 10% are intra-firm RD instruments Graphic - Norske Skog uses mostly inter-firm resource dependence instruments (81%) - Stora Enso has a strong internal focus; 80% of the actions concerned intra-firm resource dependence instruments. - UPM-Kymmene also employs a relatively high level of intra-firm resource dependence instruments (58%).
- Strategic renewal journeys followed by six players in the paper and board sector	Proposition A1 and A2 were partly illustrated: - Based on the resource dependence instruments employed and the different levels of management that can be involved in these actions, the following can be concluded with regard to strategic renewal journeys. - The players in both sectors appear to follow mostly an emergent renewal journey. Smurfit inclines slightly to a directed journey. Kappa inclines slightly to a facilitated journey.
- Development of the Organisation Structure of Six Major Players in the European Paper and Board Industry	Proposition C4 was partly illustrated: - When 1998/1999 and 2003/2004 are compared, most companies appear to have changed their organisation form. - The implications of these changes for recovered-resource dependence could not in all cases be determined - For Kappa Packaging the adaptation of the organisation form positively influences the firm's absorptive capacity.

CHAPTER 8

FOCAL COMPANY: STRATEGIC RENEWAL AND RECOVERED-RESOURCE DEPENDENCE MANAGEMENT AT KAPPA PACKAGING

INTRODUCTION

The investigation of the strategic renewal and resource dependence actions for the period 1998 until 2003 in the previous chapter showed that Kappa Packaging is a particular case. A high percentage of renewal actions were related to resource dependence, see Table 78. This gives rise to a further investigation of resource dependence management at *Kappa Packaging*. In this chapter two firm-level research questions will be addressed: "Which resource dependence strategies and resource dependence instruments are applied and why is this the case?" and "What are the implications of these strategies for management processes and organisation structures?".

Table 84 provides an overview of the propositions that will be investigated in this chapter. Four of them are related to the use of resource dependence instruments, contributing to the first firm-level research question. Two of them are related to recovered-resource dependence management, contributing to the second firm-level research question.

Attention is paid to three dimensions of strategy. Pfeffer and Salancik (1978) highlight the importance of context of a firm. The context dimension is addressed by providing an overview of the activities of the Kappa Packaging in 2004 (recovered paper business, paper and board segment and packaging segment). In this way the factor and product markets Kappa Packaging is confronted with are addressed. The process and content dimension are addressed by a longitudinal description of Kappa Packaging, covering the period 1970 until 2004, in which strategic renewal actions are investigated and the resource dependence instruments employed by the focal firm are examined (research setting 7). Furthermore the development of the recovered paper purchasing structure in the period 2000 – 2004 is examined with special attention for the organisation form and the changed role of Kappa Paper Recycling (research setting 8). The structure of the chapter follows the description of the dimensions above.

Table 84 Propositions to be investigated in Chapter 8

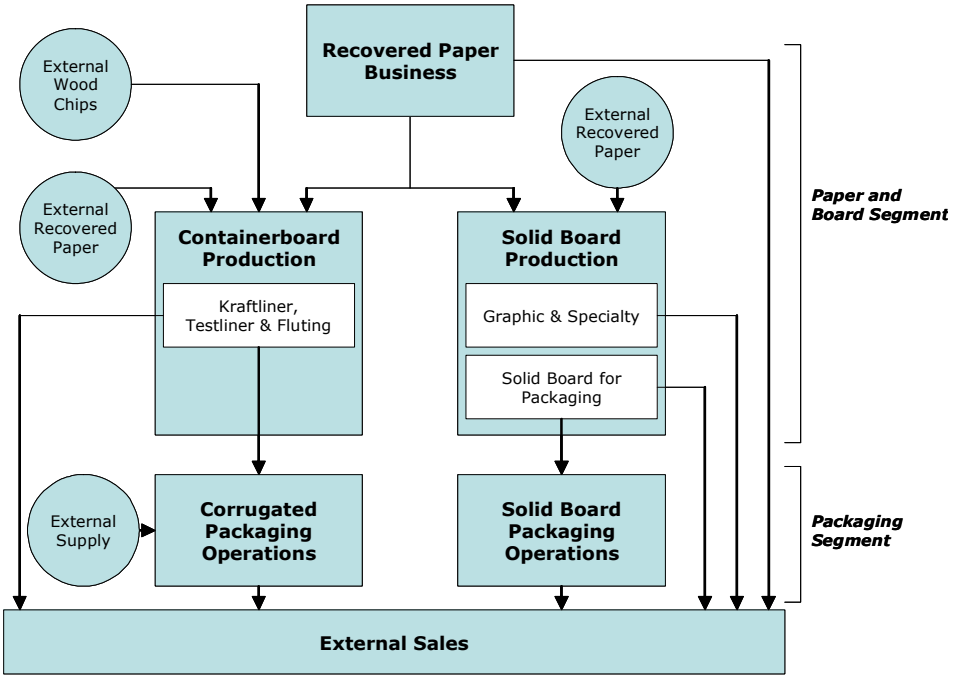
	In the context of the transition from a traditional towards a recovered-resource dependent industry…
B1	From a *resource dependence* perspective, incumbent firms are likely to use inter-firm prior to intra-firm resource dependence instruments as a mean to decrease resource dependence.
B2	From a *resource-based view of the firm* perspective (Penrose), the growth of incumbent firms necessitates managerial services to cope with resource dependence instruments.
B3	From a *dynamic capabilities theory* perspective, incumbent firms need to develop the ability to change their routines regarding the application of intra-firm and inter-firm resource dependence instruments.
B4	From a *knowledge-based view of the firm* perspective, incumbent firms are likely to increase their absorptive capacity by adopting their organisation form to cope with a variety of resource dependence instruments.
C3	From a *dynamic capabilities theory* perspective, incumbent firms are likely to develop resource dependence instrument-related routines enabling an increase of recovered-resource dependence .
C4	From a *knowledge-based view of the firm* perspective, incumbent firms are likely to adapt their organisation form (including knowledge processes) enabling an increase of recovered-resource dependence.

Source: Table 33 and Table 34

COMPANY OVERVIEW KAPPA PACKAGING

The company overview described in this section aims to provide more insight into the focal firm and the markets in which it operates. Kappa Packaging is an integrated paper and board company mainly active in Europe. The activities of Kappa Packaging comprehend two main sectors: Paper and Board, and Packaging, see Figure 31. From a recovered-resource dependence perspective, this research is mainly interested in the paper and board segment for this part of the production chain is most active involved with recovered resources and managing resource dependence. The *Paper and Board segment* is comprised of three businesses: Recovered paper, container board production, and solid board production. Kappa produces containerboard and solid board from virgin and recovered fibres. Three different sorts of containerboard, i.e. kraftliner, testliner and fluting, are produced for usage in the corrugated packaging operations. Furthermore, in the solid board division three kinds of solid board, graphic, specialty, and solid board for packaging, are produced. The *Packaging segment* aims to meet customer needs with regard to protection, transportation, storage, display and marketing throughout Europe and covers two business areas: corrugated packaging and solid board packaging. In the remainder of this section, the two aforementioned segments and the different businesses in these two segments will be discussed in more detail.

Figure 31 Business overview and product flows Kappa Packaging



Source: Kappa Packaging Annual Report 2001

Paper and Board segment

The Paper & Board segment contains the divisions: Recovered paper business, containerboard production, and solid board production. Recovered paper is the main raw material used for containerboard and solid board production. In the previous chapter it was shown that Kappa Packaging belongs to the top three of largest consumers of recovered paper in Europe (see Table 70). Containerboard is used for the production of corrugated board. In the container board division, Kappa Packaging belongs to the three largest producers by volume (20F Form 2004), and in the solid board production Kappa Packaging is the leading European producer by volume (20F Form 2004). Kappa operates 16 containerboard and solid board mills in 7 countries. Of these mills eight produce linerboard and/or fluting for conversion into corrugated packaging and eight produce solid board. Furthermore it operates 5 recovered paper depots in 4 countries, and 7 graphic board service centres in 7 countries, of which the latter are part of solid board mills operations. Each of the three divisions will now be discussed in more detail starting with containerboard production.

Containerboard production

Containerboard is the building block of corrugated packaging. Its properties give corrugated products their strength and versatility. Based on 2004 production, Kappa Packaging is the third largest producer of containerboard in Europe, with an overall market share of 9%, according to Kappa estimates (20F form 2004: 24). In 2004 Kappa sold approximately 2,219 million tonnes of containerboard, generating total sales of 793.9 million euros. Kappa Packaging sells containerboard products to its own corrugated packaging plants and to external customers. These external customers are among others small individual packaging plants, but also large integrated packaging companies which can be competitors. In 2004 most of the containerboard production remained in the company. Approximately 61% of the containerboard production was supplied to Kappa corrugated packaging plants, while the remainder was sold externally. Approximately 2% of the 2004 containerboard production was exported to Asia.

Table 85 presents an overview of the Kappa container board mills in 2004. Kappa Packaging operates eight mills that produce containerboard located in the Netherlands, Germany, Italy, the United Kingdom, Sweden, the Czech Republic, and the Slovak Republic. All containerboard mills are ISO 9000 certified. Six containerboard mills are ISO 14001 certified.

Table 85 Kappa Container board Mills 2004

Mill	Country	Machines	Paper grades L: linerboard F: Fluting	Annual production Ktonnes	Capacity Ktonnes
Recovered fibre-based paper					
- Roermond Papier	The Netherlands	3	L/F	479	480
- Zülpich	Germany	2	L/F	424	430
- Birmingham	United Kingdom	1	L/F	168	190
- Wiesloch	Germany	1	L	86	95
- Zimrovice	Czech Republic	1	L/F	56	55
- Ania	Italy	2	L/F	164	195
Sub total		10		1,377	1,445
Virgin Fibre based paper					
- Pitea	Sweden	2	L	695	700
- Štúrovo	Slovak Republic	1	F	151	180 (1)
TOTAL		13		2,223	2,325

(1) Represents containerboard production only. This mill also produced solid board in 2004 during the period January-April, which activities were closed down in April 2004.

Source: Kappa Packaging 20F Form 2004: 24.

The mills provide a European market share of 15% in kraftliner, 11% in semi-chemical fluting and 8% in testliner and recycled fluting combined, based on estimates of 2004 production (20F Form 2004). The liner of a corrugated carton is the outer paper, which you normally see. The fluting (or medium) in a piece of corrugated board is the wavy paper in the middle of the liners. Kraftliner is a base paper made out of virgin fibres for production of high quality corrugated board and packaging of corrugated board. Testliner is a liner mainly produced from recovered paper.

Solid Board production

The solid board production business can be categorised into three products: solid board for packaging, graphic board, and specialty board. In 2004 Kappa Packaging sold approximately 1,019 kilotonnes of solid board. The division was 60% solid board for packaging, 29% graphic board and 11% specialty board. The total sales generated 450.9 million euros. Kappa Packaging operates eight mills located in the Netherlands and Germany that produce various grades of solid board principally from recovered paper, see Table 86. Next to this, Kappa Packaging has seven graphic board service centres in 7 countries.

Table 86 Kappa Solid Board Mills

Mill	Country	Machines	Paper grades	Annual production Ktonnes	Capacity Ktonnes
Recovered fibre-bases paper					
- Graphic Board (2 mills)	The Netherlands	6 (1)	GB	298	300
- Triton (2 mills)	The Netherlands	3	SBP	243	260
- Herzberger Papierfabrik	Germany	2	SBP	231	230
- Attica (2 mills)	The Netherlands	2	SB	111	120
- Badenkarton	Germany	1	SBP	132	140
- Štúrovo	Slovak Republic	2	SB	16	- (2)
TOTAL		16		1,027	1,050

GB: Graphic board
SB: Specialty board
SBP: Solid board for packaging
(1) Represents 4 solid board machines and 2 machines producing laminating paper, which is primarily consumed internally.
(2) Represents solid board production only. In the fourth quarter of 2003, Kappa decided to close the solid board operations and subsequently closed the solid board mill in April 2004. However, this mill also produces containerboard (2004 containerboard production of 151 kilotonnes and containerboard annual capacity of 180 kilotonnes), which activities were not affected by the closure of our solid board mill.

Source: Kappa Packaging 20F Form 2004: 26.

With a market share of 34% Kappa is the number one solid board for packaging producer in Europe. Approximately 65% the solid board production for packaging was sold internally to the packaging segment. The remainder was sold to external converting plants, which are primarily smaller, independent solid board converters. In graphic and specialty board Kappa Packaging is the leading global producer with a global market share of 25% (based on Kappa estimates of the 2004 production). All graphic and specialty board products are sold to third party customers. Graphic board is sold primarily to manufacturers of hardback book covers, ring binders, jigsaw puzzles and board games in Europe, North America and Asia. Specialty board is sold primarily to European manufacturers of packaging for premium products, such as jewellery, cosmetics, wine and spirits.

Recovered Paper Business

Recovered paper is an important resource for the Kappa mills. In 2004 the containerboard production is approximately 62% recovered paper-based and 38% virgin fibre-based. The solid board production mills are fully dependent on recovered paper. In other words, the dependence on recovered paper is high for the Kappa Packaging mills. The total recovered paper demand for the Kappa mills amounts 2.900 ktonnes in 2004 (Kappa company data), see Table 87. The Kappa mills are dominantly present in the Netherlands and Germany. Kappa mills in these two countries together constitute more than 70% of the total recovered paper demand (2,900 ktonnes) of the Kappa mills.

In the chapter 7 it was shown already that to enable the supply of recovered paper to the Kappa mills, Kappa Packaging makes use of several resource dependence instruments, see Table 77. Kappa is vertically backward integrated and makes use of long-term contracts with suppliers. Kappa Packaging has five recovered paper depots in the Netherlands, Belgium, Germany, and the United Kingdom. The task of these depots is sourcing, sorting, and selling of recovered paper. The depots in the Netherlands, Belgium, and Germany are coordinated by Kappa Paper Recycling in Eindhoven (the Netherlands). In 2004 via the depots 896 ktonnes of recovered paper was sold, the major part was sold internally to the Kappa mills the remaining part was sold to third parties.

The supply of recovered paper is obtained primarily from direct contracts with large retailers and municipalities, spot purchases in the recovered paper market and contracts with brokers and waste collection agencies. To increase the supply of recovered paper from municipalities Kappa Packaging has a 50% joint venture (AVR Rietveld) with Afval Verwerking Rijnmond, one of the largest waste processors in the Netherlands. In the Czech Republic Kappa Packaging owns a 33% interest in EuroWaste and in Sweden Kappa Packaging has a 14.3% interest in IL Recycling. In the Slovak Republic Kappa Packaging

is building a waste collection infrastructure together with third parties through newly established joint ventures.

Table 87 Recovered paper demand Kappa mills

Mills	Country	Recovered paper demand (ktonnes)
Containerboard		
Roermond Papier	The Netherlands	540
Zülpich	Germany	460
Ania	Italy	200
Birmingham	The United Kingdom	200
Pitea	Sweden	200
Sturovo	Slovak Republic	130 (1)
Wiesloch	Germany	100
Zimrovice	Czech Republic	70
Solid board mills		
GSV (2)	The Netherlands	600
Herzberger Papierfabrik	Germany	240
Badenkarton	Germany	160
Štúrovo	Slovak Republic	- (3)
TOTAL		2,900

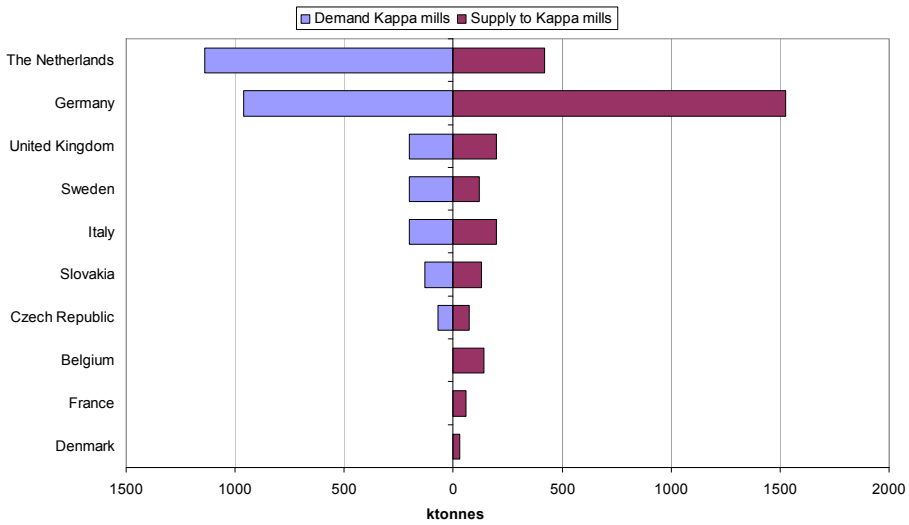
(1) Recovered paper consumption for containerboard mill and solid board mill is 130 ktonnes combined.
(2) GSV = Graphic Board, Triton, Attica, i.e. the mills in the north of the Netherlands
(3) Recovered paper consumption of the Sturovo solid board mill is included in containerboard mill demand.
Source: Kappa Company data

With regard to regional scope, the recovered paper for the Kappa mills comes from a substantial number of European countries, see Figure 32. The mills in the Netherlands (Roermond, Graphic board, Triton, Attica) have a total demand of 1,140 ktonnes, i.e. approximately half of the recovered paper collected in the Netherlands in 2004. However, less than 500 ktonnes recovered paper supply comes from the Netherlands. The major part comes from abroad, Germany and Belgium. The demand for the mills in Germany (Badenkarton, Herzberger, Wiesloch, and Zülpich) amounts 960 ktonnes in the same period. Most of the supply of these mills comes from Germany. This illustrates that Kappa Packaging is to a large extent dependent on recovered paper from Germany. More than 1,500 ktonnes recovered paper that is consumed in Kappa mills comes from Germany, which is more than the half of the total consumption.

That recovered paper can highly impact the financial performance of the firm is illustrated by the following quote. “Historically, the prices of recovered paper and wood have fluctuated significantly, particularly that of recovered paper. While in the past we have generally been able to pass along increased recovered paper costs in our containerboard and solid board and packaging prices, there are periodic margin and cash flow implications due

to delays or difficulties in our ability to raise prices to perfectly match increased recovered paper prices. Any future increase in the cost of recovered paper or wood could have a material adverse effect on our financial position and results of operations" (Kappa 20F Form: 10).

Figure 32 Kappa paper and board mills, recovered paper demand 2004 per mill, and country of origin of recovered paper



Source: Kappa company data 2004

Packaging segment

Kappa Packaging packaging products aim to meet the customers' needs regarding protection, transportation, storage, and display and marketing throughout Europe. The Packaging segment has two business areas: corrugated packaging and solid board packaging. Kappa Packaging has an extended network comprising 98 corrugated and solid board operating units in 17 European countries and in South Africa. In 2004 Kappa Packaging sold approximately 3,782 million m^2 of corrugated packaging products and 390 ktonnes of solid board packaging, generating sales of 2,168 million euros. In corrugated packaging Kappa Packaging is the third largest European producer by volume (20F Form 2004). In solid board packaging Kappa Packaging is the leading European producer by volume. Each of the business areas will now be briefly described.

Corrugated Packaging

With a market share of 12% Kappa Packaging is the third largest producer of corrugated packaging in Europe (20F Form 2004: 27) based on 2004 production. Kappa believes to be the market leader in the Benelux, the Czech Republic and the Slovak Republic and the St. Petersburg area, and to have number two market positions in Germany, Poland, Denmark and Sweden. Kappa Packaging is the overall market leader in Eastern Europe (20F Form 2004).

"The Kappa Packaging corrugated packaging plants provide packaging designed to satisfy the protection, transportation, storage, display and marketing requirements of customers in an economic and environmentally friendly manner. In addition, a growing portion of our business is related to producing higher value-added packaging solutions, such as industrial, agricultural and high quality print packaging" (20F Form 2004: 28). Kappa Packaging serves a broad customer base, including food and beverage packers and manufacturers of consumer and industrial goods. Packaging for food, beverages and agricultural products accounted for approximately 50% of the total corrugated packaging sales in 2004. Kappa's plants serve customers ranging from local businesses to large pan-European accounts, such as Heineken, MasterFoods, PepsiCo, Philips, Proctor & Gamble, and Unilever (20F form 2004).

The company operates 88 corrugated packaging plants in 17 countries throughout Western and Eastern Europe, see Table 88. Of the 88 corrugated packaging plants, 69 are integrated plants, 4 are sheet feeder plants and 15 are sheet plants. Integrated plants combine the production of corrugated board sheets with their conversion into corrugated packaging. Sheet feeder and sheet plants are dedicated exclusively to corrugating and conversion activities, respectively.

Table 88 Kappa Corrugated Packaging Plants

Region	**Number of plants**	**Production** Million m^2
- Benelux	15	826
- Germany and Switzerland	15	962
- France	8	377
- Central Europe	11	580
- Nordic	23	413
- United Kingdom	6	232
- Spain	6	249
- Italy	4	267
TOTAL	88	3,906

Source: Kappa Packaging 20F Form 2004: 28.

Solid Board Packaging

With a market share of approximately 34% based on 2004 production Kappa Packaging is the largest manufacturer of solid board packaging in Europe (20F Form 2004). Kappa Packaging operates ten solid board packaging plants that convert solid board into solid board packaging, see Table 86. In 2004 Kappa Packaging sold 390 ktonnes of solid board packaging products, generating total sales of 314,8 million euros. The company serves a large number of customers that primarily operate in the perishable agricultural sector and range from local businesses to large regional accounts.

The solid board packaging plants produce solid board for transportation and display purposes. Compared to other fibre-based packaging products, solid board offers some superior characteristics in terms of moisture resistance, efficiency of transport and handling and printability. The moisture resistance makes it particularly well suited for packaging flowers, fruit, vegetables, fresh fish, meat and dairy products. The printability makes solid board packaging ideal for value-added products where aesthetics are important.

Table 89 Solid Board Packaging Plants 2004

Region	Number of plants	Production ktonnes
- Germany	3	165
- Benelux	3	165
- France	1	1
- Norway	1	12
- United Kingdom	1	27
- South Africa	1	1
TOTAL	10	371

Source: Kappa Packaging 20F Form 2004: 29.

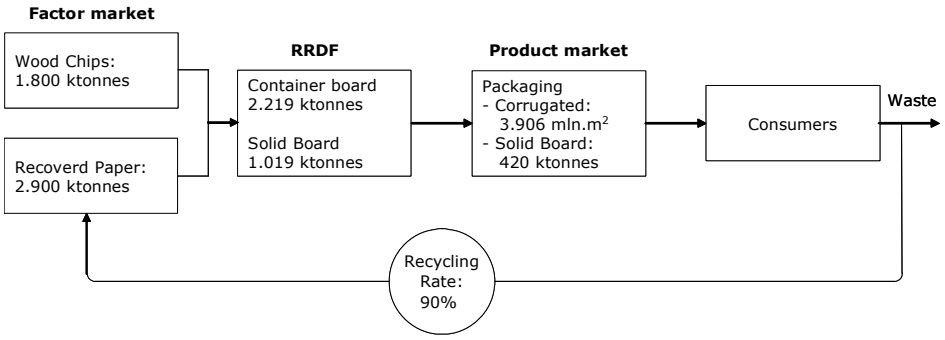
Conceptual Managerial Framework applied to Kappa Packaging

Figure 33 illustrates what the different businesses of Kappa Packaging described before mean in relationship to the conceptual framework presented in chapter 2. On the factor market, recovered paper and wood chips are the resources that the RRDF (Kappa Packaging) is most dependent on. The recycling rate is 90%, i.e. the ratio recovered paper versus containerboard and solid board production (assuming that the production is consumed)[19]. In the mills (RRDFs) containerboard and solid board are produced. These

[19] The recycling rate is calculated as follows. Total recovered paper consumed amounts 2900 ktonnes in 2004. The containerboard production amounts 2219 ktonnes and the solid board production amounts 1019 ktonnes.
Recycling rate = 2900 / (2219+1019) x 100% = 90%

products are sold on the product market, in which Kappa Packaging operates as well. About 54% of the container board and solid board products are sold inside the Kappa Group (20F Form 2004), the remaining part is sold to external parties.

Figure 33 Conceptual managerial framework applied to Kappa Packaging 2004 data



Source: Adapted from Kappa 20F Form 2004

STRATEGIC RENEWAL IN THE HISTORY OF KAPPA PACKAGING

The roots of what is now called "Kappa Packaging" lead back to three Dutch companies: Koninklijke Nederlandse Papierfabrieken (KNP), Bührmann-Tetterode (BT), and VRG-Groep. KNP was founded in 1851, and the core activity of KNP was virgin fibre-based (cellulose) printing paper. The merger of G.H. Bührmann's Papiergroothandel N.V. and N.V. Lettergieterij "Amsterdam" formerly N. Tetterode lead to the creation of Bührmann-Tetterode in 1963. Bührmann's Papiergroothandel was established in 1866 as a paper merchant to the printing industry and occupied an important position in the Dutch market. N. Tetterode was established in 1851 and a leading supplier of printing equipment in the Netherlands. The companies were active as suppliers to the printing industry in complementary markets. KNP and BT both built their packaging activities in the 1970s as an addition to their core activities of paper sales, retail printing and coated-paper production. At the end of the 1970s the business portfolio contained: solid board (and converting), containerboard, corrugated board, flexible packaging (paper and plastics), merchandising (wholesale), representative of printing machines in the Benelux (Heidelberg) and representative of machines for solid board and corrugated converting in the Benelux (Bobst). The foundations of VRG lead back to the merger of Van Reekum Papier and N.V. Gepacy in 1950. Both companies were involved in the international trading and merchanting of paper and board (Buhrmann website). Because of the special interest of this study in recovered-resource dependence management, the description will focus on

renewal actions that are related to recovered resources. In the previous chapter the renewal actions for the period 1998 – 2003 were analysed. Table 90 presents an overview of illustrative inter-firm resource dependence-related renewal actions for the period 1970 – 2004. The development of Kappa Packaging and resource dependence actions will now be discussed in more detail. Later in this chapter, attention will be paid to intra-firm resource dependence instruments, management involvement and the adaptation of the organisation form as well.

Table 90 Illustrative inter-firm recovered-resource dependence related Strategic renewal actions of Kappa Packaging (1970 – 2004)

Period	Strategic renewal action	Resource dependence instrument	Level of analysis
1970's	BT acquires Roermond papier	Diversification	Inter-firm
	KNP acquires the Kappa Shares which leads to white paper activities supplemented with corrugated board activities	Diversification	Inter-firm
1984	Joint activities KNP and BT KNP becomes owner of 50% of Roermond shares	Joint Venture	Inter-firm
1986	KNP acquires Herzberger Papierfabrik (including Badenkarton, Neuss, München) extension of the packaging paper and board activities	Horizontal and vertical integration	Inter-firm
1987	Acquisition SSK	Horizontal integration	Inter-firm
1989	KNP and BT acquire the shares of Sieger (Germany) on a 50/50 basis. Extension of the packaging paper and board activities	Horizontal and vertical integration	Inter-firm
1993	KNP-BT arises as a result of the merger between KNP, BT and VRG.	Horizontal integration and diversification	Inter-firm
1997	- Printing paper division sold to Sappi. - Flexible packaging sold to Tenneco. - Packaging and trade activities split up. Merchant activities continue under the name: Buhrmann	Diversification (narrowing scope)	Inter-firm
1998	Acquisition Wiesloch Papier by KNP BT	Horizontal integration	Inter-firm
1998	Kappa Packaging arises. Management KNP-BT purchases the packaging sector companies of KNP BT with help of CVC and Cinven	Diversification (narrowing scope)	Inter-firm
2001	Acquisition Assi Domän, Kappa Packaging almost doubles in size.	Diversification, Horizontal integration Vertical integration	Inter-firm
2005	*Merger of Kappa Packaging and Jefferson Smurfit leading to Smurfit Kappa (Not in the Scope of this research which is limited to 2004)*	*Diversification, Horizontal integration Vertical integration*	*Inter-firm*

A changing industry context: the shift from straw as a raw material towards recovered paper due to legislation

At the end of the 1970s the Netherlands had a special position in the paper and board industry because of the use of *straw* as the raw material. The North-Eastern part of Groningen (the Netherlands) contained a multitude of cooperatives of farmers, exploiting cardboard and starch mills, with small-scaled activities. The strawboard production in the North of the Netherlands created employment in an agriculture area with little industry. However, the strawboard production had environmental disadvantages; the chemicals required for making the straw suitable for the production process were drained off in the canals. From an environmental perspective this was not (longer) acceptable and at the end of the 1970's the restructuring of solid board activities, in Dutch "Herstructurering Massief karton" abbreviated *Hermas* was initiated by the Ministry of Economic Affairs. This resulted in mill closures, concentration of activities, and less employment.

Motivated by subsidies of the Dutch government to decrease the unemployment in the area between 1975 and 1980, Kappa – at that time a paper trading organisation for several mills – built a new *recovered paper-based* paper machine named Okto (because of the 8th machine in the group) in Winschoten. The machine was designed to produce containerboard for the corrugated sector and lightweight cardboard. By that time the use of straw as a raw material ceased to exist in the Netherlands; a new era was entered: recovered paper-based paper and board production.

Diversification packaging activities

The Okto mill had difficulties with starting up and the Dutch government asked KNP to assist in order to get the machine running. However, the machine remained problematic and therefore it was decided to shut it down. The Kappa shares were sold to KNP which meant that Okto, Verenigde Papierfabrieken Eerbeek (VPE, now belonging to Mayer-Melnhof, producer of folding boxboard), de Kroon (now Attica), and Britannia in Sappermeer producing solid board and the corrugated board activities joined with the earlier acquired *Free*, the Packaging Division of KNP. The name Kappa was well known in this field and was reserved for this Division. VPE also kept its name. Since this moment KNP has two pillars: white printing paper and (brown) paper packaging including solid board and corrugated board. KNP wanted to expand activities because of the cyclical and volatile nature of the printing paper market. At that time the packaging market was less volatile which was from a resource dependence management view an interesting supplement for KNP.

Horizontal integration: Joint Activities KNP and BT

Being both major players with paper activities in Groningen KNP and BT met in the project *Hermas*. BT possessed a paper mill in Roermond (acquired in 1971), in the south of the Netherlands. Roermond had two paper machines at that time and wanted to invest in a new paper machine. Roermond Papier was interested in parts of the recently closed Okto machine. And this is what happens. The PM3 gets built in Roermond with parts of the Okto machine and in return KNP became owner of 50% of the Roermond Papier shares. This was the first joint activity of KNP and BT.

In the following period several acquisitions in Germany occur. In 1986 KNP (alone) acquired Herzberger Papierfabrik including Badenkarton, Neuss, München (closed by now), and Herzberger, i.e. an extension of the packaging paper and board activities. In 1989 KNP and BT acquired all the shares of Sieger (Germany) on a 50/50 basis. The Sieger papermill in Zülpich was linked to Roermond Papier under a "holding" structure called RPE (Recycled Paper Europe). The acquisition of Sieger incorporated corrugated companies as well: Feucht, Hanau, Brühl, Rheinwelle and Sarstedt. KNP and BT realise that they now have joint corrugated activities in Germany, and separated in the Netherlands: de Zeeuw, (with plants in Eerbeek and Oudenbosch) and Vandra belonging to BT, whereas the Kappa plants in Helmond, Hoogeveen and Nieuwe Pekela were KNP companies. The idea arose to combine the KNP and BT corrugated activities in a new company: Corrugated Europe: (CE) with only two shareholders: BT 50% and KNP 50%. The paper activities were already joined in RPE (Recycled Paper Europe). Solid board activities remained separated.

Horizontal integration and Diversification: Merger KNP and BT

In the 1990s environmental issues and legislation impacting the recycling rate start playing a role. The market is consolidating and the two companies KNP and BT realise that to survive they have to do something. A merger was discussed together with VRG (Van Reekum Groep, a paper merchant), a tripartite deal. In 1993 a merger between the paper and packaging divisions of the three companies Koninklijke Nederlandsche Papierfabrieken NV, Bührmann-Tetterode nv and VRG-Groep N.V. took place. As a result of the merger, the company NV Koninklijke KNP BT was formed, a paper, packaging and distribution company (source Buhrmann.com website).

Their combined packaging activities have a market share in the United Kingdom, Benelux, Germany and Poland and were later extended to France. The name Corrugated Europe ceased to exist. Because of the merger, KNP BT now has a range of many different activities with different foci and interests like printing paper, packaging and merchandising. KNP BT is active in three main areas: paper manufacturing, packaging and business services and distribution. In 1998 Wiesloch is acquired and incorporated in RPE.

Reconsidering the business portfolio and the birth of Kappa Packaging

In 1997 it became evident that the expected synergy effects of the KNP-BT merger were not realised and certain strategic decisions concerning the future of KNP BT were made. It was decided to sell parts of the organisation. KNP BT decided to focus entirely on its distribution activities in the field of office products, paper merchanting and graphic equipment and to sell the manufacturing activities. The paper manufacturing operations, known as KNP LEYKA, were sold in 1997 to Sappi (South African Pulp and Paper Industries Limited). Flexible packaging was sold to Tenneco. What remained was *packaging* and *merchandising* and it was decided to split these activities up. The merchant activities remained stock exchange listed, however under a new name: Buhrmann (without umlaut). On May 11, 1998, (with effect from May 31, 1998) the management of the packaging division of KNP BT purchased the packaging sector companies from KNP BT with the help of two institutional investors, Cinven and CVC. This independent group of companies commenced Packaging activities under the name "Kappa Packaging" as from June 1, 1998. Kappa Holding B.V. was incorporated under Dutch law in the Netherlands on June 26, 1998 as a private company with limited liability. The shares of Kappa Holding are primarily held by funds managed or advised by CVC Capital Partners and funds managed or advised by Cinven Limited. The name KAPPA, in Dutch, KArton Productie & PApier (cardboard production and paper) had been in use before.

Horizontal Integration, Vertical Integration and Diversification: Kappa Packaging almost doubles in size

The consolidation and internationalisation of the market continued. Kappa Packaging wanted more European coverage and halfway 2001 Kappa Packaging was able to double its size with the acquisition of the packaging activities of the Assi Domän Group. Herewith it strengthened its market position with new activities, both in paper and converting, in UK, Sweden, Finland, Denmark, Benelux, France, Italy, Germany, Switzerland, Russia and Slovakia. This acquisition positioned Kappa Packaging among the three largest European players in the market of paper based packaging.

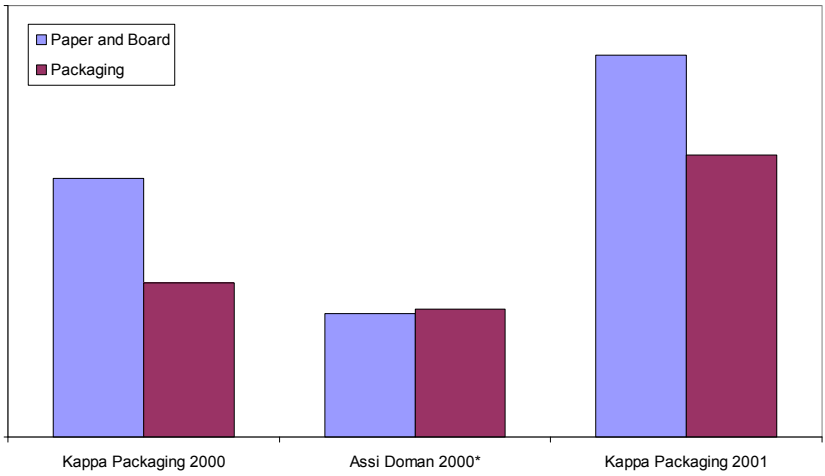
From a resource dependence perspective this acquisition had some interesting aspects. As discussed in the country comparison in chapter 6, due to the historical presence of forestry, the paper and board industry in the Nordic countries relies to a large extent on virgin resources for paper production. Where Kappa Packaging relied on recovered paper as major resource for container board production, Assi Domän (a Nordic company) produced Kraftliner paper, i.e. a containerboard type mainly produced from virgin fibres, as well. By acquiring Assi Domän, Kappa Packaging diversified its resource portfolio: recovered paper and wood pulp for paper and board production, one of the strategies proposed by Pfeffer

and Salancik (1978) to lower resource dependence, and resource importance in particular. The 2004 20F Form of Kappa Packaging mentions the following:

> *"Our containerboard facilities acquired as part of the Alpha acquisition are primarily fresh fiber-based, and thus require a supply of wood. While we believe that our wood and wood chip supply contract that we entered into with the forestry division of AssiDomän (now owned by Sveaskog) provides some protection against any shortage of supply, there can be no assurances that we will be able to secure all of our fresh fiber requirements. Any failure by us to secure our recovered paper and wood supply may result in loss of production at our plants, which could have a material adverse effect on our financial position and results of operations. (20F Form of 2004: 10).*

As an integrated paper and board company (chapter 2, Figure 8) being active in the paper and board segment and in the packaging segment, the acquisition of Assi Domän led to a shift in interdependence between these business segments inside the company as well. The ratio of Paper and Board activities and Packaging activities of Kappa Packaging and Assi Domän was different, see Figure 34. Kappa Packaging had a stronger position in Paper and Board segment, Assi Domän had a stronger position in Packaging segment. Or formulated differently, before the acquisition Kappa Packaging produced more paper and board products than were consumed by its packaging activities, the surplus was sold to third parties. Assi Domän produced relatively more Packaging products than containerboard products and the deficit was purchased from third parties. After the acquisition of Assi Domän both market segments of the enlarged company were more in balance. Later in this chapter it will be illustrated how this could impact the financial performance in 2000 and 2002 when two recovered paper price spikes occurred.

Figure 34 Paper and Board and Packaging activities of Kappa Packaging and Assi Domän in 2000 and 2001



Source: abstracted from Kappa Packaging annual report 2000 and 2001

Merger Kappa Packaging and Jefferson Smurfit

In December 2005 a merger took place between Kappa Packaging and Jefferson Smurfit. The enlarged group becomes one of the main players in the paper and board sector and the largest consumer of recovered paper in Europe. "Smurfit Kappa Group combines the operations of Jefferson Smurfit Group and Kappa Packaging. The Group is a world leader in corrugated, a European leader in containerboard and also has market leading positions, in both paper grades, in Latin America. The Group currently employs a workforce of approximately 43,000 people. In 2004, revenue generated from the combined operations was €7.6 billion" (press release 1.12.2005). This merger has consequences for recovered-resource dependence management. However, the time frame of this study limits to 2004 and therefore no further attention will be paid to this relevant issue. In the last chapter some remarks will be made about the impact of this merger in resource dependence terms.

RECOVERED RESOURCES AND MANAGEMENT INVOLVEMENT

The previous section has provided an overview of the strategic renewal actions of the company through time. This section will shed more light on the management of recovered paper as a resource at Kappa Packaging. Three periods will be discerned ranging from low management involvement until top management involvement. Changing

perspectives regarding recovered paper management at Kappa Packaging are influenced by external factors, as described in chapter 6 but it will be shown that management in the organisation have played a major role in the change processes as well.

Responsibility low in the organisation

In the 70's and 80's there is sufficient recovered paper, and therefore the supply to the paper mills is always secured. The price is the mechanism to get recovered paper. It is a buyers market and the paper mills determine the price to pay for recovered paper. Because of sufficient supply the responsibility for recovered paper purchasing is low in the organisation. Every mill can get its recovered paper without many difficulties. From 1988 on the waste problem increases. Landfilling with waste and burning of waste is no longer regarded as an acceptable way to deal with recovered paper. In the period 1988 until the end of 1994 recovered paper purchasing is decentralised; the paper mills have their own recovered paper purchasers with their own suppliers, which is not necessarily a BT or KNP recovered paper company. There are differences between KNP and BT. BT (Levison) is more profit-oriented and KNP is more oriented on mill supply.

In the 90's the situation starts to change. Due to the 1992 Töpfer Decree and the 1994 Packaging and Packaging Waste Directive the supply of recovered paper increases dramatically in the early 1990s. In 1994 McKinsey publishes a report in which is stated that there will enough recovered paper until 2010. This implies that recovered paper is not a resource to care about at high levels in the organisation. However when time evolves, things appear to work out differently. Although the supply of recovered paper has risen, the consumption of recovered paper increases as well due to newly built capacities and the newsprint sector that starts to use higher quantities of recovered paper. Later in the 1990's export to the Far East starts playing a role and also influences recovered paper prices (see Figure 23, chapter 6). The supply of recovered paper is no longer secured and the market is no longer a buyer markets where the mills can determine the price. This makes that new ways of securing the supply of recovered paper becomes necessary. In 1992 the company closes the first contract for the supply of recovered paper with RWE. From this time on ever more contracts are closed with suppliers.

Responsibility at middle management

After the merger of KNP, VRG and BT in 1993 the activities of the organisation are reorganised. People higher in the organisation become concerned with recovered paper and it is decided that the responsibility of recovered paper supply should be at the mills (decentralised). The recovered paper depots are profit oriented, however with a basis supply budget to the mills. From January 1995 until December 1995 the supply responsibility of the mills GSV in the north of the Netherlands rests at KNP BT Paper Recycling

(centralised). This changes again when in 1996 when a new managing director Paper and Board is appointed. Recovered paper procurement becomes a decentralised activity and every individual mill, including GSV, is responsible for its own recovered paper procurement. The mills determine who is responsible for procurement and where recovered paper is bought. The role of Kappa Paper Recycling in this is limited. It is just a potential supplier.

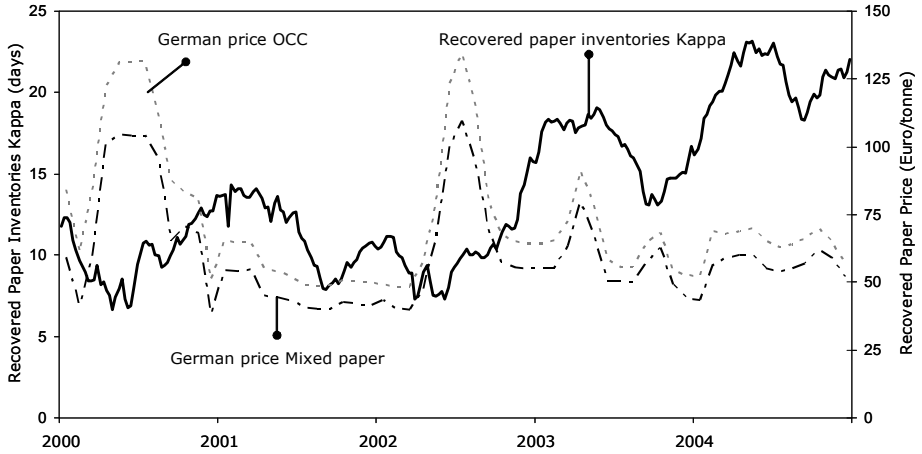
The recovered paper price spikes and development in the business make that later in the 1990s more people are occupied with recovered paper at KNP BT, and also higher in the organisation. It is the interlude to a new era. Legislation becomes ever more important and the supply of recovered paper of the right quality becomes a real challenge.

Top management involvement

In May 2001 the managing director Paper and Board retires. His successor is less acquainted with recovered paper and the CEO of Kappa becomes more involved in recovered paper management. From 2000 on, the market is getting more volatile. In the beginning of the new millennium two price peaks occur (see Figure 35) that more or less are an impetus for a more active approach towards recovered paper management at Kappa Packaging. The first visible results of these are increase of long-term contracts with suppliers and (coordinated) inventory levels of recovered paper. In the annual report of 2002 it was phrased as follows: “For recovered paper, measures have been taken to make the Group less vulnerable to periodic buying campaigns from Asia. The Group will increase its strategic stocks for recovered paper together with increased long-term supply contracts.” (Annual report Kappa Packaging 2002: 5).

Figure 35 shows that at the moment of the price spikes in 2000 and 2002, the recovered paper inventories of Kappa are particularly low. By consequence the impact of the price spikes is quite high for Kappa Packaging because for the continuation of the production processes the firm is forced to buy recovered paper at high prices. Kappa is an integrated company and to a large extent its own customer, i.e. consumer of paper and board products, see Figure 34.

Figure 35 Recovered paper prices in the period 2000 – 2004 and inventory management at Kappa Packaging



Source: Adapted from Kappa inventory monitoring data and company data recovered paper prices

The product market (packaging product market) is characterised by long-term contracts with customers, which makes that the increase in recovered resource prices can't be charged to the customers. In this respect the price spike of 2000, before the acquisition of Assi Domän, was easier to handle than the price spike of 2002 because in 2002 a higher ratio of paper and board products are consumed inside the company, see Figure 34. In the 20F Form of 2004 it is phrased as follows:

> *"Historically, the prices of recovered paper and wood have fluctuated significantly, particularly that of recovered paper. While in the past we have generally been able to pass along increased recovered paper costs in our containerboard and solid board and packaging prices, there are periodic margin and cash flow implications due to delays or difficulties in our ability to raise prices to perfectly match increased recovered paper prices. Any future increase in the cost of recovered paper or wood could have a material adverse effect on our financial position and results of operations" (20F Form of 2004: 10).*

The evidence above illustrates Proposition B2: "In the context of the transition from a traditional towards a recovered-resource dependent industry: From a resource-based view of the firm perspective (Penrose) the growth of incumbent firms necessitates managerial services to cope with resource dependence instruments". By increasing the recovered paper inventories the company reduces its vulnerability to fluctuations in market

supply. Furthermore the negotiating position towards suppliers is improved. Recovered paper inventory levels are increased from current levels to approximately four weeks at reasonable prices and costs of carry. The target with regard to contract with suppliers becomes to increase long-term contracted volumes up to 70% of the needs linked to source (all mills included).

CHANGE OF ORGANISATION FORM AND THE ROLE OF THE BUSINESS UNIT KAPPA PAPER RECYCLING

In chapter 7 it was shown that the organisation form of Kappa Packaging and in particular the role of recovered paper purchasing has changed when 1999 (Figure 29) and 2003 (Figure 30) are compared. This section will shed some light on the reasons behind. As discussed before, the recovered paper market has become volatile, and in particularly the German market on which Kappa Packaging depends to a large extent. Kappa Packaging has grown. Kappa as a group becomes important and to prevent competition between Kappa operating companies coordination becomes essential. In 2003 coordinated recovered paper purchasing is initiated by Kappa top management. Coordinated purchasing can be regarded as a mixture of decentralised and centralised purchasing. The reasons for coordination are related to the importance of recovered paper as a resource and the changing industry environment, see Table 91.

Table 91 Reasons for coordinated purchasing at Kappa Packaging

Recovered paper is Kappa Packaging's most important raw material
The volatility of recovered paper prices highly impacts the financial performance of Kappa Packaging
Easy availability of recovered paper is of growing concern.
Tension between Kappa mills that "fish in the same pond" (Germany and Benelux) when recovered paper prices increase.

Source: Kappa internal document "Recovered Paper Purchasing Coordination 2003"

The objectives of coordinated purchasing are obtaining economies of scale (cf. Pfeffer and Salancik, 1978), getting the best price level for Kappa Packaging in specific market situations. Seamless cooperation between Kappa mills, especially for Germany/Benelux area, and full transparency within Kappa. One face of Kappa operating companies towards market players is another target. This is accomplished by a market approach per country or region, see Table 92. Five buying regions are distinguished, each with its own buying approach, i.e. a clear market plan. A local for local approach is preferable above mill by mill approach. The responsibilities who purchases what and where

must be clear, therefore per country seamless coordination is needed (source: internal documents).

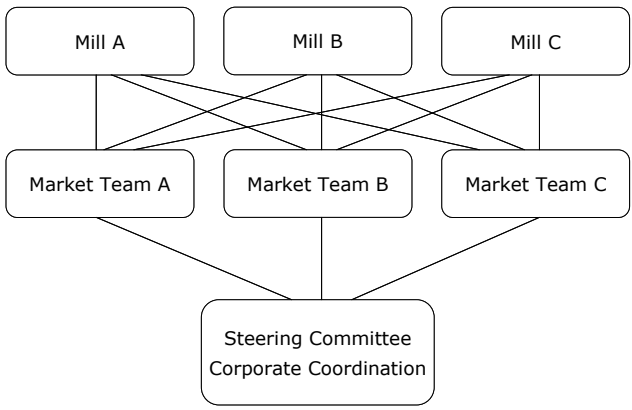
Table 92 Buying regions, countries, Kappa mills and buying approach

Buying region	Countries	Kappa Mills	Buying approach
A	The Netherlands Germany Belgium	Graphic Board, Triton, Attica, Roermond Badenkarton, Herzberger, Wiesloch, Zülpich	Coordinated
B	Sweden	Piteå	Autonomous
C	Slovakia Czech Republic	Štúrovo Morava	Autonomous
D	United Kingdom	SSK	Autonomous
E	Italy	Ania	Autonomous

Source: Kappa internal document 2003

Recovered paper purchasing becomes a coordinated activity in the markets where the company is dominantly present (Benelux and Germany), see Figure 32. Per country a market coordinator is appointed and these coordinators report to a steering committee. The managing directors of the mills have a final say what to buy, except when otherwise decided by the Steering Committee which consists of the CEO of Kappa, the managing directors of the mills Roermond, Zülpich, GSV, the board member of Paper and Board, managing director sourcing and managing director of Kappa Paper Recycling, see Figure 36.

Figure 36: Organisation Model



Source: Kappa internal document "Recovered Paper Purchasing Coordination 2003"

The role of Kappa Paper Recycling changes. Its main objective becomes to guarantee the supply of recovered paper to mills in the most cost-efficient way. Kappa Paper Recycling becomes a coordinating vehicle for recovered paper. Or as it was put in the budget meeting of 2004: "Kappa Paper Recycling has changed from profit centre to Kappa's recovered paper coordinator internal as well as external" (Internal document budget meeting 2004). The mill purchasers and Kappa Paper Recycling act on the market as a team. The market coordinator, mill purchaser, and depots get their own responsibilities, see Table 93. The role of the recovered paper depots changes. In the new situation the primary role becomes to support the supply to the mills. The secondary role is to make profit. Before, depots were regarded as profit centres. These changes in the organisation form illustrate proposition B4 "From a knowledge-based view of the firm perspective incumbent firms are likely to adapt their organisation form, i.e. an intra-firm resource dependence instrument" and proposition C4 "From a knowledge-based view of the firm perspective, incumbent firms are likely to adapt their organisation form (including knowledge processes) enabling an increase of recovered-resource dependence". By applying this changed organisation form knowledge processes regarding recovered paper are better supported which is likely to positively influence recovered-resource dependence.

Table 93 Role of market coordinator, mill purchaser and recovered paper depots

Market coordinator	Mill purchaser	Recovered Paper Depots
- Looks for market opportunities (based on market plan) - Initial primary contact with suppliers - Contract negotiations - Logistics from supplier to mill (if required)	- Define needs for mill (budget) - Planning of volumes and specifications - Maintain local flows that are directly linked to source and do not need coordination (discretion of market coordinator) - - Support market coordinator and participate in country market team	- Primary role to support supply to mills - Secondary role to make profit - Collection and sorting of paper (local recovery) - Valve with external buyers (de-inking, medium and higher grades, export)

Source: Kappa internal document "Recovered Paper Purchasing Coordination 2003"

Development of organisational routines regarding recovered paper management

From 2000 on Kappa Packaging and Kappa Paper Recycling in particular start developing new organisational routines in order to be better able to address the changing market environment. Since 2000, recovered paper inventories at the mills are monitored at Kappa Paper Recycling. The mills report their recovered paper inventories on a weekly basis. After coordinated recovered paper purchasing is initiated in 2003, recovered paper

inventories are increased (see Figure 35). Inventory management is an example of the application of an intra-firm resource dependence instrument to deal with changing environments. At central level knowledge about suppliers and mill behaviour is further extended with information about contracts with suppliers. The reporting of contracts at central level can be regarded as mean to deal with inter-firm resource dependence instruments. From 2004 on the Kappa mills have to report the recovered paper deliveries of their suppliers on a weekly basis. The fact that both resource dependence instruments are now applied, and not before, illustrates that the company learns and develops capabilities to deal with recovered-resource dependence. Both developments illustrate proposition B3 "From a dynamic capabilities theory perspective incumbent firms need to develop the ability change their routines regarding the application of intra-firm and inter-firm resource dependence instruments" and proposition C3 "From a dynamic capabilities theory perspective, incumbent firms are likely to develop resource dependence instrument-related routines enabling an increase of recovered-resource dependence ".

In the three following sections control over recovered resources and monitoring of recovered paper deliveries, both illustrative for the propositions B3 and C3, and the temporal dimension of intra-firm and inter-firm resource dependence instruments illustrative for proposition B1, will be discussed in more detail.

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Development of routines to enhance control over recovered paper sources

As mentioned before, recovered paper is of high importance for Kappa Packaging and therefore the company wants to increase its control over recovered paper sources. Kappa makes a distinction between four different levels of control ranging from high to low: (1) direct control, (2) contracts with direct sources, (3) contracts with indirect sources, and (4) day-to-day. Actually these can be regarded as different resource dependence instruments. *Direct control* means the supply of recovered paper via own depots or clippings. Clippings are the paper "waste" that arises in the paper and board production and packaging production processes of the own mills. Contracts with *direct sources* cover contracts with communities and supermarkets. Contracts with *indirect sources* concern contracts with waste managers, integrated sorting companies, and small local recovered companies. *Day-to-day* implies recovered paper at spot markets. For each buying region (see Table 92) the desired contract levels are determined, depending on the local circumstances.

When coordinated recovered paper purchasing starts in 2003, the recovered paper contracts of the mill are all revised. Mills have their own contracts, which date from the past. These contracts are made with recovered paper companies not with municipalities (Kappa Paper Recycling does have contracts with municipalities). Some suppliers deliver recovered paper to more than one Kappa mill, however, with different payment conditions.

Having this payment condition information available at central level offers the opportunity to investigate which conditions are most profitable. The supplier can then be approached by a Kappa team with the aim to apply this more profitable payment condition to all Kappa mills that are provided with recovered paper by this supplier.

New contracts with suppliers are discussed in the Steering Committee. In practice, the conversations concern the pre-2001 Kappa Packaging companies, i.e. mainly buying region A, see Table 92. Here communication is most important because the companies are located closely to each other. The other four buying regions are autonomous with regard to their day-to-day business. Kappa SSK (region D) and Kappa Piteå (region B) are more to the north and wider from each other. Kappa Štúrovo (region C) is more to the east and Kappa Ania (region E) more to the South, and have their own supply region. Moreover, the average recovered paper consumption is relatively low, see Figure 32.

The developments described above illustrate proposition B3 "From a dynamic capabilities theory perspective incumbent firms need to develop the ability to change their routines regarding the application of intra-firm and inter-firm resource dependence instruments" and proposition C3 "From a dynamic capabilities theory perspective, incumbent firms are likely to develop resource dependence instrument-related routines enabling an increase of recovered-resource dependence ".

Monitoring recovered paper deliveries

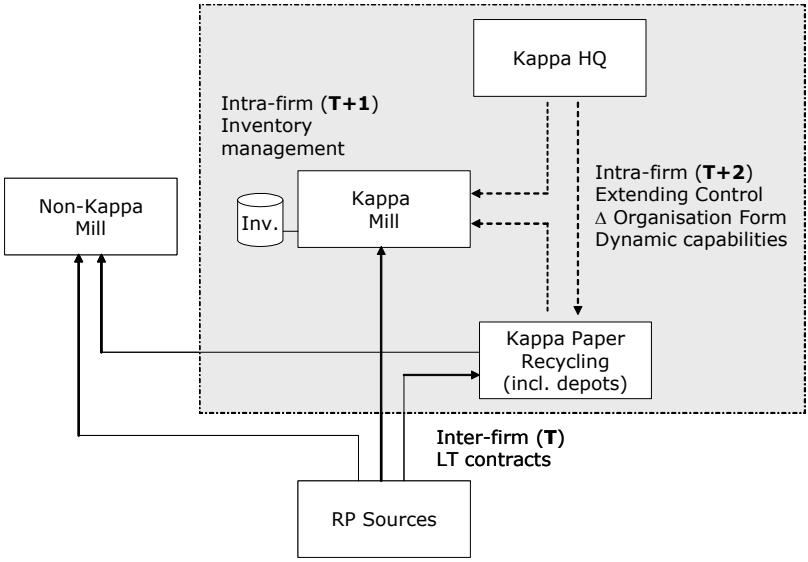
In chapter 7 the organisation form of 1998 and 2004 were compared and it was illustrated how the shift towards coordinated recovered paper purchasing leads to an increase in absorptive capacity, see Table 82. To enhance the knowledge about suppliers and mill purchasing behaviour and to be better able to approach the market from 2004 on the mills have to report the recovered volumes and prices paid on a weekly basis to Kappa Paper Recycling. This provides insight into the recovered paper costs from the different suppliers. With monitoring of the deliveries of the contracted volumes, it becomes possible to rate the reliability of the supplier. It can lead to cost benefits. For example if a supplier delivers too much of the more expensive grades and not enough of the cheaper grades, this negatively influences the average recovered paper prices paid by the mills. Recovered paper monitoring has advantages not only at corporate level, but for the mills as well. The managing directors of the mills are represented in the Steering Committee and this way they get information about other mills and prices of suppliers that they didn't have before.

Intra-firm and inter-firm resource dependence instruments

Figure 37 illustrates the temporal dimension of the use of intra-firm and inter-firm resource dependence instruments. The development of Kappa Packaging has shown that to a large extent inter-firm resource dependence instruments have been applied. In the

beginning of the 1990s additional to inter-firm resource dependence like acquisitions, Kappa Packaging starts using long-term contracts as a mean to secure the supply of recovered paper. In the beginning the number of contracts is limited but the contract level gradually increases. In 2003 the contract level has risen to about 70% of the recovered paper supply. From 2002 on (T+1) Kappa Packaging starts using intra-firm resource dependence instruments like inventory management, see Figure 35. As discussed before, at the moment of price spikes in 2000 and 2002 the recovered paper stocks were low and by consequence the impact of the price spikes was high for Kappa. The company had no choice but to purchase recovered paper for the continuation of the production processes. By increasing the recovered paper stocks, Kappa can do longer without the supply (cf. Pfeffer and Salancik, 1978). The next step (T+2) is the adaptation of the organisation structure, i.e. coordinated recovered paper purchasing. This order in the use of resource dependence instruments illustrates proposition B1: "In the context of the transition from a traditional towards a recovered-resource dependent industry: From a resource dependence perspective, incumbent firms are likely to use inter-firm prior to intra-firm resource dependence instruments as a mean to decrease resource dependence".

Figure 37 Temporal dimension of the use of intra-firm and inter firm resource dependence instruments and change of organisation form at Kappa Packaging



Moreover, the developments show that Kappa Packaging develops dynamic capabilities in order to manage recovered-resource dependence, illustrative for proposition C3: "In the context of strategic renewal due to the shift from a traditional towards a

recovered-resource dependent industry, from a dynamic capabilities theory perspective, incumbent firms are likely to develop resource dependence instrument-related routines enabling an increase of recovered-resource dependence".

Summary Strategic Renewal and Resource Dependence Actions Kappa Packaging 1970 - 2004

Table 94 provides an overview of the resource dependence instruments that were distinguished in chapter 2 and the extent to which they are used by Kappa Packaging in the last two stages that were discerned in chapter 6 (setting 3). The dependence on recovered paper as a resource is changing from moderate to a high dependence on recovered paper. It appears that in the period 1970 – 1995 Kappa Packaging mainly used inter-firm resource dependence instruments. In the period 1995 – 2004 Kappa starts using more intra-firm resource dependence instruments. This evidence illustrates proposition B2.

Table 94 Resource Dependence instruments employed by Kappa Packaging during the periods 1970 – 1995 and 1995 – 2004

Resource Dependence Instruments	**Period 1970 – 1995**	**Period 1995 – 2004**
Intra-firm		
- *Substitute resources*	Dependence on virgin fibres. Change from straw as raw material towards recovered paper at the end of the 1970s. During the following periods recovered paper consumption gradually increases.	Recovered paper is the most important raw material for paper and board production. After the acquisition of Assi Domän in 2001 relative dependence on recovered paper decreases.
- *Inventories*	Recovered paper stocks at a level necessary for continuing production.	From 2002 on: inventory management. From recovered paper stocks necessary for continuing production towards recovered paper stocks up to three weeks of production capacity.
- *Diversification (entering different lines of Business)*	Combination of extending current product lines and refocus, back to core business	Extending current product lines, focus on Packaging sector
- *Organic Growth*	Capacities of existing mills and corrugated divisions expands through time	Capacities of existing mills and corrugated divisions expands through time

Table 94 Resource Dependence instruments employed by Kappa Packaging during the periods 1970 – 1995 and 1995 – 2004 (continued)

Resource Dependence Instruments	Period 1970 – 1995	Period 1995 – 2004
Inter-firm		
- *Diversification*	Diversification increases through means as joint activities and later the merger of KNP and BT	Diversification decreases. In 1998 Kappa Packaging comes alive with only packaging activities.
- *Vertical Integration*	Backward: acquisition of depots. Forward: acquisition of corrugated activities	Backward: Depots in Czech republic and Slovakia. Forward: acquisition of packaging activities of Assi Domän
- *Horizontal Integration*	Number of mills increases by Merger of KNP and BT, Acquisition of mills: SSK, Herzberger, Baden, Zülpich.	Acquisition of mills of Assi Domän
- *Long term contracts*	None to limited at the end of stage 2. first contract in 1992	Contract level with recovered paper suppliers increases from 1995 on up to 70 % in 2003. Long term contracts with suppliers of wood / wood chips (source: Presentation Kappa Packaging 2003)
- *Cooptation*	n.a.	n.a.
- *Social coordination*	n.a.	n.a.
Institutional Field		
- *Influence and use of legislation*	Via branch organisation	Via branch organisation
- *Anti trust suits*	n.a.	n.a.

Source: Table 90, company documents, annual reports, paperloop.com.

CONCLUSION

Like the previous chapter, this chapter has contributed to the firm-level research question: "Which resource dependence strategies and resource dependence instruments are applied and why is this the case?" Moreover, the second firm-level research question, "What are the implications of these strategies for management processes and organisation structures?" has been addressed by investigating the change in organisation form of Kappa Packaging and the changing role of Kappa Paper Recycling. Six propositions related to resource dependence instruments and recovered-resource dependence have been (partly) illustrated. Table 95 presents an overview of the topics discussed in this chapter and the findings.

Table 95 Topics and Findings Chapter 8

Topics discussed	Findings
- Company overview Kappa Packaging	- Kappa Packaging is an integrated Paper and Board company active in two main businesses: Paper and Board and Packaging. - Recovered paper is the most important raw material - Recycling rate of 90%
- Strategic renewal in the history of Kappa Packaging	- Change from straw towards recovered paper as a important resource - Kappa grows from a Dutch local company to an International operating company. - Business focus (end-use market) is shifting through time.
- Recovered resources and management involvement	Proposition B2 was illustrated: - Though time Kappa grows and management involved in recovered paper purchasing shifts from low in the organisation to top management involvement.
- Changing role of Kappa Paper Recycling	Proposition B1 was illustrated: - Kappa uses mergers, acquisitions, and long-term contracts prior to inventory management and changing the organisation form Proposition B3 and C3 were illustrated: - Routines are developed to deal with recovered-resource dependence management. Examples: reporting of recovered paper deliveries and contracts with suppliers Proposition B4 and C4 were illustrated: - The organisation form is adapted to be better able to deal with recovered-resource dependence and the role of Kappa Paper Recycling changes from profit centre towards knowledge centre

The company overview has shown that Kappa Packaging is an integrated paper and board packaging company active in two segments: paper and board production and packaging production. Recovered paper plays an important role in the production process of Kappa Packaging. The recycling rate amounts 90% in 2004, high above the industry average.

Strategic renewal in the history of Kappa Packaging shows the shift from straw as a raw material towards recovered paper and a shifting focus of the product portfolio. It also shows the development of an industry that is consolidating and expanding. The company changed from a local player towards an international operating company. Through time the company has accomplished growth by organic growth, partnerships, and acquisitions leading to horizontal integration, vertical integration, and diversification.

The changing industry context, the growth of the company, and the higher recovered-resource dependence made that management has become more active with regard to resource dependence management. In this sense proposition B2 “In the context of the transition from a traditional towards a recovered-resource dependent industry: From a resource-based view of the firm perspective (Penrose), the growth of incumbent firms

necessitates managerial services to cope with resource dependence instruments" is illustrated.

During the development of the company the resource dependence instruments to manage recovered-resource dependence become more varied. In the beginning of the 90's the first contracts are closed with recovered paper suppliers. Through time the contract level increases. After the price spike in 2002 Kappa introduces a more proactive inventory management policy. Recovered paper inventories are increased. Top management involvement in the recovered paper purchasing process increases as well. From 2003 on coordinated purchasing takes place, where top management is involved. This illustrates proposition B4 and C4 (see Table 84) which are both concerned with the change of firm's organisation form. Furthermore, it appears that the company develops dynamic capabilities to deal with resource dependence instruments and recovered-resource dependence, in this way the propositions B3 and C3 are addressed (see Table 84). Proposition B1 was illustrated as well. It appears that Kappa Packaging used inter-firm resource dependence instruments (horizontal and vertical integration, long-term contracts with suppliers) prior to intra-firm resource dependence instruments (inventory management and adapting the organisation form), see Figure 37.

PART FOUR:
DISCUSSION AND CONCLUSION

CHAPTER 9

SUMMARY, CONTRIBUTIONS, LIMITATIONS AND FUTURE RESEARCH, AND MANAGERIAL RECOMMENDATIONS

SUMMARY

This study has contributed to the insight into recovered-resource dependence management of recovered-resource dependent firms, i.e. resource dependence management by firms that due to environmental issues and regulations become increasingly dependent on their own end-of-life product as a resource for the continuation of their production processes. This phenomenon is investigated here from a resource dependence perspective in the context of strategic renewal of the firms involved. It was argued that for firms oprating in recovered-resource dependent industries resource dependence management is more complex than for firms oprating in traditional industries; in recovered-resource dependent industries the return of end-of-life products has to be managed and also the number of actors involved is higher. This research has addressed the following *research question*: In the context of the transition from a traditional towards a recovered-resource dependent industry, how do internal and external factors influence incumbent firms' strategic renewal and the use of resource dependence instruments and what are the implications for recovered-resource dependence management and competitive advantage?

To contribute to solving the research problem a multi-dimension, multiple lenses, multiple level, and multi method research methodology is followed. To structure the investigation, following Volberda et al. (2001a) three dimensions of strategy are used: context, content and process (see Table 96). The *context* dimension provides insight into how the external, and in particular the institutional, context influences a firm's recovered-resource dependence management and is addressed by Institutional theory (DiMaggio and Powell 1983; Scott, 2001; Greenwood and Hinings, 1996) and Resource Dependence theory (Pfeffer and Salancik, 1978). The *content* dimension provides insight into the resource dependence instruments that can be employed to manage recovered-resource dependence (Pfeffer and Salancik, 1978) and firms' internal factors influencing the use of these resource dependence instruments. The dominant theoretical perspectives associated with these internal factors used in this research are the Resource-based view of the firm (Penrose, 1959), Dynamic Capability theory (Teece et al., 1997; Eisenhardt and Martin, 2000; Dosi et al., 2002), and Absorptive Capacity literature (Cohen and Levinthal, 1989; 1990; Van den Bosch et al., 1999; Jansen et al., 2005).

The *process* dimension of strategy provides insight into the process of strategic renewal due to the shift from a traditional towards a recovered-resource dependent industry and is contributed to by Strategic Renewal literature (Volberda et al. 2001a; 2001b), Dynamic Capability (Teece et al., 1997; Eisenhardt and Martin, 2000; Dosi et al., 2002) and Absorptive Capacity literature (Cohen and Levinthal, 1989; 1990; Van den Bosch et al, 1999; Jansen et al., 2005).

Table 96 Strategy Dimension, Focus, associated theoretical lenses and main contributors used in this research

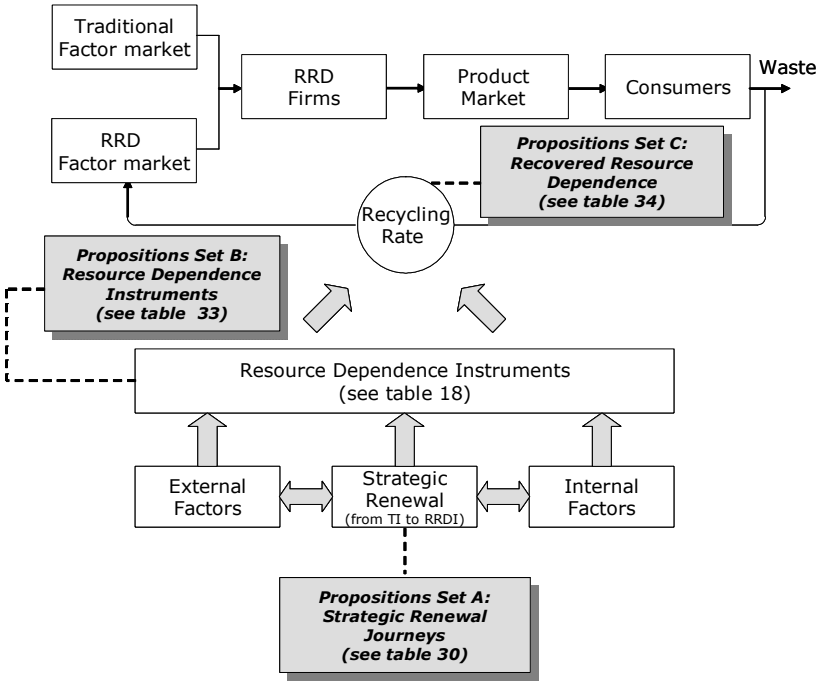
Strategy Dimension	(1) Focus / Question	(2) Associated theoretical lenses and main contributors used in this research
Context	- How does a firm's external and in particular institutional context influence recovered-resource dependence management?	- Resource dependence theory (Pfeffer and Salancik, 1978) - Institutional theory (DiMaggio and Powell, 1983; Scott , 2001)
Content	- What internal factors influence a firm's recovered resource dependence management? - Which resource dependence instruments can be used in order to manage recovered-resource dependence?	- Resource dependence theory (Pfeffer and Salancik, 1978) - Resource-based view of the firm (Penrose, 1959) - Dynamic capabilities & Absorptive capacity (Teece et al., 1997; Eisenhardt and Martin, 2000; Dosi et al., 2002; Cohen and Levinthal, 1989; 1990; Van den Bosch et al., 1999; Jansen et al., 2005)
Process	- In the process of strategic renewal due to the shift from a traditional towards a recovered-resource dependent industry, when and how do resource dependence actions occur?	- Strategic renewal literature (Volberda et al., 2001a; 2001b) - Dynamic capabilities & Absorptive capacity (Teece et al., 1997; Eisenhardt and Martin, 2000; Dosi et al., 2002; Cohen and Levinthal, 1989; 1990; Van den Bosch et al., 1999; Jansen et al., 2005)

Source: (1) Table 3, (2) Table 4

In chapter 3 a conceptual managerial framework was developed distinguishing external and internal explanatory factors that influence the strategic renewal journeys that incumbent firms follow due to the shift from a traditional towards a recovered-resource dependent industry, see Figure 38. Furthermore propositions were developed by applying the five aforementioned theoretical lenses on three relevant constructs: Strategic renewal, resource dependence instruments, and recovered-resource dependence, see Table 27. Theories associated with internal factors are: Resource dependence theory (Pfeffer and Salancik, 1978), Resource-based view of the firm (Penrose, 1959); Dynamic capability theory (Teece et al., 1997; Eisenhardt and Martin, 2000; Dosi et al., 2002) and Absorptive capacity literature (Cohen and Levinthal, 1989; 1990; Van den Bosch et al., 1999; Jansen et

al., 2005). Institutional theory (DiMaggio and Powell, 1983; Scott, 2001; Greenwood and Hinings, 1996) and resource dependence theory (Pfeffer and Salancik, 1978) were addressed to provide insight into the external factors influencing the firm. Furthermore the model includes resource dependence instruments that can be employed in order to manage recovered-resource dependence. The use of these resource dependence instruments is influenced by the interplay of internal factors, external factors, and strategic renewal. The resource dependence instruments employed finally determine a firm's recovered-resource dependence, represented by the recycling rate.

Figure 38 Conceptual Managerial Framework and Three Sets of Propositions



Moreover the study follows a *multi-level approach* whereby a distinction is made between cross-industry (Paper and Board, Aluminium, and Plastics industry), industry (Paper and Board industry), cross-firm (Kappa Packaging, Jefferson Smurift, SCA, Norske Skog, Stora Enso, and UPM-Kymmene), and firm level (Kappa Packaging), see Table 36. At cross-industry and industry level the emphasis is on external factors influencing recovered-resource dependence. The industry level of the research questions is listed in Table 97. The external factors distinguished in this study are: legislation (institutional theory), regional scope, resource recycling characteristics, end-use

markets influencing virgin and recovered resources, and technological developments. The extent to which these factors constrain incumbent firms is investigated in the empirical industry level chapters (chapter 5 and 6) of this study and it appears that all of them impact the industry and industry performance.

At firm level the emphasis is on the inside of the firm. The firm level research questions are listed in Table 97 and investigated in the two firm-level chapters of the study, i.e. chapter 7 and chapter 8. Internal factors, and theories and constructs associated with these selected in this research, are management (resource-based view of the firm), dynamic capabilities, and organisation form (absorptive capacity). The resource dependence instruments employed depend on the situations that the firms are in. These affect the three determinants of dependence (Pfeffer and Salancik, 1978): Importance of the resource exchange for the firm, discretion over resource allocation and use, and concentration of resource control, see Table 17. According to Pfeffer and Salancik (1978) the most effective means to reduce resource dependence is to use resource dependence instruments limiting the importance of a resource exchange (substitute resources for example). However, in the given field this might not always be possible or desirable which encourages firms to choose other means like vertical integration, horizontal integration, and diversification.

Table 97 Industry and firm level research questions

Industry level research questions:
- Which external factors constrain firms in recovered-resource dependent industries?
- To what extent are external explanatory constructs able to explain differences in performance of recovered-resource dependent industries?

Firm level research questions:
- Which internal factors constrain recovered-resource dependent firms?
- To what extent are internal explanatory constructs associated with these internal factors able to explain differences in performance of recovered-resource dependent firms?
- Which resource dependence strategies and resource dependence instruments are applied and why is this the case?
- What are the implications of these strategies for management processes and organisation structures?

The *empirical part* comprises *eight* research settings (see Table 36) contributing to the research problem as follows. At *cross-industry level* (research setting 1) the impact of external factors imfluencing recovered-resource dependent industries is examined. First a brief description is given of the history of three recovered-resource dependent industries: Paper and Board, Aluminium, and Plastics (chapter 5) and it appears that the external factors distinguished in chapter 2, i.e. resource recycling characteristics, market for virgin and recovered resources, regional scope, and legislation, matter. A comparison of the recycling performance of the three industries indicates that the European Paper and Board

industry has the highest recycling rate: 53%, see Table 54. To find out why this is the case, attention is paid to three external factors impacting the industry. It appears that the end-use sectors in which the industries are present influence the time that products are in use and hence also influence the time when the used product can be recovered see Table 55. Differences in resource recycling characteristics appear to impact the performance of the industry as well. Finally the institutional context impacting the recovered-resource dependent industries is examined. It appears that legislation sets different recycling targets for the industries (see Table 57) and in this way influences the recycling performance, see Table 58.

At *industry level* (chapter 6) the paper and board industry, which appeared to be the industry with the highest recycling rate – suggesting that recovered-resource dependence is best managed here – is discussed. Like in chapter 5 the emphasis is on external factors influencing recovered-resource dependence management. A comparison of the recycling performance of three main regions at *global* level (research setting 2), North America, Asia Far East, and Western Europe at three snapshots in time shows that Europe is the best performer. This gives rise to the investigation of the European paper and board industry in more detail. A longitudinal description of the *European* paper and board industry (research setting 3) provides more insight into the factors impacting the industry. It appears that legislation has highly impacted the availability of recovered paper and the prices of recovered paper and later export to Asia Far East as well, see Figure 23. An analysis of the paper and board end-use markets shows that the paper and board industry is not homogeneous and that dependence on recovered resources differs per end-use market. A comparison of end-use sectors in the European paper and board industry (research setting 4) shows that the Packaging sector is most dependent on recovered paper for paper and board production (see Table 64), and that therefore in this sector recovered-resource dependence management is important. A comparison at country level (research setting 5) shows that prices for recovered paper differ per region, see Table 66. This implies that for firms operating in countries where prices are stable, resource dependence management will be less difficult than in countries where prices are volatile. Pfeffer and Salancik (1978) suggest inventories as a means to reduce resource dependence; higher inventories could lead to more stable prices, see Figure 25. Recovered paper inventories in the six countries (see Table 67) were compared with the variation in recovered paper prices (see Table 64), however, no correlation could be found, which implies that other factors play a more dominant role with regard to price development at country level.

At *cross-firm* level (chapter 7) strategic renewal actions and resource dependence instruments employed by six main players in the paper and board industry are investigated for the period 1998 until 2003, (research setting 6). The six incumbents were selected from the two largest paper and board end-use sectors: graphic and packaging, cf. research setting

4. Companies representing the Packaging end-use sector are: Kappa Packaging, Jefferson Smurfit, and SCA. Companies representing the Graphic end-use sector are: Norske Skog, UPM-Kymmene, and StoraEnso. The companies in the packaging sector depend most on recovered paper (see Table 71) and it appears they are most active with regard to managing resource dependence; most of the renewal actions in the packaging sector were resource dependence actions as well. SCA has by number the most actions followed by Kappa Packaging on the second place and Jefferson Smurfit on the third place, see Table 78. It appears that all of the incumbent firms have mostly followed an emergent renewal journey, see Figure 28. Jefferson Smurfit slightly inclines towards a directed renewal journey suggesting an active role of top management. Kappa Packaging slightly inclines towards a facilitated renewal journey, suggesting an active involvement of middle and frontline management. An overview of the development of the organisation structure from 1999/1998 and 2003/2004 shows that the companies investigated have started adapting their organisation form. Due to limitations in data availability no support could be found to suggest that these adaptations in organisation form were initiated to improve knowledge processes regarding recovered-resource dependence management.

At *firm* level (chapter 8) Kappa Packaging is investigated (research setting 7). Results of the previous chapter suggested that Kappa Packaging is the company that is most active with regard to recovered-resource dependence management. Kappa Packaging is a vertical integrated firm active in the Paper and Board segment and the Packaging segment, see Figure 31. The recovered paper business is part of the Paper and board segment. The company description indicates that recovered paper is the most important resource for Kappa Packaging which is also expressed by the recycling rate of 90%, see Figure 33. The strategic renewal actions analysis from 1970 until 2005 shows that mainly inter-firm resource dependence instruments are used as diversification, horizontal integration and vertical integration, see Table 90. With regard to recovered-resource dependence management, it appears that in time recovered paper has become more important in the organisation. In the 1970s and 1980s the responsibility for recovered paper purchasing is low in the organisation. At the beginning of the 1990s middle management becomes involved in recovered paper purchasing. Besides mergers and acquisitions, long term contracts with suppliers are used as a resource dependence instrument. After 2001 top-management becomes involved in recovered paper purchasing. This suggests that recovered-resource dependence management has become ever more important. This increase in importance of recovered paper is also expressed in the organisation form (research setting 8). The role of Kappa Paper Recycling changes from profit centre towards knowledge centre. From 2003 onwards Kappa Paper Recycling gets a coordinating role in the recovered paper purchasing process in the regions where Kappa is dominantly present, i.e. Benelux and Germany. Recovered paper purchasing changes from a decentralised

activity to a centralised activity. Moreover Kappa starts using intra-firm resource dependence instruments like recovered paper inventory management and recovered paper monitoring, see Figure 37.

CONTRIBUTIONS

This research has contributed to resource dependence management of recovered-resource dependent firms in four ways, see Table 98. Each issue will now be discussed in more detail.

Table 98 Contribution to resource dependence management in four ways

1. Extending resource dependence theory and application to a new research context (see Table 99)
2. Developing a conceptual managerial framework and propositions (see Table 101)
3. Extending empirical data (see Table 102)
4. Extending knowledge on resource dependence management in recovered-resource dependent industries (see Table 103)

1. Extending resource dependence theory and application to a new research context

A multi-level and multiple lens approach was followed. Resource dependence theory was extended and applied to a highly relevant industry context: recycling industries, here coined as recovered-resource dependent industries. Resource dependence management in recovered-resource dependent industries is more complex than resource dependence management in traditional industries for in recovered-resource dependent industries the return of the end-of-life products has to be managed as well, see Figure 2. This means that more actors are involved, in other words, recovered-resource dependent firms are dependent on more organisations. The resource dependence issue has been extended towards a *recovered*-resource dependence issue.

In order to address the recovered-resource dependence issue, five theoretical perspectives were applied, contributing to two of the three dominant themes of resource dependence theory (Pfeffer and Salancik, 1978). The *first* theme, importance of understanding a firm's environment, see Table 15, is addressed by resource dependence theory (Pfeffer and Salancik, 1978) and institutional theory (DiMaggio and Powell, 1983; Scott, 2001; Greenwood and Hinings, 1996). The *second* theme, firms' attempts to influence the constraints emerging from the environment, see Table 15, providing insight by means of the following theories: Resource dependence theory (Pfeffer and Salancik, 1978), resource-based view of the firm (Penrose, 1959), dynamic capabilities theory (Teece et al., 1997; Eisenhardt and Martin, 2000; Dosi et al., 2002), and absorptive capacity

literature (Cohen and Levinthal, 1989; 1990; Van den Bosch et al., 1999; Jansen et al., 2005). In this way different levels of analysis are addressed: Theme 1 concentrates mainly on *industry* level and theme 2 mainly concentrates on *firm* level.

Following a multi-level approach, the resource dependence instruments proposed by Pfeffer and Salancik (1978) have been categorised based on level of analysis. Where Pfeffer and Salancik (1978) make a distinction between three determinants of dependence – importance of a resource exchange for the firm, discretion over resource allocation and use, and concentration over resource control (see Table 16) – this research categorises the resource dependence instruments on level of analysis. A distinction is made between intra-firm, inter-firm, and institutional field resource dependence instruments, see Table 18.

Finally, resource dependence theory (Pfeffer and Salancik, 1978) is linked to strategic renewal literature (Volberda et al., 2001a; 2001b) by relating incumbent firms' resource dependence instruments, and the different levels of management that can be involved in this in particular, to strategic renewal journeys, see Table 29. It appears that inter-firm resource dependence instruments are most related to top management involvement. When using intra-firm resource dependence instruments all levels of management can be involved. Table 99 provides a summary of the contribution to resource dependence management.

Table 99 Contribution to Extending Resource Dependence theory and application to a new research context

- Applying resource dependence management to a highly relevant industry context (Recovered-Resource Dependent Industry)
- Introducing the construct Recovered-Resource Dependent Firm and Industry
- Application of a multiple lens approach
- Application of a multi-level approach and classification of resource dependence instruments regarding level of analysis
- Linking resource dependence to strategic renewal literature

2. Developing a conceptual managerial framework and propositions

In chapter 3 a conceptual managerial framework was developed (Figure 11) on managing (recovered-) resource dependence in the context of strategic renewal due to the transition from a traditional towards a recovered-resource dependent industry. The framework distinguishes between external as well as internal factors influencing strategic renewal. Theoretical lenses associated with internal factors are: Resource dependence theory (Pfeffer and Salancik, 1978), resource-based view of the firm (Penrose, 1959), dynamic capabilities theory (Teece et al., 1997; Eisenhardt and Martin, 2000; Dosi et al., 2002), and absorptive capacity literature (Cohen and Levinthal, 1989; 1990; Van den Bosch

et al., 1999; Jansen et al., 2005). Institutional theory (DiMaggio and Powell, 1983; Scott, 2001; Greenwood and Hinings, 1996), and legislation in particular, was discussed as an external factor influencing recovered-resource dependence. Furthermore the framework incorporates three constructs contributing to the research question – strategic renewal, resource dependence instruments, and recovered-resource dependence – on which the five theoretical lenses are projected, see Figure 38. The five theoretical lenses and the three constructs related to resource dependence management are used for proposition development, see Table 100.

Table 100 Five theoretical perspectives applied on three constructs: Strategic renewal, resource dependence instruments and recovered-resource dependence.

	Construct		
Theoretical perspective	**A Strategic renewal journeys**	**B Resource dependence instruments**	**C Recovered-resource dependence**
1. Resource dependence theory	Proposition A1	Proposition B1	Proposition C1
2. Resource-based view of the firm	Proposition A2	Proposition B2	Proposition C2
3. Dynamic capabilities theory	Proposition A3	Proposition B3	Proposition C3
4. Knowledge-based view of the firm	Proposition A4	Proposition B4	Proposition C4
5. Institutional theory	Proposition A5	Proposition B5	Proposition C5

Source: Table 27

Three sets of propositions were developed. The first set of propositions consists of five theoretical perspectives applied to *strategic renewal* due to the transition from a traditional towards a recovered-resource dependent industry. The propositions suggest what strategic renewal journey incumbent firms are likely to follow. The next set of propositions concerns five theoretical perspectives on the *resource dependence instruments* that firms are likely to use in their renewal journey. A multitude of resource dependence instruments at different levels of analysis is proposed to reduce incumbent firms' resource dependence. The last set of propositions concerns how incumbent firms are likely to manage their *recovered-resource dependence*. Table 101 provides a summary of the contribution to the conceptual managerial framework and propositions.

Table 101 Contribution to developing a conceptual managerial framework and propositions

- Five theoretical lenses applied on three constructs related to recovered-resource dependence management: (A) strategic renewal, (B) resource dependence instruments, and (C) recovered-resource dependence
- Incorporating external factors (legislation)
- Incorporating internal factors (management, dynamic capabilities, organisation form)
- Distinguishing resource dependence instruments (intra-firm, inter-firm and institutional field level
- Development of three sets of propositions on constructs relevant to recovered-resource dependence management: (A) strategic renewal, (B) resource dependence instruments, and (C) recovered-resource dependence.

3. Extending Empirical Data

Empirical data on resource dependence are relatively scarce (Pfeffer and Salancik, 2003: xiv). This study has contributed to this lacuna by presenting new empirical data on resource dependence management and strategic renewal on different levels of analysis. Resource dependence has been investigated in the context of recovered-resource dependent firms, or more precisely, incumbent firm's resource dependence management in the transition from traditional towards recovered-resource dependent industry. Resource dependence management in this type of industry is different from traditional firms in the sense that RRDFs must manage their recycling rate, or the return of end-of-life products of their own industry.

A *cross-industry* analysis was executed in order to investigate external factors, and the impact of legislation in particular, impacting incumbent firms' resource dependence management in three recovered-resource dependence industries; Paper and Board, Aluminium, and Plastic. This research has generated a brief description of the history of the abovementioned three industries with attention to the following external factors: legislation, regional scope, resource recycling characteristics, technology, and markets for virgin and recovered resources. The recycling performance of these three industries was compared and empirical evidence shows that the European Paper and Board industry is the best performing RRDI with a recycling rate of 53% (see Table 54). Furthermore this study has generated data on legislation impacting RRDIs. It was shown that legislation affects the targets set for the industry performance, see Table 57. Moreover, legislation was related to the end-use sectors in which the industries are present – e.g. packaging, household & sanitary, automotive – and it was illustrated that end-use sectors affects the recycling targets that have to be met. In the packaging sector for example, (directive 1994/62/EC) the recycling targets are highest for the Paper and Board industry (60% in 2008) and lowest for the Plastic industry (22.5% in 2008), see Table 57. In the automotive sector however, the

end-of-life vehicle directive (2000/53/EC) sets similar recycling and reuse targets for Aluminium and Plastics industry, see Table 57.

At *industry level* three continents were discerned, North America, Western Europe, and Asia far East. This study has provided empirical data on the development of the collection of recovered paper of these continents at three points in time: 1992, 2000, and 2010, relevant for a comparison of the performance of the three continents. A longitudinal description of the European paper and board industry was conducted, resulting in insight into the development of the use of recovered resources versus virgin resources and external factors impacting the paper and board industry. Empirical evidence suggests that that legislation has played an important role in the use of recovered resources highly impacting the recycling rate. The description has provided data on price volatility (see Figure 23) as well. Furthermore, the description shows how regional scope has impacted the Paper and Board industry in Europe. Since the end of the 1990s the quantities of recovered resources exported to Asia far East are increasing. Besides the longitudinal description, this research has shown that the paper and board industry is not homogeneous. Different end-use sectors were distinguished with different recovered-resource dependencies. In the Packaging sector the dependence on recovered resources is high and in the Graphic sector the use of recovered paper as a resource is remarkably lower, with the exception of the newsprint sub sector, see Table 64. Finally, at country level the study has provided data on price volatility of recovered resources. For in six European countries the price volatility of recovered paper was related to recovered paper inventories. Pfeffer and Salancik (1978) mention inventories as a means to reduce resource dependence. It was assumed that higher recovered paper inventories lead to less price volatility.

At *cross-firm level* this study has generated data on strategic renewal actions and journeys of six major players in the Paper and Board industry including the resource dependence instruments employed. The period investigated is 1998 until 2003. Three major players in the two largest paper and board sectors were selected: Kappa Packaging, Jefferson Smurfit, and SCA in the Packaging sector, and Norske Skog, StoraEnso, and UPM-Kymmene in the Graphic sector, see Table 70. It appears that the companies have mostly followed an emergent renewal journey, see Figure 28. Kappa Packaging slightly inclines towards a facilitated renewal journey; Jefferson Smurfit slightly inclines towards a directed renewal journey, implying a more active role of top management. SCA, Jefferson Smurfit, and Norske Skog mainly use inter-firm resource dependence instruments. Kappa Packaging, StoraEnso, and UPM-Kymmene mainly use interfirm resource dependence instruments, see Table 77. Furthermore the research has contributed to insight into the development of the organisation form of the six firms which is compared in terms two snapshots in time: 1998/1999 and 2003/2004.

Finally, this study has contributed to empirical data on *firm-level* by investigating one incumbent firm, Kappa Packaging, in more detail. First of all a description is given of the activities and markets segments and countries in which Kappa Packaging is active. Kappa Packaging is to a large extent dependent on recovered resources, see Figure 33. The longitudinal description of Kappa Packaging provides an overview of highly relevant strategic renewal actions in the period 1970 until 2004, furthermore, attention is paid to the resource dependence instruments employed by the company. The longitudinal description has contributed to empirical data on management involvement. It is shown that management involvement with regard to recovered resources has increased through time. In the 1970s and 1980s the responsibility for recovered paper purchasing was placed low in the organisation. During the 1990s the responsibility for the supply of recovered paper was placed higher in the organisation. After 2000 top management becomes involved in recovered paper purchasing and the organisation structure changes. This research has provided data on the development of the organisation forms and development of capabilities as well. It appears that the focal firm changes its organisation form and develops dynamic capabilities to be better able to deal with recovered-resource dependence. The role of Kappa Paper Recycling for example changes from a profit centre towards a knowledge centre of recovered paper. Table 102 presents an overview of the contributions to empirical data.

Table 102 Contribution to extending empirical data

- Industry level: developing data of external factors affecting RRDI's
  - *Cross-industry level*: comparison of external factors impacting the Paper and Board, Aluminium, and Plastic industry, e.g. influence of end-use markets on recovered resources and EU legislation impacting the industries.
  - *Industry level*: Comparison performance of three continents, longitudinal description of factors impacting the European Paper and Board industry, Comparison of end-use sectors in the European Paper and Board industry, Comparison of the performance of six European countries.
- Firm-level: strategic renewal and resource dependence management
  - *Cross-firm level*: Comparison of strategic renewal and resource dependence actions of six major players in the European Paper and Board industry, comparison of organisation form of six incumbent firms at two moments in time.
  - *Firm level*: Longitudinal description of Kappa Packaging, a major player in the European paper and board industry with attention for strategic renewal and resource dependence actions. Development of management involvement in recovered-resource dependence management. Development of organisation form and the role of Kappa Paper Recycling.

4. Extending knowledge on resource dependence management in recovered-resource dependent industries

Finally the research has contributed to knowledge on incumbent firms' recovered-resource dependence management. The major difference in comparison to traditional industries is that the return of end-of-life products has to be managed. This makes recovered-resource dependence management more complex than resource dependence management in traditional industries. This study has delivered a conceptual managerial framework on resource dependence management in recovered-resource dependent industries. The framework can help management to identify relevant aspects that play a role in recovered-resource dependence management. The framework pays attention to two themes (Pfeffer and Salancik, 1978): (1) In order to understand the behaviour of an organisation it is necessary to understand the context in which the firm is operating; (2) Organisations can do something about their situations, see Table 15. With regard to the context, in chapter two several external factors have been identified that help to understand the environment. Attention was paid to legislation and characteristics of factors and product markets like, technological developments, resource recycling characteristics, regional scope, and end-use markets.

Furthermore attention was paid to internal factors influencing recovered-resource dependence management that firm's management should take into account: firm's management, dynamic capabilities, organisation form, and the use of resource dependence instruments, whereby a distinction was made between intra-firm, inter-firm, and institutional field resource dependence instruments. The study has also shown that the attitude of management at different levels of the organisation – top management, and middle and frontline management – affects the strategic renewal journeys that incumbent firms follow from a traditional towards a recovered-resource dependent industry. Table 103 provides an overview of the contribution of this study to management.

Table 103 Contribution to extending knowledge on resource dependence management in recovered-resource dependent industries

- The return of end-of-life products has to be managed
- Managerial framework
- Context of the firm influences recovered-resource dependence management: legislation, technological developments, resource recycling characteristics, regional scope, and end-use markets
- Inside of the firm influences recovered-resource dependence management:, dynamic capabilities, organisation form
- Management has the disposal over different resource dependence instruments that can be used at different levels of analysis
- Management is able to influence the renewal journey from traditional towards recovered-resource dependent industry.

LIMITATIONS AND FUTURE RESEARCH

Although this research contributed to answering the research question, or more generally to insight into resource dependence management of incumbent firms during the strategic renewal journey to the shift from a traditional towards a recovered-resource dependent industry, there are limitations which could be addressed in future research. The limitations to which attention will be paid are: Resource dependence theory, conceptual framework, propositions, extending empirical research.

Resource Dependence Theory

In their book 'The External Control of Organizations' Pfeffer and Salancik (1978) discuss three main themes: (1) In order to understand the behaviour of an organisation one must understand the context of that behaviour; (2) Organisations can do something about the constraints emerging from their environment; (3) In order to understand both intra-organisational and inter-organisational behaviour one must understand the importance of power. Theme one and theme two have been addressed and, moreover, extended with multiple theoretical perspectives, however, theme three has been paid limited attention to in this research; the importance of power could be further investigated in future research.

Although research dependence theory has been extended with multiple theoretical lenses, other lenses can be chosen as well. The contribution of Mintzberg's ten schools of thought to the research problem, discussed in chapter 2, can be used as a basis for selecting these theories. Future research could for example pay attention to the power school, which captures the third theme (Pfeffer and Salancik, 1978) that was not addressed in this study. The cognitive school offers the opportunity to further extend the multi-level approach. Industry/institutional field level and firm/management level have been addressed. The cognitive level has not been investigated.

A start was made by discussing which resource dependence instruments are likely to be used depending on the circumstances a firm is in, see Table 33. It was argued that the resource dependence instruments influence the different determinants of dependence. Future research could focus on providing more insight into which resource dependence instruments to use depending on the situations.

The study has contributed to strategic renewal research by relating resource dependence instruments used and the levels of management that can be involved to strategic renewal journeys (see Table 29). It was argued that depending on the resource dependence instruments employed (intra-firm, inter-firm, or institutional field level), different levels of management can be involved: top management, and frontline and middle

management. Future research could contribute to a further investigation of the relationship between resource dependence management, resource dependence instruments and strategic renewal.

Resource dependence theory has in this manuscript been applied to a specific industry context, i.e. recovered-resource dependent firms. In this industry not only is resource management important but also recovered-resource dependence management as well. Future research should aim at providing more insight into the phenomenon of recovered-resource dependence management.

Conceptual Framework and Propositions

With regard to the conceptual framework, it includes five theories associated with internal and external factors influencing resource dependence management and three constructs relevant to recovered-resource dependence management in the context of the study: strategic renewal, resource dependence instruments, and recovered-resource dependence management. The conceptual managerial framework could be extended with the construct "power". Power is the third major theme that Pfeffer and Salancik (1978) discuss and influences resource dependence management, see Table 15. As argued in chapter two, in order to understand both intra-organisational and inter-organisational behaviour one must understand the importance of power. The influence of power on managerial decision making, resource dependence management and strategic renewal has been neglected in this research.

Not only could the constructs of the model be extended, but the internal and external factors and associated theories could of course also be extended. In the proposition development it was decided to use only theory-driven factors. However, in chapter 2 external factors related to factor and product markets were discussed as well. The non-theory driven external factors influencing recovered-resource dependence were not included in the framework. Future research could focus on extending the framework with external as well as internal factors, and proposition development on these issues. Also *corporate sustainability* (Hart 1995; 1997) issues could be applied. In chapter one the issue was briefly addressed but it was not discussed extensively in this study.

In the theory part of this research propositions have been developed covering three issues: strategic renewal journeys, resource dependence instruments, and recovered-resource dependence management. Theoretical research on these topics could be extended. Furthermore, future research could contribute to illustrating the propositions in other relevant industry contexts as well.

Extending empirical research

Research on external and internal factors impacting the firm could be further investigated. In the industry comparison of this research it was illustrated that external factors do matter, however, the impact has not been tested. A more profound analysis of external factors impacting recovered-resource dependent firms and industries could show to what extent external influences are similar. A similar approach could be followed for an analysis of the internal factors influencing recovered-resource dependence management.

The empirical part of the study has compared three recovered-resource dependent industries. Investigating more industries, like zinc or oil, is useful and will provide more insight into the similarities and differences between recovered-resource dependent industries, and recovered-resource dependence management and strategic renewal in particular. Aluminium and zinc are both resources that can be recycled without quality loss. A comparison in recovered-resource dependence management could provide relevant insights. The oil industry is an example where inventory management is used as a resource dependence instrument. Legislation obliges Member States to maintain oil stock at a minimum level of 90 days. The Energy industry could be investigated as well. Tis industry is different from other industries in the sense that the end product (electricity) is consumed and cannot be recycled. The "waste" product *heat*, however, can be recovered. More insight into resource dependence instruments employed in other recovered-resource dependent industries than the paper and board industry would be valuable.

More recovered-resource dependent firms in the same but also in other recovered-resource dependent industries could be investigated on issues addressed in this research. The cross-firm analysis has provided insight into the strategic renewal and resource dependence actions of major players in the industry. However, these players represent only a part of the total industry, see Table 70. The paper and board industry is comprised of four main sectors, all with their own recovered-resource dependence. An analysis of more firms in the same industry would be helpful to do generic predictions about the industry and sectors in the industry.

The impact of strategic renewal on resource dependence management deserves further attention. Also a further analysis of strategic renewal journeys followed by incumbent firms in their journey from traditional towards recovered-resource dependent industry could provide valuable insight into the phenomenon under research. More research on firm's internal processes, the adaptation of the organisation form, and the involvement of the different levels of management in managing resource dependence would help in an increased understanding of resource dependence management in recovered-resource dependent industries.

Finally, the focal firm has been investigated up to 2004. At the end of 2005 a merger took place of Jefferson Smurfit and Kappa Packaging, i.e. an inter-firm resource

dependence instrument. This of course influenced recovered-resource dependence of the group as a whole. Future research could focus on recovered-resource dependence management and strategic renewal of the new group. The analysis of the renewal actions showed that Kappa Packaging slight inclines towards a facilitated renewal journey and Jefferson Smurfit inclines slightly towards a directed renewal journey, see Figure 28. From this point of view it is interesting to investigate what the future renewal direction will be. The same is true with regard to resource dependence instruments employed. The analysis of resource dependence instruments illustrates that Kappa mainly uses intra-firm resource dependence instruments and Smurfit mainly inter-firm resource dependence instruments, see Table 77. Future research could investigate the impact of the merger on the resource dependence strategy.

MANAGERIAL RECOMMENDATIONS

In the context of strategic renewal, due to the transition from a traditional towards a recovered-resource dependent industry, recovered-resource dependence management becomes important besides resource dependence management. The firm has to renew and this renewal journey must be managed. In this renewal journey attention must be paid to different issues. Figure 11 shows that strategic renewal is influenced by external and internal factors, or the external and internal context of the organisation.

The first central theme of resource dependence theory (Pfeffer and Salancik, 1978) is that in order to understand the behaviour of a firm, one must understand the context of the firm. The transition from a traditional towards a recovered-resource dependent industry influences the determinants of dependence, i.e. the importance of a resource exchange for the firm, the discretion over resource allocation and use, and the concentration of resource control, see Table 31. Whereas in a traditional industry virgin or traditional resources are important, in recovered-resource dependent industries recovered resources become important. Discretion over resource allocation and use (possession, access to resources ability to control the use of a resource etc.) will change as well. In other words, the context has changed. Attention must be paid to the change in external factors constraining the firm, e.g. legislation, recycling characteristics, markets for virgin and recovered resources, and innovation. In recovered-resource dependent industries the number of actors involved is likely to be higher, which asks for an active resource dependence management at different levels of the organisation.

The internal factors influencing strategic renewal that managers should take into account are closely related to the second central theme of resource dependence theory (Pfeffer and Salancik, 1978): Firms can do something about their situations. Internal factors influencing recovered-resource dependence that have to be taken into account are

management at the different levels of the organisation, dynamic capabilities and the extent to which the organisation form is suitable for knowledge transfer. Incumbent firms' strategic renewal journey is determined by management activity regarding resource dependence management at different levels of the organisation. If an incumbent firm wants to grow and gain competitive advantage, it has to develop dynamic capabilities in order to deal with the changing environment and adapt a firm's organisation routines. Knowledge plays a major role in this. Knowledge about the characteristics of the new industry context and knowledge about how the firm should respond to these. The firm's organisation form must be chosen in such a way that knowledge transfer and absorption is enabled.

The above-mentioned internal and external factors and strategic renewal influence the resource dependence instruments employed to manage recovered-resource dependence. Pfeffer and Salancik (1978) describe a multitude of resource dependence instruments that management can use to reduce resource dependence, Table 17. In this study a distinction was made between intra-firm, inter-firm, and institutional field resource dependence instruments, see Table 18. Management must learn what resource dependence instruments to use in the context of recovered-resource dependent industries.

CONCLUSION

Resource dependence management is essential for incumbent firms to survive (Pfeffer and Salancik, 1978). In the last decades firms have become ever more obliged to behave sustainable and to manage the return of end-of-life products. For firms operating in so called "recovered-resource dependent industries", i.e. industries that to a large extent depend on end-of-life-products, resource dependence management is more complex than in traditional industries because the return of these products has to be organised and managed as well, and more actors are involved. This study seeks to extend research on resource dependence theory in the context of recovered-resource dependent industries and investigates the following research question: **"**In the context of the transition from a traditional towards a recovered-resource dependent industry, which internal and external factors influence incumbent firms' strategic renewal and the use of resource dependence instruments and what are the implications for recovered-resource dependence management and competitive advantage?"

To address the research question, five theoretical lenses are applied and a conceptual managerial framework is developed incorporating internal and external factors influencing strategic renewal and recovered-resource dependence management. Furthermore, a multi-dimensions approach is followed with attention for the context, content, and process dimension of Strategy. The *context* dimension pays attention to the

external and internal context of the firm. The *content* dimension focuses among others on the resource dependence instruments that can be employed for recovered-resource dependence management. The *process* dimension gives insight in the renewal journeys that incumbent firms can follow.

A multi-level research design encompassing eight research settings (Table 6) is followed to illustrate the conceptual framework and propositions at different levels of analysis: cross-industry (Paper and Board, Aluminium, and Plastic), industry (Paper and Board industry), cross-firm (Kappa Packaging, Jefferson Smurfit, SCA, Norske Skog, Stora Enso, and UPM-Kymmene), and (intra-)firm level (Kappa Packaging). At industry level this study attempts to illustrate the influence of external factors. At firm level it attempts to illustrate in particular internal factors influencing recovered-resource dependence management.

The results highlight that the external factors distinguished in this study (e.g. legislation, regional scope, resource recycling characteristics) indeed matter and that the European Paper and Board industry belongs to the best performing industries with regard to recycling rate. With regard to the internal factors influencing recovered-resource dependence, the evidence suggests that managers of incumbent firms in recovered – resource dependent industries should anticipate on the changing business environment by taking proper strategic renewal actions. By doing so, management can influence a firm's strategic renewal journey and recovered-resource dependence and contribute to sustainable competitive advantage.

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NEDERLANDSE SAMENVATTING (DUTCH SUMMARY)

Deze studie heeft een bijdrage geleverd aan resource dependence management in "recovered-resource dependent firms", dat wil zeggen resource dependence management van ondernemingen die door toedoen van regelgeving en milieu issues in toenemende mate afhankelijk worden van hun eigen eindproducten als grondstof. Voornoemd verschijnsel is in deze studie onderzocht vanuit een resource dependence perspectief en wel in de context van strategische vernieuwing. Resource dependence management in dit type industrie is complexer dan in traditionele industrieën omdat er een een additioneel aspect een rol speelt, namelijk het terug krijgen van de gebruikte eindproducten in het productieproces. Door deze kringloop zijn er bovendien meer partijen betrokken dan bij conventionele industrieën. In deze studie is de volgende probleemstelling onderzocht: *In de context van de overgang van een traditionele naar een recovered-resource dependent industry: welke interne en externe factoren beïnvloeden de strategische vernieuwing en het gebruik van resource dependence instrumenten van bestaande ondernemingen en welke gevolgen heeft dit voor resource dependence management en competitatief voordeel?* Om een anwoord te vinden op deze probleemstelling is een aanpak gevolgd met meerdere dimensies van strategie, meerdere theoretische lenzen, meerdere levels, en meerdere onderzoeksmethoden. De nadruk lag hierbij op het uitbreiden van een bestaande theorie en toepassing in een nieuwe research context. Het doel van dit onderzoek was niet om hypotheses te testen. De proposities die in deze studie zijn ontwikkeld, zijn in het empirisch onderzoek geïllustreerd.

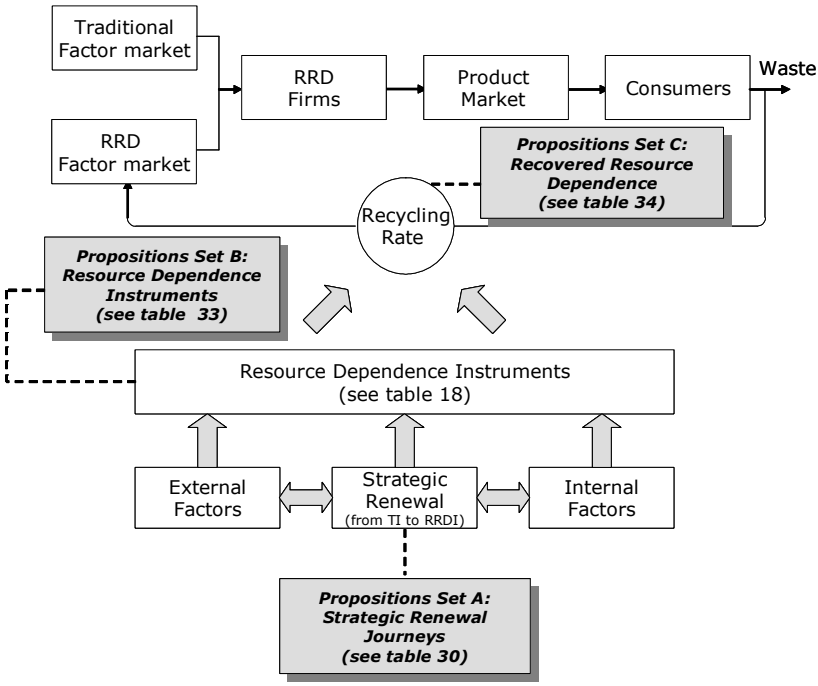
Onderzoeksaanpak en bevindingen

Om het onderzoek te structureren zijn in navolging van Volberda et al. (2001a) drie strategie dimensies gebruikt: "context", "content" en "process". De "context" dimensie geeft inzicht in de wijze waarop de externe context de resource dependence van ondernemingen beïnvloedt en wordt vertegenwoordigd door Institutionele theorie (DiMaggio & Powell 1983; Scott, 2001; Greenwood & Hinings, 1996) en Resource Dependence theory (Pfeffer & Salancik, 1978). De "content" dimensie geeft inzicht in instrumenten die ondernemingen kunnen gebruiken om hun resource dependence te verminderen (Pfeffer & Salancik, 1978) en in de interne factoren die het gebruik van resource dependence instrumenten beïnvloeden. Theoretische lenzen die geassocieerd worden met interne factoren zijn Resource-Based view of the Firm (Penrose, 1959), Dynamic Capabilities theory (Teece et al., 1997; Eisenhardt & Martin, 2000; Dosi et al., 2002) en Absorptive Capacity literatuur (Cohen & Levinthal, 1989; 1990; Van den Bosch et al., 1999; Jansen et al., 2005). De "process" dimensie geeft inzicht in het strategische vernieuwingsproces als gevolg van de overgang van een conventionele naar een recovered-

resource dependent industry. Hieraan wordt bijgedragen door de strategische vernieuwings-literatuur (Volberda et al. 2001a; 2001b), maar ook Dynamic Capabilities theory (Teece et al., 1997; Eisenhardt & Martin, 2000; Dosi et al., 2002) en Absorptive Capacity literatuur (Cohen & Levinthal, 1989; 1990; Van den Bosch et al, 1999; Jansen et al., 2005) spelen hierbij een rol.

In hoofdstuk 3 is een conceptueel model geconstrueerd waarin externe en interne factoren onderscheiden worden die het strategische vernieuwingstraject beïnvloeden als gevolg van de overgang van een traditionele naar een recovered-resource dependent industry, zie Figure 39. Ook zijn er proposities ontwikkeld door de vijf voornoemde theoretische lenzen toe te passen op drie relevante constructen: strategische vernieuwing, resource dependence instrumenten en recovered-resource dependence, zie Table 27.

Figure 39 Conceptueel Model en drie sets proposities



Theorieën die geassocieerd worden met interne factoren zijn: Resource dependence theory (Pfeffer & Salancik, 1978), Resource-based view of the firm (Penrose, 1959); Dynamic capabilities theory (Teece et al., 1997; Eisenhardt & Martin, 2000; Dosi et al., 2002) en Absorptive capacity literatuur (Cohen & Levinthal, 1989; 1990; Van den Bosch et al., 1999; Jansen et al., 2005). Om inzicht te verschaffen in externe factoren is

teruggegrepen op Institutionele theorie (DiMaggio & Powell, 1983; Scott, 2001; Greenwood & Hinings, 1996) en resource dependence theory (Pfeffer & Salancik, 1978).

Verder bevat het model resource dependence instrumenten die gebruikt kunnen worden om de recovered-resource dependence van de onderneming te managen. Het gebruik van deze resource dependence instrumenten zal worden beïnvloed door het samenspel van externe factoren, interne factoren en strategische vernieuwing. Het gebruik van verschillende resource dependence instrumenten tenslotte, bepaalt de recovered-resource dependence van een onderneming, in het model vertegenwoordigd door de recycling rate.

In deze studie wordt een onderzoeksaanpak gevolgd met meerdere analyseniveaus. Het empirische deel omvat *acht* onderzoekssettings (zie Table 36). Op *cross-industry level* (onderzoekssetting 1) wordt de invloed van externe factoren op recovered-resource dependent industries onderzocht waarbij een vergelijking gemaakt wordt tussen de (1) papier en karton, (2) aluminium en (3) plastic industrie (hoofdstuk 5). Uit analyse blijkt dat de externe factoren die in hoofdstuk 2 werden besproken (t.w. resource recycling eigenschappen, markten voor conventionele en recovered resources, beschikbaarheids-verschillen en regelgeving) van invloed zijn. Een vergelijking van de recycling rate van de drie industrieën laat zien dat de papier en karton industrie met 53% het hoogste scoort, zie Table 54. Het blijkt dat de eindmarkten waarin de industrieën vertegenwoordigd zijn de tijd dat eindproducten in gebruik zijn beïnvloeden. Naarmate producten langer in gebruik zijn, duurt het langer voordat deze gerecycled kunnen worden. Zie Table 55. Verschillen in resource recycling eigenschappen lijken de performance van een industrie ook te beïnvloeden. Ten slotte heeft de institutionele omgeving invloed op de prestaties van industrieën. In de regelgeving gelden voor industrieën verschillende recycling eisen waar aan moet worden voldaan, zie Table 57).

Op *industry level* (hoofdstuk 6) wordt de best presterende industrie (papier en karton) qua recycling rate nader onder de loep genomen. Net als in het voorgaande hoofdstuk ligt de klemtoon op analyse van externe factoren die recovered-resource dependence management beïnvloeden. In onderzoekssetting 2 wordt de recycling performance van drie regio's (Noord Amerika, Azië en Verre Oosten, en West Europa) vergeleken op drie momenten in de tijd. Daaruit blijkt dat West Europa het best presteert. Op grond hiervan wordt de Europese papier en karton industrie longitudinaal onderzocht (onderzoekssetting 3). Hieruit blijkt dat regelgeving de beschikbaarheid en prijzen van oud (recovered) papier in hoge mate heeft beïnvloed. Een nadere analyse van de papier en karton eindsectoren laat zien dat de industrie niet homogeen is. De vierde onderzoekssetting laat zien dat er grote verschillen in recovered-resource dependence bestaan tussen de grafische en de packaging sector. De packaging sector is het meest afhankelijk van recovered resources, zie Table 64. Dit houdt in dat in deze sector recovered-resource

dependence management het meest belangrijk is. Een vergelijking op landelijk niveau (onderzoekssetting 5) laat zien dat de fluctuaties in de prijzen voor oud papier per regio sterk verschillen, zie Table 66. Dit suggereert dat in landen waar de prijzen voor oud papier stabieler zijn, recovered-resource dependence management minder moeizaam zal zijn dat in landen waar de prijzen erg bewegen. Pfeffer & Salancik (1978) noemen het gebruik van voorraden als een middel om prijsfluctuaties te verminderen, zie Figure 25. Van zes Europese landen zijn in deze studie de voorraden (Table 67) vergeleken met de prijsfluctuaties (Table 64), echter er kon geen correlatie gevonden worden, hetgeen impliceert dat er nog meer factoren een rol spelen.

At *cross-firm level* (chapter 7, onderzoekssetting 6) worden de strategische vernieuwingsacties en gebruikte resource dependence instrumenten van zes ondernemingen in de papier en karton industrie vergeleken gedurende de periode 1998 tot en met 2003. De zes ondernemingen werden geselecteerd uit de twee grootste papier en karton sectoren: grafisch en packaging (vergelijk ook onderzoekssetting 4). Jefferson Smurfit en SCA zijn hierbij de vertegenwoordigers van de packaging sector. Norske Skog, UPM-Kymmene en StoraEnso vertegenwoordigen de grafische sector. In onderzoekssetting 4 bleek dat de packaging sector het meest afhankelijk is van oud papier, zie Table 71. Hier blijkt dat deze ondernemingen ook het meest actief zijn met betrekking tot recovered-resource dependence management. In de packaging sector was het hoogste percentage vernieuwingsacties gerelateerd aan resource dependence management acties. SCA is het meest actief gevolgd door Kappa Packaging en Jefferson Smurfit op de derde plaats zie Table 78. Als gekeken wordt naar de variatie in het gebruik van resource dependence instrumenten dan blijkt deze bij Kappa Packaging het grootst.

Op *firm level* (chapter 8) is Kappa Packaging nader onderzocht (onderzoekssetting 7). De resultaten van onderzoekssetting 6 vormden aanleiding voor een nadere analyse van Kappa Packaging. Oud papier is één van de belangrijkste grondstoffen voor Kappa. Dat blijkt ook uit het recycling percentage van 90%, zie Figure 33. Het blijkt dat recovered-resource dependence management een steeds prominentere plaats heeft gekregen binnen de organisatie. In de jaren 70 en 80 ligt de verantwoordelijkheid voor oud papier inkoop laag in de organisatie. In de jaren 90 begint midden management hier meer betrokken bij te raken. Ook de resource dependence instrumenten worden meer divers. Naast fusies en overnames, worden nu ook lange termijn contracten gesloten met leveranciers. Na 2001 raakt het top management betrokken bij de oud papier inkoop. Hetgeen aanduidt dat recovered-resource dependence management steeds hoger op de agenda van top management komt. Dit blijkt ook uit de veranderende organisatievorm, onderzoekssetting 8. De rol van Kappa Paper Recycling verandert van profit center naar coördinerend orgaan (vanaf 2003) in de regio's waar Kappa Packaging het meest aanwezig is (Benelux en Duitsland). Oud papier inkoop verandert van een gedecentraliseerde activiteit naar een

gecentraliseerde business. Verder worden er intra-firm resource dependence instrumenten gebruikt zoals voorraad management en oud papier monitoring, zie Figure 37.

Bijdragen

Dit onderzoek heeft een bijdrage geleverd aan resource dependence management van recovered-resource dependent ondernemingen op vier gebieden, zie Table 98. Op elk van de vier gebieden zal nu nader worden ingegaan.

Table 104 Bijdrage aan resource dependence management op vier gebieden

1. Uitbreiding van resource dependence theory en toepassing in een nieuwe onderzoekscontext
2. Ontwikkeling van een conceptual model en proposities
3. Uitbreiding van empirische data
4. Uitbreiding van resource dependence management in recovered-resource dependent industries

Uitbreiding van resource dependence theory en toepassing in een nieuwe onderzoekscontext

Resource dependence theory is in dit onderzoek uitgebreid met meerdere theoretische lenzen, meerdere analyse niveaus en toegepast in een relevante industrie context; recovered-resource dependent industries, zie Table 105. Resource dependence is in deze industrieën complexer dan in conventionele industrieën omdat de recycling loop ook gemanaged moet worden, zie Figure 2. In deze studie is het resource dependence issue uitgebreid naar een *recovered*-resource dependence issue.

Verder zijn in deze studie vijf theoretische perspectieven toegepast welke een bijdrage leveren aan twee van de drie hoofdthema's van de resource dependence theory (Pfeffer & Salancik, 1978). Het *eerste* thema, de noodzaak om de omgeving van een onderneming te begrijpen (Table 15) wordt geadresseerd door Resource dependence theory (Pfeffer & Salancik, 1978) en Institutionele theorie (DiMaggio & Powell, 1983; Scott, 2001; Greenwood & Hinings, 1996). Aan het *tweede* thema, ondernemingen zijn in staat om hun afhankelijkheid van hun omgeving te beïnvloeden, (Table 15) wordt een bijdrage geleverd door Resource dependence theory (Pfeffer & Salancik, 1978), resource-based view of the firm (Penrose, 1959), dynamic capabilities theory (Teece et al., 1997; Eisenhardt & Martin, 2000; Dosi et al., 2002) en absorptive capacity literatuur (Cohen & Levinthal, 1989; 1990; Van den Bosch et al., 1999; Jansen et al., 2005). Deze aanpak omvat tevens meerdere analyse niveaus: Thema 1 concentreert zich voornamelijk op industry level en thema 2 op firm-level.

Pfeffer & Salancik (1978) maken onderscheid tussen drie determinanten van dependence: (1) De mate van belang van een resource uitwisseling voor een organisatie, (2) de zeggenschap over het gebruik en aanwenden van resources, en (3) concentratie van de zeggenschap over resources (Table 16). Daar dit onderzoek een multi-level aanpak volgt, zijn de door Pfeffer & Salancik (1978) aangedragen resource dependence instrumenten gecategoriseerd op basis van analyse niveaus waarbij een onderscheid gemaakt wordt tussen intra-firm, inter-firm en institutionele context georiënteerde resource dependence instrumenten, zie Table 18.

Tenslotte is resource dependence theory (Pfeffer & Salancik, 1978) gerelateerd aan strategische vernieuwing literatuur (Volberda et al., 2001a; 2001b) door het koppelen van resource dependence instrumenten aan verschillende management lagen die hierbij betrokken kunnen zijn. De mate van betrokkenheid van de verschillende management lagen bij strategische vernieuwingsacties leidt tenslotte tot verschillende strategische vernieuwingstrajecten die gevolgd kunnen worden, zie Table 29. Het blijkt dat inter-firm resource dependence instrumenten het meest gerelateerd zijn aan top management betrokkenheid. Bij intra-firm resource dependence instrumenten kunnen alle management lagen betrokken zijn.

Table 105 Bijdrage aan de uitbreiding van resource dependence theorie en toepassing in een nieuwe onderzoekscontext

- Toepassen van resource dependence management in een relevante industrie context (recovered-resource dependent industry)
- Introductie van de constructie recovered-resource dependent firm en -industry
- Multi-lens benadering
- Toepassing van een multi-level onderzoeksaanpak en groeperen van resource dependence instrumenten op basis van meerdere analyse niveaus
- Relatie met strategische vernieuwing literatuur

Ontwikkeling van een conceptueel model en proposities

Dit onderzoek heeft een bijdrage geleverd in de vorm van de ontwikkeling van een conceptueel model en proposities, zie Table 106. In hoofdstuk 3 is een conceptueel model ontwikkeld (Figure 11) met betrekking tot (recovered-) resource dependence management in de context van strategische vernieuwing als gevolg van de overgang van een traditionele naar een recovered-resource dependent industry. Het model maakt onderscheid tussen externe en interne factoren die de strategische vernieuwing beïnvloeden. Theoretische lenzen die geassocieerd worden met *interne* factoren zijn: Resource dependence theory (Pfeffer & Salancik, 1978), resource-based view of the firm (Penrose, 1959), dynamic capabilities theory (Teece et al., 1997; Eisenhardt & Martin, 2000; Dosi et al., 2002) en

absorptive capacity literatuur (Cohen & Levinthal, 1989; 1990; Van den Bosch et al., 1999; Jansen et al., 2005). De theoretische lenzen die geassocieerd worden met *externe* factoren zijn: Resource dependence theory (Pfeffer & Salancik, 1978) en Institutionele theorie (DiMaggio & Powell, 1983; Scott, 2001; Greenwood & Hinings, 1996) en regelgeving in het bijzonder. Verder omvat het model drie voor de onderzoeksvraag relevante constructen – strategische vernieuwing, resource dependence instrumenten en recovered-resource dependence – waarop de vijf eerder genoemde theoretische lenzen geprojecteerd worden, zie Figure 38. De combinatie van de drie constructen en de vijf theoretische lenzen wordt gebruikt voor het ontwikkelen van 3 sets proposities.

De eerste set proposities bestaat uit vijf theoretische lenzen die op strategische vernieuwing geprojecteerd zijn en doen aannames over de strategische vernieuwing-strajecten die bestaande ondernemingen kunnen volgen. De tweede set proposities doet uitspraken over de resource dependence instrumenten die ondernemingen kunnen gebruiken om hun resource dependence te verminderen. De laatste set proposities doet uitspraken over hoe bestaande ondernemingen hun *recovered-resource dependence* kunnen managen.

Table 106 Bijdrage aan de ontwikkeling van een conceptueel model en proposities

- Vijf theoretische lenzen zijn toegepast op drie constructen gerelateerd aan recovered-resource dependence management: (A) strategische vernieuwing, (B) resource dependence instrumenten, en (C) recovered-resource dependence
- Omvat externe factoren (regelgeving)
- Omvat interne factoren (management, dynamic capabilities, organisatievorm)
- Onderscheiden van resource dependence instrumenten (intra-firm, inter-firm and institutional field level)
- Ontwikkeling van drie sets proposities die betrekking hebben op de voornoemde constructen: (A) strategische vernieuwing, (B) resource dependence instrumenten, en (C) recovered-resource dependence

Uitbreiding van empirische data

Deze studie heeft empirische data met betrekking tot resource dependence management uitgebreid, zie Table 107. Resource dependence management is onderzocht in de context van recovered-resource dependent firms. Zoals eerder aangegeven wijkt resource dependence management in dit type industrie af van traditionele industrieën omdat ondernemingen bepaalde recycling percentages moeten halen. Dit leidt ertoe dat gebruikte producten weer terug gebracht moeten worden in het productieproces.

Op *cross-industry level* is onderzoek gedaan naar de mate waarin externe factoren, zoals onder andere regelgeving, de resource dependence van de industrie beïnvloeden. Er werden drie industrieën vergeleken: papier en karton, aluminium, en plastic. De recycling prestatie van deze industrieën is met elkaar vergeleken en hieruit blijkt dat de Europese papier en karton industrie de beste recycling prestatie heeft (zie Table 54). Verder is

geïllustreerd dat regelgeving recovered-resource dependent industries beïnvloedt (Table 57). Bovendien is de regelgeving gerelateerd aan de verschillende eindsectoren waarin de verschillende industrieën aanwezig zijn en hieruit bleek dat aan verschillende eindsectoren verschillende recycling eisen worden gesteld. Als naar de packaging sector gekeken wordt, (directive 1994/62/EC) blijkt de eis voor papier en karton het hoogste te liggen (60% in 2008) en het laagste voor de plastic industrie (22,5% in 2008), zie Table 57. In de automotive sector echter (directive 2000/53/EC), worden vergelijkbare eisen gesteld aan het recyclen van aluminium en plastic zie Table 57.

Op *industry level* zijn drie regio's met elkaar vergeleken: Noord Amerika, Azië en het Verre Oosten en West Europa, op drie verschillende momenten. Hieruit bleek dat West Europa de best presterende regio is met betrekking tot recycling percentage. Vervolgens heeft een longitudinale beschrijving van de Europese papier en karton industrie meer inzicht gegeven in de externe factoren die de industrie beïnvloeden. Hieruit blijkt dat de regelgeving een belangrijk rol heeft gespeeld in de ontwikkeling van deze industrie. Ook is inzicht verschaft in de prijsschommelingen van de oud papier industrie (zie Figure 23). Voorts blijkt dat de lokale verschillen in beschikbaarheid ertoe leiden dat sinds de jaren 90 er steeds grotere hoeveelheden oud papier naar China en het Verre Oosten geëxporteerd worden waardoor de beschikbaarheid in Europa afneemt. Een analyse van de eindsectoren in de papier en karton industrie laat zien dat de recovered-resource dependence per eindsector verschilt. Onderzoek laat zien dat de packaging sector het meest afhankelijk is van oud papier als grondstof, in de grafische sector is het gebruik van deze resource aanmerkelijk lager, zie Table 64. Op landen niveau tenslotte heeft deze studie een bijdrage geleverd aan data betreffende prijsschommelingen en voorraden als resource dependence instrument. Helaas kon de relatie tussen voorraden en prijsschommelingen kon niet worden geïllustreerd.

Op *cross-firm level* heeft deze studie strategische vernieuwingsacties en het gebruik van resource dependence instrumenten onderzocht van zes dominante spelers in de papier en karton industrie. Er zijn drie spelers in de packaging sector onderzocht (Kappa Packaging, Jefferson Smurfit en SCA) en drie in de grafische sector (Norske Skog, StoraEnso en UPM-Kymmene), in de periode 1998 tot en met 2003, zie Table 70. De resultaten suggereren dat de meeste ondernemingen een "emergent renewal journey" (Volberda et al., 2001a) gevolgd hebben, zie Figure 28. SCA, Jefferson Smurfit en Norske Skog maken met name gebruik van inter-firm resource dependence instrumenten. Kappa Packaging, StoraEnso en UPM-Kymmene maken voor een groot deel gebruik van intra-firm resource dependence instrumenten, zie Table 77. Verder heeft dit onderzoek inzicht opgeleverd in de ontwikkeling van de organisatievorm van de zes spelers.

Op *firm-level* is Kappa Packaging (een onderneming met ca. 16.000 werknemers en hoofdkantoor in Eindhoven tot 2005) nader onderzocht met aandacht voor de

eindsectoren waarin de onderneming actief is en mate waarin Kappa Packaging afhankelijk is van recovered resources, zie Figure 33. De longitudinale beschrijving geeft een overzicht van relevante strategische vernieuwingsacties in de periode 1970 tot 2004. Tevens is aandacht geschonken aan de resource dependence instrumenten die door de onderneming gebruikt zijn en de betrokkenheid van de verschillende management lagen. Hieruit blijkt dat door de tijd oud papier steeds belangrijker is geworden en meer aandacht heeft gekregen in hogere lagen van de organisatie. Verder heeft dit onderzoek bijgedragen aan inzicht in de ontwikkeling van de organisatievorm van Kappa Packaging. Het onderzoek laat zien dat de organisatievorm wordt aangepast om beter te kunnen presteren in de veranderende omgeving. Tevens blijkt dat de organisatie dynamic capabilities ontwikkelt om beter om te kunnen gaan met recovered-resource dependence.

Table 107 Bijdrage aan het uitbreiden van empirische data

- Industry level: ontwkkelen van data met betrekking tot externe factoren die RRDIs beïnvloeden
  - *Cross-industry level*: Vergelijking van externe factoren die papier en karton, aluminium, en plastic industrie beïnvloeden zoals, eindsectoren waarin de industrie aanwezig is en Europese regelgeving (onderzoekssetting 1)
  - *Industry level*: Vergelijking van de recycling performance van drie regios (onderzoekssetting 2), longitudinale beschrijving van externe die de European papier en karton industrie beïnvloeden (onderzoekssetting 3), Vergelijking van eindsectoren in de Europese papier en karton industrie (onderzoekssetting 4), Vergelijking van de performance van zes Europese landen (onderzoekssetting 5)
- Firm-level: ontwikkelen van data met betrekking tot strategische vernieuwing en resource dependence management
  - *Cross-firm level*: Vergelijking van de strategische vernieuwingsacties en het gebruik van resource dependence instrumenten van zes spelers Europese papier en karton industries en vergelijking van de organisatievorm op twee verschillende momenten (sonderzoekssetting 6)
  - *Firm level*: Longitudinale beschrijving van Kappa Packaging met aandacht voor strategische vernieuwingsacties, resource dependence instrumenten en de ontwikkeling van management betrokkenheid bij recovered-resource dependence management (onderzoekssetting 7). Ontwikkeling van de organisatievorm en de rol van Kappa Paper Recycling (onderzoekssetting 8)

Uitbreiding van resource dependence management in recovered-resource dependent industries

Tenslotte heeft dit onderzoek bijgedragen aan kennis over recovered-resource dependence management in recovered-resource dependent industries, zie Table 108. Het conceptuele model dat in deze studie ontwikkeld is, kan het management van bestaande ondernemingen helpen te bepalen waar rekening mee gehouden dient te worden in een recovered-resource dependent context. Het model omvat twee thema's. Allereerst dienen managers zich te realiseren in welke mate ze van hun omgeving afhankelijk zijn. Het tweede thema is dat het mogelijk is om de omgeving te beïnvloeden, zie Table 15. In hoofdstuk 2 zijn externe factoren aangedragen die inzicht geven in het eerste thema. Denk

hierbij bijvoorbeeld aan regelgeving, recycling eigenschappen van producten, technologische ontwikkelingen en eindsectoren waarin de onderneming actief is. Ook is aandacht besteed aan interne factoren die een rol spelen bij recovered-resource dependence management. Denk hierbij bijvoorbeeld aan management, dynamic capabilities, organisatievorm en het gebruik van resource dependence instrumenten.

Table 108 Bijdrage aan uitbreiden van kennis met betrekking tot resource dependence management in recovered-resource dependent industries

- Bij de recovery spelen management en organisatiefactoren eenwezenlijke rol
- Ontwikkeling van een conceptueel model
- De omgeving van de organisatie beinvloedt haar recovered-resource dependence: regelgeving, technologische ontwikkelingen, resource recycling eigenschappen, plaatselijke beschikbaarheid van resources, en eindsectoren waarin de onderneming actief is
- Binnenkant van de onderneming beïnvloedt recovered-resource dependence management:, dynamic capabilities, organisatievorm
- Management heeft de beschikking over verschillende resource dependence instrumenten welke toegepast kunnen worden op verschillende analyse niveaus
- Management kan het strategische vernieuwingstraject van een traditionele naar een recovered-resource dependent industry beïnvloeden

Beperkingen en vervolgonderzoek

Dit onderzoek heeft een bijdrage geleverd aan de beantwoording van de onderzoeksvraag, of meer algemeen geformuleerd, aan inzicht in resource dependence management van firms in de overgang van een traditionele naar een recovered-resource dependent industry. Er zijn echter beperkingen geweest waarop toekomstig onderzoek zich zou kunnen richten. De beperkingen waar nu op ingegaan zal worden, hebben betrekking op: Resource dependence theorie, conceptueel model, proposities, en uitbreiden van empirisch onderzoek.

Resource Dependence Theory

In hun boek ‘The External Control of Organizations’ behandelen Pfeffer & Salancik (1978) drie centrale thema’s: (1) Om het gedrag van een onderneming te kunnen begrijpen, moet men de context hiervan begrijpen; (2) Organisaties kunnen de afhankelijkheid van hun omgeving beïnvloeden; (3) Om het intra- en inter-organisationele gedrag te kunnen begrijpen moet men de rol van “power” begrijpen. De eerste twee thema’s zijn in dit onderzoek behandeld en bovendien uitgebreid met meerdere theoretische lenzen. Het derde thema is hier echter niet op ingegaan. Toekomstig onderzoek zou hieraan een bijdrage kunnen leveren.

Hoewel resource dependence theory is uitgebreid met meerdere theoretische lenzen, kunnen ook andere lenzen gekozen worden. De bijdrage van de tien scholen van

Mintzberg, behandeld in hoofdstuk 2, zou hierbij als basis kunnen dienen voor theorie selectie. Toekomstig onderzoek zou zich bijvoorbeeld kunnen richten op de "power" school, waarmee tevens een bijdrage wordt geleverd aan het derde centrale thema van Pfeffer & Salancik (1978). De cognitieve school biedt de mogelijkheid om de multi-level benadering verder uit te breiden. Cross-industry tot en met intra-firm level is in deze studie aandacht aan geschonken maar het cognitieve niveau is niet onderzocht.

Er is een aanzet gemaakt met de argumentatie welke resource dependence instrumenten gebruikt zullen worden afhankelijk van de omstandigheden waarin de onderneming zich bevindt, zie Table 33. Het onderzoek heeft laten zien dat resource dependence instrumenten de verschillende determinanten van dependence beïnvloeden. Vervolgonderzoek kan een bijdrage leveren aan welke resource dependence instrumenten gebruikt zouden kunnen worden afhankelijk van de situatie waarin de onderneming verkeert.

Deze studie heeft een bijdrage geleverd aan strategische vernieuwing literatuur door het gebruik van de verschillende resource dependence instrumenten ("intra-firm", "inter-firm", en "institutional field" level) te relateren aan de management lagen ("top management", "frontline and middle management") die betrokken kunnen zijn bij strategische vernieuwingsreizen, zie Table 29. Toekomstig onderzoek zou een bijdrage kunnen leveren aan meer inzicht in de relatie tussen resource dependence management, resource dependence instrumenten en strategische vernieuwing.

Resource dependence theorie is in deze studie toegepast in een specifieke industrie context, nl. recovered-resource dependent firms. Er is beargumenteerd dat niet alleen resource dependence management hier belangrijk is maar ook recovered-resource dependence management. Toekomstig onderzoek zou zich kunnen concentreren op een verdere bijdrage aan recovered-resource dependence management.

Conceptueel model en proposities

Het conceptuele model bevat vijf theorieën geassocieerd met interne en externe factoren die resource dependence management beïnvloeden en constructen die relevant zijn voor recovered-resource dependence management: strategische vernieuwing, resource dependence instrumenten en recovered-resource dependence management. Het model zou uitgebreid kunnen worden met het construct "power". Dit is het derde centrale thema dat Pfeffer & Salancik (1978) bespreken en resource dependence management beïnvloedt, zie Table 15. Zoals in hoofdstuk 2 besproken werd, is het belangrijk om het belang van "power" te begrijpen om intra- en inter-organisationeel gedrag te kunnen begrijpen. Aan de invloed van "power" op managementbeslissingen is in dit onderzoek weinig aandacht geschonken.

Ook de externe en interne factoren en hiermee geassocieerde theorieën kunnen verder worden uitgebreid. In de ontwikkeling van proposities is ervoor gekozen om alleen naar theorie-gedreven factoren te kijken. Echter, in hoofdstuk 2 zijn eveneens externe factoren besproken die niet op theorie gebaseerd zijn. Vervolgonderzoek zou zich kunnen richten op het uitbreiden van het framework en proposities met deze facoren. Daarbij zou ook *corporate sustainability* (Hart 1995; 1997) kunnen worden betrokken.

In het theoretische deel van dit onderzoek zijn proposities ontwikkeld die betrekking hebben op drie constructen: strategische vernieuwingstrajecten, resource dependence instrumenten en recovered-resource dependence management. Het theoretisch onderzoek zou op deze gebieden verder kunnen worden uitgebreid. Tevens kunnen de proposities geïlustreerd worden in andere relevante industrie contexten.

Uitbreiding van empirisch onderzoek

Onderzoek naar hoe externe en interne factoren de recovered-resource dependence van ondernemingen beïnvloeden kan verder worden uitgebreid. In dit onderzoek is getracht te illustreren dat externe en interne factoren er toe doen, maar de proposities zijn niet getest. Een diepgaandere analyse van hoe externe factoren recovered-resource dependent firms en industries beïnvloeden zou aan kunnen tonen in welke mate de invloed in verschillende industrieën vergelijkbaar is. Een vergelijkbare aanpak zou gevolgd kunnen worden bij een analyse van hoe interne factoren recovered-resource dependence management beïnvloeden.

In het empirische deel van dit onderzoek zijn drie recovered-resource dependent industries vergeleken. Het onderzoeken van meer industrieën, zoals bijvoorbeeld zink of olie, kan meer inzicht geven in de overeenkomsten en de verschillen tussen recovered-resource dependent industries, en meer inzicht verschaffen in recovered-resource dependence management en strategische vernieuwing. Aluminium en zink zijn beide producten die gerecycled kunnen worden zonder kwaliteitverlies. Een vergelijking van recovered-resource dependence management in deze industrieën kan relevante inzichten opleveren. De olie industrie is een voorbeeld waar voorraden worden gebruikt als resource dependence instrument. Regelgeving verplicht EU Lidstaten om tenminste een olievoorraad van 90 dagen aan te houden. Ook de energiesector zou onderzocht kunnen worden. Het bijzondere van deze industrie is het eindproduct (elektriciteit) niet hergebruikt kan worden maar het bijproduct warmte wel. Meer inzicht in resource dependence instrumenten die in andere industrieën dan de papier en karton industrie worden toegepast zou waardevolle inzichten kunne opleveren.

Het onderzoek naar recovered-resource dependence management in de geselecteerde industrieën kan verder worden uitgebreid. De cross-firm analyse heeft inzicht gegeven in de strategische vernieuwingsacties en gebruikte resource dependence instrumenten van zes grote spelers in de papier en karton industrie, maar deze spelers

vertegenwoordigen slechts een deel van de totale industrie, zie Table 70. De papier en karton industrie bestaat uit vier hoofdsectoren, elk met hun eigen recovered-resource dependence. Een analyse van meer ondernemingen in dezelfde industrie is waardevol om generieke uitspraken te kunnen doen over de papier en karton industrie en de verschillende sectoren hierbinnen.

De invloed van strategische vernieuwing op resource dependence management verdient nader onderzoek. Een verdere analyse van de strategische vernieuwingstrajecten die gevestigde ondernemingen volgen in de overgang van een traditionele naar een recovered-resource dependent industry zou waardevolle inzichten kunnen opleveren in dit onderzoeksfenomeen. Meer onderzoek naar de interne processen, de aanpassing van de organisatievorm en de betrokkenheid van verschillende management lagen bij recovered-resource dependence management zou een bijdrage kunnen leveren aan een beter begrip van resource dependence management in recovered-resource dependent industries.

Tenslotte is in dit onderzoek Kappa Packaging onderzocht tot 2004. Aan het einde van 2005 heeft er een *fusie* plaatsgevonden tussen Jefferson Smurfit en Kappa Packaging (inter-firm resource dependence instrument). Deze fusie heeft gevolgen voor de recovered-resource dependence van de onderneming. Toekomstig onderzoek zou zich kunnen richten op recovered-resource dependence en strategische vernieuwing van de nieuwe groep. De analyse van de vernieuwingsacties liet zien dat Kappa Packaging een lichte neiging heeft naar een “facilitated renewal journey” en Jefferson Smurfit een lichte neiging naar een “directed renewal journey”, zie Figure 28. Vanuit dit gezichtspunt is het interessant te onderzoeken wat de toekomstige richting zal zijn. Ook op het punt van resource dependence instrumenten toonden beide ondernemingen een verschillend beeld. De analyse van gebruikte resource dependence instrumenten laat zien dat Kappa in hoge mate gebruik maakt van intra-firm resource dependence instrumenten en Smurfit past met name inter-firm resource dependence instrumenten toe, zie Table 77. Toekomstig onderzoek zou zich kunnen richten op de invloed van de fusie op de resource dependence strategie.

Aanbevelingen aan management

In de context van strategische vernieuwing als gevolg van de overgang van een traditionele naar een recovered-resource dependent industry wordt recovered-resource dependence management belangrijk naast resource dependence management. De onderneming zal moeten vernieuwen en tijdens dit vernieuwingstraject zal het management aandacht moeten besteden aan verschillende facetten. Figure 11 laat zien dat strategische vernieuwing beïnvloed wordt door externe en interne factoren, of anders geformuleerd, de externe en interne context van de onderneming.

Het eerste centrale thema van resource dependence theory (Pfeffer & Salancik, 1978) is dat om het gedrag van een onderneming te kunnen begrijpen men ook de context van deze onderneming moet begrijpen. De overgang van een traditionele naar een recovered-resource dependent firm beïnvloedt de determinanten van dependence: (1) de mate van belang van een resource uitwisseling voor een organisatie, (2) de zeggenschap over het gebruik en aanwenden van resources en (3) concentratie van de zeggenschap over resources (zie Table 31). De mate van belang van een resource uitwisseling verandert. Waar in een traditionele industrie traditionele resources belangrijk zijn, zijn in een recovered-resource dependent industry recovered resources belangrijk. De zeggenschap over het gebruik en aanwenden van resources (eigendom, toegang tot resources, etc.) zal eveneens veranderen. Met andere woorden, de context is veranderd. Management zal aandacht moeten besteden aan de veranderende externe factoren zoals bijvoorbeeld regelgeving, resource recycling eigenschappen, markten voor traditionele en recovered resources en innovatie. In recovered-resource dependent industries zal het aantal betrokken actoren groter zijn, hetgeen vraagt om een actief (recovered-) resource dependence management op verschillende niveaus in de onderneming.

De interne factoren zijn nauw gerelateerd aan het tweede centrale thema van resource dependence theory (Pfeffer & Salancik, 1978): Ondernemingen kunnen hun resource dependence beïnvloeden. Interne factoren die een rol spelen zijn: management op verschillende niveaus in de onderneming, dynamic capabilities en de mate waarin de organisatievorm geschikt is voor kennisoverdacht. In dit onderzoek is beargumenteerd dat strategische vernieuwing wordt beïnvloed door de mate waarin verschillende management lagen actief zijn met betrekking tot veranderingen in de omgeving. Als een onderneming wil groeien en “competitive” wil blijven, moet zij “dynamic capabilities” ontwikkelen om met deze veranderende omgeving om te kunnen gaan en dienen organisatorische routines te worden herbezien. Kennisontwikkeling speelt hierbij een belangrijke rol. Kennis met betrekking tot de eigenschappen van de nieuwe industrie en kennis over hoe de onderneming hierop zou moeten reageren. De organisatievorm van de onderneming moet zodanig worden gekozen dat kennisoverdracht en kennis absorptie gefaciliteerd wordt.

De bovengenoemde interne externe factoren alsmede strategische vernieuwing bïnvloeden het gebruik van resource dependence instrumenten. Pfeffer & Salancik (1978) geven een overzicht van resource dependence instrumenten die het management kan gebruiken om de resource dependence van een onderneming te managen, zie Table 17. In dit onderzoek is een onderscheid gemaakt tussen “intra-firm”, “inter-firm” en “institutional field” resource dependence instrumenten, zie Table 18. Het management van een onderneming moet leren welke resource dependence instrumenten toe te passen in de context van recovered-resource dependent industries.

Conclusie

Resource dependence management is essentieel voor ondernemingen om te overleven (Pfeffer & Salancik, 1978). De laatste decennia worden organisaties steeds meer aangespoord om zich maatschappelijk verantwoord te gedragen en om gebruikte producten te recyclen. Voor ondernemingen in "recovered-resource dependent industries", dat wil zeggen, industrieën die in hoge mate afhankelijk zijn van hun eigen eindproducten als resource, is resource dependence management complexer omdat de retour van deze eindproducten ook georganiseerd en gemanaged dient te worden en bovendien zijn er meer actoren betrokken.

Dit onderzoek beoogt om resource dependence theory (Pfeffer & Salancik, 1978) uit te breiden in de context van recovered-resource afhankelijke industrieën en wordt geleid door de volgende onderzoeksvraag: "In de context van de overgang van een traditionele naar een recovered-resource dependent industry: welke interne en externe factoren beïnvloeden de strategische vernieuwing en het gebruik van resource dependence instrumenten van bestaande ondernemingen en welke gevolgen heeft dit voor resource dependence management en competitatief voordeel?"

Om een antwoord op deze vraag te vinden zijn vijf theoretische lenzen toegepast en is een conceptueel model ontwikkeld met daarin aandacht voor externe en interne factoren die strategische vernieuwing en recovered-resource dependence management beïnvloeden. Verder is een aanpak gevolgd die meerdere strategie dimensies belicht: "context", "content" en "process". De context dimensie belicht de externe en interne context van de onderneming. De content dimensie richt zich onder andere op de resource-dependence instrumenten die gebruikt kunnen worden voor recovered-resource dependence management. De process dimensie tenslotte verschaft inzicht in de strategische vernieuwingstrajecten die gevolgd kunnen worden.

Met betrekking tot het empirisch onderzoek is een aanpak gevolgd met acht onderzoekssettings (zie Table 6) om het conceptuele model en de proposities te illustreren op verschillende analyse niveaus: cross-industry (Papier en Karton, Aluminium en Plastic), industry (Papier en Karton industrie), cross-firm (Kappa Packaging, Jefferson Smurfit, SCA, Norske Skog, Stora Enso en UPM-Kymmene) en (intra-)firm level (Kappa Packaging). Op industry level is getracht om de invloed van externe factoren te illustreren. Op firm level is met name getracht om inzicht te krijgen in de wijze waarop interne factoren recovered-resource dependence beïnvloeden.

De resultaten laten zien dat de externe factoren die onderscheiden zijn in dit onderzoek (zoals onder andere regelgeving, regionale verschillen in beschikbaarheid van resources, resource recycling eigenschappen) er inderdaad toe doen en dat de Europese Papier en Karton industrie tot de best presterende industrieëën behoort als naar de recycling rate gekeken wordt. Met betrekking tot interne factoren die recovered-resource

afhankelijkheid beïnvloeden, laten de resultaten zien dat managers van bestaande recovered-resource dependent firms moeten anticiperen op veranderingen in de omgeving door middel van de adequate strategische vernieuwingsacties en resource dependence instrumenten. Op deze manier kan het management het strategische vernieuwingstraject en de recovered-resource dependence van de onderneming beïnvloeden en daarmee bijdragen aan een duurzame concurrentiepositie.

CURRICULUM VITAE

Erik P. van Leeuwen (Gouda, Netherlands, January 5, 1974) began his study Mechanical Engineering at the Polytechnics Department of the HTS Dordrecht and specialised in Energy Management. After receiving his Bachelor degree in 1997, he wanted to enlarge his management knowledge by taking a MSc in Business Administration at the RSM Erasmus University with a major in Strategic Management. The topic of his Master thesis was: Knowledge Absorption in Strategic Alliances. For this purpose he investigated the Joint Venture between ENECO and Shell Energy from a learning perspective. He received his Master's degree in 2000 and started a Management Traineeship at Kappa Packaging, (Smurfit Kappa nowadays) one of Europe's leading producers of Paper & Board Packaging. In 2003, after his traineeship, Erik van Leeuwen accepted a job as Recovered Paper Researcher at Kappa Paper Recycling, department of Market Intelligence, and simultaneously started his PhD research at the Department of Strategic Management and Business Environment of the RSM Erasmus University. At present he is associated with the department and involved in supervising Master theses. Since February 2007, Erik van Leeuwen works as a Senior Business Analyst at ENECO Energy, department ENECO Milieu.

APPENDICES

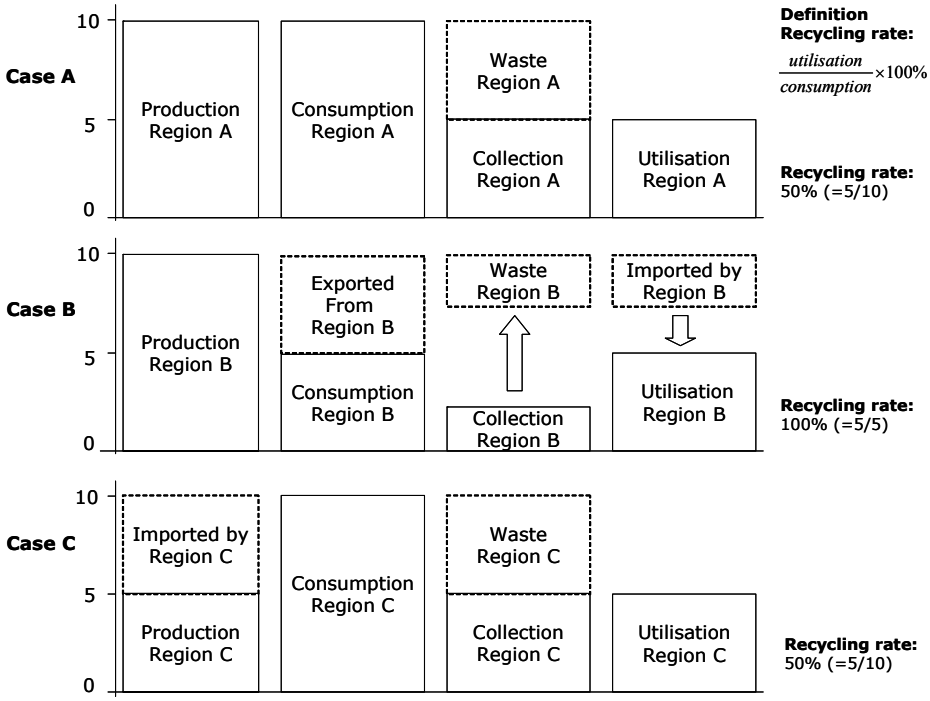
APPENDIX 1: LIMITATIONS OF THE RECYCLING RATE AS A PERFORMANCE INDICATOR AND RELATIONSHIP BETWEEN UTILISATION RATE, RECYCLING RATE, AND THE COLLECTION RATE

In this research the *recycling rate* is used as a performance indicator for firms operating in RRDI's. This indicator has limitations. Despite these limitations it is used here anyway, for it is an accepted indicatory in the industry and most of the regulations set targets for the *recycling rate*. With use of three cases depicted in Figure 40, it will be illustrated that import and export of products and recovered resources influence the availability and cause that the recycling rate is an imprecise indicator of the industry's performance in a particular country or region. The following assumptions were made. Production stands for the production of end products. With consumption is meant the consumption of the end products. Collection means the collection of discarded end products. Utilisation means the recovered resources used for production. In all three cases half of the consumed products are collected and the utilisation of recovered resources for production is the same.

In Case A, the production of end products meets the consumption of these products. Half of the discarded end products are collected and utilised which results in a recycling rate of 50% (=5/10). This resembles industries in regions where the consumption and production are the same or the net trade (difference between import and export) is zero. In Case B, the consumption is half as high as the production of the end products, the surplus is exported from region B. The exported products will not be collected in the region where they were produced. If the utilisation of recovered resources is the same as in case A, the difference between collection and utilisation needs to be imported, which results in a recycling rate of 100% (=5/5). In Case C, the production is half as high as the consumption of end products. The deficit of products has to be imported to supply the demand. If half of the consumed end products are collected and reused again, the recycling rate becomes 50% (=5/10).

This example shows that although in all cases the efficiency of collection of recovered resources is the same, i.e. half the consumption, the recycling rate differs due to trade. This means that in regions that export or import end products or recovered resources to a large extent, the recycling rate as performance indicator needs to be considered with care.

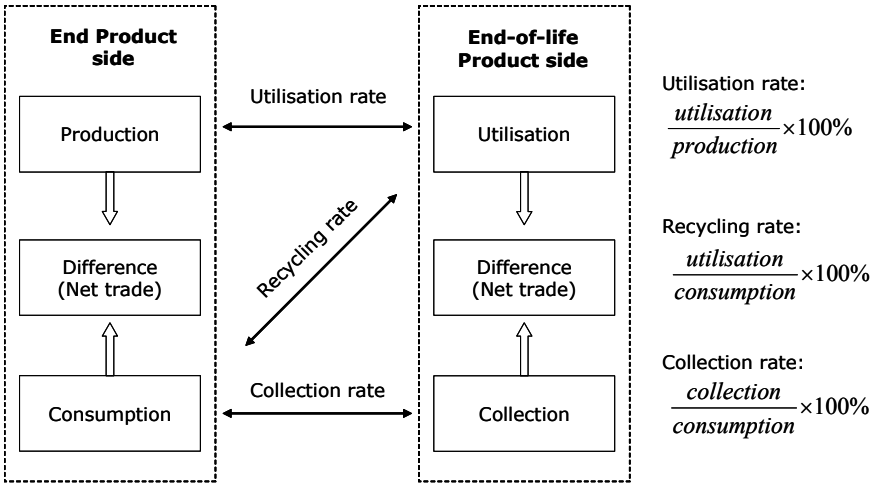
Figure 40 Three cases: Impact of differences in production, consumption, collection and utilisation on the recycling rate



Relationship between utilisation rate, recycling rate, and the collection rate

Beside the recycling rate as a performance indicator for recovered-resource dependent firms other ratios exist as well. Figure 41 presents an overview of the relationship between the recycling rate, utilisation rate, and collection rate. The left column of Figure 41 represents the production and consumption of end products. A difference (net trade) exists when production and consumption are not at the same level. The difference leads to import or export of end products. The right column in Figure 41 represents the end-of-life product side. End-of-life products are collected and later utilised in the production process. A net trade exists if the collection is higher or lower than the utilisation. The differences can be imported or exported.

Figure 41 Relationship utilisation rate, recycling rate, and collection rate



Source: adapted from Jaakko Pöyry Consulting 2005

The recycling rate was defined before as the ratio between utilisation of recovered resources and consumption of end products. The efficiency of collection is represented by the collection rate, defined as the ratio between the collection of recovered resources and the consumption of end products, see Figure 41. To compare regions on the amount of recovered resources used for production the utilisation rate can be used, defined as the ratio between recovered resources used for production and production of end products, see Figure 41. Table 109 presents an overview of the different rates for all three cases depicted in Figure 40. Although the recycling rate has limitations in regions where net trade of resources and products is relatively high, in this research it will be used as a performance indicator.

Table 109 Recycling rate, Collection rate, and Utilisation rate for three cases in Figure 40.

	Recycling rate	**Collection rate**	**Utilisation rate**
Case A	50% (=5/10)	50% (=5/10)	50% (=5/10)
Case B	100% (=5/5)	50% (=2.5/5)	50% (=5/10)
Case C	50% (=5/10)	50% (=5/10)	100% (=5/5)

APPENDIX 2: MINTZBERG'S SCHOOLS OF THOUGHT AND RESEARCH PROBLEM

The Design School

The design school is the first of the prescriptive schools and has the motto: establish fit between internal capabilities and external possibilities or opportunities (Mintzberg et al., 1998). 'Economic strategy will be seen as the match between qualifications and opportunity that positions a firm in its environment' (Christensen *et al.*, 182: 164). The main actor in literature belonging to the design school is the leader of the firm; he is the strategist. The strategist sets out the different options and chooses the best (resource dependence) strategy.

All the prescriptive schools add to the content or "what" dimension. The design school does pay attention to the context dimension in the form of opportunities and threats, which can be at firm or industry level. The content dimension, what strategy to choose is given shape by the strategist of the firm.

Although the design school does not explicitly focus on managing resource dependence, it does not necessarily neglect it either. Managing resource dependence essentially is not so much more than managing external opportunities, or when negative, threats, with use of internal developed capabilities. From this perspective the design school has attention for managing resource dependence.

This school encounters problems with the issue managing strategic renewal. Thinking is separated from acting, or put differently; the strategy design stage is separated from the implementation phase, which has implications for firms operating in changing environments. Like all prescriptive schools, the design school assumes the environment to be relatively stable. Changes that take place after the strategy formulation stage are not taken into account, which can mean that the intended strategy is overhauled before implementation. In stable environments resource dependence will be manageable but in volatile environments sustainable competitive advantage may be difficult to obtain; changes are taken into account only occasional (Mintzberg et al., 1998). This makes the contribution of the school to resource dependence in the context of strategic renewal limited. In summary:

Table 110 Contribution of Design School to Resource Dependence management

School of Thought	Central actor(s)	Dimension	Level of analysis	Environment	Contribution to resource dependence
	(1)	(2)	(3)	(4)	(5)
Design	Chief executive (as 'architect')	Content, Context	Firm, Industry	Stable	Limited

Source: Column (1), Mintzberg et al. (1998); (2), (3), (4) adapted from Mintzberg et al. (1998)

The Planning School

The planning school shares many characteristics with the design school, e.g. both make use of the SWOT approach as starting point. The major differences between the two schools exist in the context of people who are occupied with strategy formation, and the planning process. The strategy at the planning school is "… guided by a cadre of highly educated planners, part of a specialized strategic planning department with direct access to the chief executive" (Mintzberg *et al*., 1998: 48). The responsibilities for the strategy still lie with the CEO in principle, but the planners are responsible for the execution. In practice, the planners are the persons that are most active with strategy formation.

The planning school contributes mainly to the content and context dimension. Strategy formation at the planning school is a formal process which is decomposed into distinct steps, whereby each step is characterised by checklists and supported by techniques. In this respect the planning school is more formal and extended than the design school. When the planners have attention for resource dependence management it will be a formal and complex process, decomposed in distinct steps with attention for contextual forces. The level of analysis is firm level (strengths and weaknesses) and industry level (opportunities and threats).

The preferred environment of this school is stable. Similar to the design school, the thinking and acting are detached from each other. Dealing with changes that occur to a firm can be planned too. 'The planning school claims that organizations have stability and change concurrently: they can set course by explicit plans, yet change every year on schedule. Very convenient. But very questionable' (Mintzberg *et al*., 1998: 364). Very questionable indeed, for changes that occur after the full blown strategy process are not submitted in the (resource dependence) strategy. In other words, management is active with regard to environment, however, not *proactive* but more *reactive* which may lead to the risk of being too late with reacting.

The contribution to resource dependence is more or less comparable with that of the design school. In stable environments, and environments where change can be foreseen, resource dependence management strategy can be successful. In volatile environments a

competitive resource dependence strategy can be problematic. The contribution to resource dependence of this school is therefore limited. In summary:

Table 111 Contribution of the Planning School to Resource Dependence Management

School of Thought	Central actor(s)	Dimension	Level of analysis	Environment	Contribution to resource dependence
	(1)	(2)	(3)	(4)	(5)
Planning	Planners	Content, Context	Firm, Industry	Stable	Limited

Source: Column (1), Mintzberg et al. (1998); (2), (3) adapted from Mintzberg et al. (1998)

The Positioning School

The last of the three prescriptive schools is the positioning school with Michael E. Porter as most famous representative. As in the planning school, the enabler of strategic change is the strategist in principle, assisted with analysts. The positioning school has in common with the environmental school that it gives the context – in the environmental school called 'environment', in Porter's terms 'industry structure' – an eminent role. Porter (1980) reduces strategy making to something simple: selecting generic *positions* in the market place. The market structure drives the strategies that can be selected, or in other words, structure conducts performance. The leader has become a market position selector instead of the strategist as in the design school.

The positioning school mainly contributes to the context and content dimension. Porter (1980) distinguishes five market forces that have to be managed: (1) threat of new entrants, (2) bargaining power of firm's suppliers, (3) bargaining power of firm's customers, (4) threat of substitute products, and (5) intensity of rivalry among competitive firms. Although Porter (1980) did not use a resource dependence perspective, all of these forces impact a firm's resource dependence (cf. chapter 0). According to Porter (1980) there are just two foci to deal with these forces which lead to competitive advantage: *Low cost* or *differentiation*. When they are combined with *scope* (narrow or broad) of a particular business, it leads to three generic strategies for above average performance in the industry: (1) Cost leadership (low cost, broad scope, (2) Differentiation (differentiation, broad scope), and (3a) Cost focus (low cost, narrow scope) or (3b) Differentiation focus (differentiation, narrow scope). Differentiation influences a firm's resource dependence, by setting the business firm in a new industry context (cf. chapter 0). Low cost might be beneficial for a firm but need not be related to a firm's resource dependence management.

Beside the context dimension the positioning school adds content in the form of market positions that have to be selected. The level of analysis is industry level.

The preferred environment for this school is, like for the design and planning school, stable. According to the positioning school only the industry that a firm is in determines its competitive advantage. The value of capabilities and knowledge in a firm are neglected by this school. The industry structure dictates the strategy to be selected and the role of the strategist and analysts becomes one of selecting generic market positions. Like in the other prescriptive schools, thinking is detached from acting. Strategies are formulated full blown and then implemented. Operating in a volatile environment could mean that the context has changed and, in the words of Porter (1980), a new generic position should be adopted. The contribution of the school to managing resource dependence is limited. In summary:

Table 112 Contribution of the Positioning School to Resource Dependence Management

School of Thought	Central actor(s)	Dimension	Level of analysis	Environment	Contribution to resource dependence
	(1)	(2)	(3)	(4)	(5)
Positioning	Analysts	Content, Context	Industry	Stable	Limited

Source: Column (1), Mintzberg et al. (1998); (2), (3) adapted from Mintzberg et al. (1998)

The Entrepreneurial School

In the entrepreneurial school, the first of the descriptive schools discussed here, *vision* is the central theme. The person involved in managing resource dependency is the leader, an entrepreneur. It depends on the leader's vision what resource dependence strategy is followed. Resource dependence is not necessarily an issue in the entrepreneurial school, but is an issue that can de dealt with. The entrepreneurial spirit of other persons than the leader can be of great value for the total organisation. Organisations with an entrepreneurial culture can be very innovative. Innovation can lead to new ways of managing resource dependence.

The entrepreneurial school contributes to the content dimension; the vision of the leader determines what resource dependence strategy will be followed. The level of analysis is therefore 'individual' or management level, although this does not exclude attention for firm and industry level.

Contrary to the three prescriptive school discussed before, this school is able to deal with changing environments. Thinking is no longer separated from acting and the

leader stays involved during the implementation stage. Changes that are perceived can be anticipated upon, and if necessary specific aspects can be reformulated. The strategic renewal journey can be regarded as directed or emergent. In the words of Mintzberg *et al*. (1998: 143), '*The strategic vision is thus malleable, and so entrepreneurial strategy tends to be deliberate and emergent – deliberate in overall vision and emergent in how the details of the vision unfold*' (italics in original). The contribution of this school to resource dependence is substantial. In summary:

Table 113 Contribution of the Entrepreneurial School to Resource Dependence Management

School of Thought	Central actor(s)	Dimension	Level of analysis	Environment	Contribution to resource dependence
	(1)	(2)	(3)	(4)	(5)
Entrepreneurial	Leader	Content	Management	Stable/ dynamic	Substantial (new ideas)

Source: Column (1), Mintzberg et al. (1998); (2), (3) adapted from Mintzberg et al. (1998)

The Cognitive School

Contrary to the school described before, the central actor in this school is not person or group of individuals, but the mind, or cognition, the decision making process. Representative authors of the cognitive school focus on what happens in the mind of the strategist. Putting it in the context of this research, what makes that the mind of a strategist considers managing resource dependence to be important? What actions are taken and why? In this school two wings can be distinguished: an objective and a subjective wing. According to the objective wing, the inputs flow through all sorts of distortion filters before they are decoded in the mind. The subjective wing regard the world as constructed, the inputs are interpretations of a world that exists only in terms of how it is perceived. Mintzberg *et al*. (1998) phrase it as follows. 'One wing, more positivistic, treats the processing and structuring of knowledge as an effort to produce some kind of *objective* motion picture of the word. The mind's eye is thus seen as a kind of camera: it scans the world, zooming in and out in response to its owner's will, although the pictures it takes are considered in this school to be rather distorted. The other wing sees all of this as *subjective*: strategy is some kind of interpretation of the world. Here the mind's eyes turn inward, on how the mind does "take" on what it sees out there – the event, the symbols, the behaviour of customers, and so on. So while the other wing seeks to understand cognition of some kind of *re-creation* of the world, this wing drops the prefix and instead believes that cognition *creates* the world' (1998: 150-151, italics in original).

Building on the objective wing there are different biases that influence the way the strategist looks at resource dependence. Some examples of biases provided by Makridakas (1990) are summed up in Table 114.

Table 114 Selected biases influencing decision making

Bias	Description of bias
Selective perception	People tend to see problems in terms of their own background and experience
Optimism, wishful thinking	People's preferences for future outcomes affect their forecasts of such outcomes.
Conservatism	Failure to change (or change slowly) one's mind in the light of new information/evidence.
Recency	The most recent events dominate those in the less recent past, which are downgraded or ignored.

Source: Mintzberg et al., (1998: 153) and Makridakas (1990: 36-37)

The school contributes mainly to the process dimension and the way the strategist's mind processes information in particular. The level of analysis is therefore cognitive, or put in the context of this research managerial level.

This cognitive school is indifferent to the kind of environment. Both stable and dynamic environments can be dealt with. Cognitive processes take place in the mind of managers at all levels of the organization, and can lead to a passive or active managerial attitude toward the environment. The contribution of the cognitive school to the resource dependence problem is substantial; this school deals with the mental aspects influencing the resource dependence strategy. In summary:

Table 115 Contribution of the Cognitive School to Resource Dependence Management

School of Thought	Central actor(s)	Dimension	Level of analysis	Environment	Contribution to resource dependence
	(1)	(2)	(3)	(4)	(5)
Cognitive	Mind	Process	Cognitive, management	Stable/ dynamic	Substantial (awareness)

Source: Column (1), Mintzberg et al. (1998); (2), (3) adapted from Mintzberg et al. (1998)

The Learning School

Contributors to the learning school suggest that strategists learn over time, and regard strategy formation as an emergent process. The actor concerned with managing resource dependence can be the strategist but most of the time, the collective system learns; there are many potential strategists in most organisations. The role of the leader is to

manage the process of strategic learning, whereby novel resource dependence strategies can emerge.

Like the cognitive school the learning school contributes mainly to the process dimension. Quinn (1980) introduces the concept of 'logical incrementalism'. '… The real strategy tends to evolve as internal decisions and external events flow together to create a new, widely shared consensus for action among key members of the top management team' (Quinn: 1980: 15). Absorptive capacity literature considers how firms absorb external knowledge, internalise it and use it to commercial ends (Cohen and Levinthal, 1990). The level of analysis is individual or intra-organisational. The learning school starts from the premise that anyone in the organisation can learn.

The learning school is well able to deal with change. Change offers new learning opportunities. Nelson and Winter (1982) associate learning with organisational routines. 'The interaction between established routines and novel situations is an important source of learning. As routines are changed to deal with new situations, larger changes come about' (Mintzberg et al., 1998: 185). Especially dynamic capability theory is interested in learning of organisations in volatile environments (Teece et al., 1997; Eisenhardt and Martin, 2000; Zollo and Winter, 2002). The contribution of this school to resource dependence in the context of strategic renewal is substantial. This schools assumes that management learns what resource dependence instruments to use in order to decrease resource dependence in stable and volatile environments. In summary:

Table 116 Contribution of the Learning School to Managing Resource Dependence

School of Thought	Central actor(s)	Dimension	Level of analysis	Environment	Contribution to resource dependence
	(1)	(2)	(3)	(4)	(5)
Learning	Anyone who can learn	Content, Process	Management	Stable/ dynamic	Substantial

Source: Column (1), Mintzberg et al. (1998); (2), (3) adapted from Mintzberg et al. (1998)

The Power School

Proponents of the power school regard strategy formation as a process of negotiation. Power plays a central role. To quote Mintzberg *et al*. (1998: 236), 'Introduce any form of ambiguity – environmental uncertainty, competing goals, varied perceptions, scarcity of resources – and politics arise'. The school distinguishes between two wings: micro and macro power. Both contribute to the context and content dimension.

The micro power wing deals with the play of politics inside the organisation and anyone with power in the organization in the organisation can be the actor. Competing goals of individuals and coalitions ensure that any intended strategy will be disturbed and distorted every step of the way. People play 'political games' in organisations, which can influence resource dependence strategies. The macro power wing focuses on the use of power by the whole organisation; the whole organisation is the central actor. The macro power wing regards organisations as promoting their own welfare – which can be reducing resource dependence – by controlling or cooperating with other organisations, through the use of strategic manoeuvring as well as collective strategies in various kinds of networks and alliances. Major contributors to this school are Pfeffer and Salancik (1978), more about these in chapter two.

The levels of analysis are intra-firm (micro power) and inter-firm (macro power). The school can deal with stable and dynamic environments. All management levels in the organisation will be active promoting their own interest, in doing so they can be active or passive with regard to the environment.

The contribution of the political school to the resource dependence is substantial as highlighted by the following quote concerning macro power. Macro power '… reflects the interdependence between an organization and its environment. Organizations have to deal with suppliers and buyers, unions and competitors, investment bankers and government regulators, not to mention a growing list of pressure groups that may target one or another of their activities' (Mintzberg *et al.*, 1998: 248). In chapter 3 it will be shown that the different management levels do not have the same disposition over means to manage resource dependence. In summary:

Table 117 Contribution of the Power School to Resource Dependence Management

School of Thought	Central actor(s)	Dimension	Level of analysis	Environment	Contribution to resource dependence
	(1)	(2)	(3)	(4)	(5)
Power	Micro: Anyone with power Macro: whole organisation	Content, Context	Inter-firm and management	Stable/ dynamic	Substantial

Source: Column (1), Mintzberg et al. (1998); (2), (3) adapted from Mintzberg et al. (1998)

The Cultural School

Contributors to the cultural school examine more or less the opposite of the power school. Where power can fragment the internal of an organisation, culture knits a collection

of individuals together. Mintzberg *et al.* (1998) argue that culture can be regarded as the 'organisations mind'. People in the same organisation share beliefs that are reflected in traditions, routines, symbols, even buildings and products. The actor involved with managing resource dependence in the cultural school is the whole organisation.

The main dimensions that the cultural school contributes to are the organisational context and content (resources and capabilities). Mintzberg *et al.* (1998) place the resource-based view of the firm under this school for people are an organisation's most valuable resources and together determine to a large extent the organisational culture. Resource-based view of the firm argues that firms are unique, differences in culture and a firm's idiosyncrasy can be a source of sustained competitive advantage (Penrose, 1959; Wernerfelt, 1984). The level of analysis in the cultural school is the whole organisation.

The way the organisation will deal with volatile environments depends on the organisational culture. As organisational culture knits a collection of individuals together, it is expected that different management levels will have the same attitude towards the environment. Dominant management logic (Prahalad and Bettis, 1986; Bettis and Prahalad, 1995) embedded in the culture makes that the organisation will behave resistant towards to change. In the words of Mintzberg et al. (1998: 269) 'An organization develops a "dominant logic" that acts as an information filter, leading to a focus on some data for strategy making while ignoring others'. The contribution to the resource problem is substantial in the sense that it pays attention to the endogenous factors influencing a firm's resource dependence management. In summary:

Table 118 Contribution of the Cultural School to Resource Dependence Management

School of Thought	Central actor(s)	Dimension	Level of analysis	Environment	Contribution to resource dependence
	(1)	(2)	(3)	(4)	(5)
Cultural	Collectivity	Content, Context	Management	Stable/ dynamic	Substantial

Source: Column (1), Mintzberg et al. (1998); (2), (3) adapted from Mintzberg et al. (1998)

The Environmental School

Mintzberg *et al*. (1998) mention the following about the 'the environment'. 'It is usually treated as a set of vague forces "out there" – in effect, everything that is not organization' (1998: 287). The investigators of the environmental school regard the environment as actor/actuator. The premise is that the organisation has to adapt to the environment or will be "selected out".

Mintzberg et al., (1998) describe three theoretical perspectives belonging to environmental: contingency theory (Pugh *et al.*, 1963; Miller, 1979; Droge and Toulouse, 1988), population ecology (Hannan and Freeman, 1977), and institutional theory DiMaggio and Powell, 1983; Greenwood and Hinings, 1996; Scott, 2001). Contingency theorists reject the view that there is one best way of managing. 'To contingency theorists, "it all depends": on the size of the organization, its technology, the stability of its context, external hostility and so on' (Mintzberg *et al*., 1998: 289). Population ecologists make use of the variation-selection-retention model. Institutional theory is associated with isomorphism; organisations operating in the same environment adopt similar structures and practices.

As shown in the argument above, the environmental school contributes mainly to the context dimension; however, more recent contributions (Greenwood and Hinings, 1996) contribute to the process dimension as well. The level of analysis is 'the environment'.

Whether the school favours a stable or dynamic environment is difficult to answer for the environment is regarded here as the central actor. Because of the dominance of the environment, the role of management is rather limited in this school. The leader can be regarded as a passive element for purposes of reading the environment and ensuring proper adaptation by the organisation. However one could argue that management at different levels in the organisation must act active with regard to the environment, if they don't, the firm will be selected out. Oliver (1991) offers a variety of strategic responses to institutional processes. The contribution to resource dependence of this school is substantial because it pays attention to the dominance of external forces. In summary:

Table 119 Contribution of the Environmental School to Resource Dependence Management

School of Thought	Central actor(s)	Dimension	Level of analysis	Environment	Contribution to resource dependence
	(1)	(2)	(3)	(4)	(5)
Environmental	'Environment'	Context	Environmental	Stable/ dynamic	Substantial (context)

Source: Column (1), Mintzberg et al. (1998); (2), (3) adapted from Mintzberg et al. (1998)

The Configuration School

The configuration school is the last school of thought and also forms the last 'group' of schools. Contributors to this school reason from the premise that an organisation can be in two states of being: in a steady state (configuration) or in transition (transformation) from one configuration to the next. The configuration school accepts the premises of all previous schools, but selects the one that is most appropriate depending on

the circumstances. This means that with regard to managing resource dependence many different actors can be involved, and in the search for an adequate strategic management of recovered-resource dependent industries attention is paid to all dimensions and levels of analysis discussed before.

Table 120 Contribution of the Configuration School to Resource Dependence Management

School of Thought	Central actor(s)	Dimension	Level of analysis	Environment	Contribution to resource dependence
	(1)	(2)	(3)	(4)	(5)
Configuration	All of above, in context	Content, Context, Process	All of the previous	Stable/ dynamic	Substantial

Source: Column (1), Mintzberg et al. (1998); (2), (3) adapted from Mintzberg et al. (1998)

APPENDIX 3: RELATIONSHIP BETWEEN SKILLS, ROUTINES AND CAPABILITIES

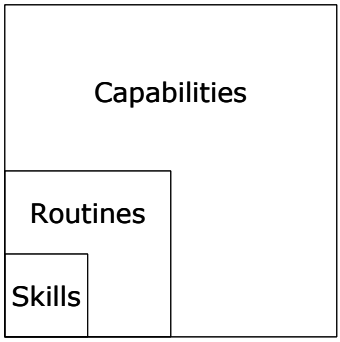
The literature that deals with capabilities is quite extensive, and unfortunately also quite ambiguous. Or to use the words of Dosi et al. (2000: 3) 'The term 'capabilities' floats in literature like an iceberg in a foggy Arctic sea, one iceberg among many, not easily recognized as different from several icebergs nearby'. It is beyond the scope of this study to discuss all the icebergs but some of them will be paid attention to. Here the relationship between skills, routines and capabilities will be shed a light on.

According to Fiol (2001) and Wright et al. (2001) each firm contains resources, capabilities, dynamic capabilities, and knowledge, and these are closely interlinked. 'As firms evolve, they pick up skills, abilities, and resources that are unique to them, reflecting their particular path through history. These resources and capabilities reflect the unique personalities, experiences, and relationships that exist only in a single firm' (Barney 1995: 53). But how are these interlinked? The relationship between skills, routines and capabilities is depicted in, Figure 42.

Dosi et al. (2000) regard individual skills as the building blocks of routines. With regard to level of analysis Dosi et al (2000) suggest to reserve the term 'skills' to the individual level and 'routines' to the organizational level. The same idea can be found at Nelson and Winter (1982) who propose that skills are the analogue of organizational routines and 'an understanding of the role that routinization plays in organizational functioning is therefore obtainable by considering the role of skills in individual functioning' (1982: 73).

About the distinction between capabilities and routines Dosi et al. (2000) mention the following. 'Capabilities involve organized activity and the exercise of a capability is typically repetitious in substantial part. Routines are 'chunks' of organized activity with a repetitive character. Hence, it is basically well said that 'routines are the building blocks of capabilities' – although routines are not the only building blocks of capabilities' (2000: 4). Zollo and Winter (2002) regard routines as 'stable patterns of behavior that characterize organizational reactions to variegated, internal or external stimuli' (2002: 340). Some organisations will be capable to perform a certain routine and others will not be. This uniqueness can be a source of competitive advantage, for example in the context of the research problem, firms that are better able to manage the return flow of end-of-life products can gain competitive advantage.

Figure 42 Relationship Skills, Routines, and Capabilities



Source: from Dosi *et al.*, 2000

APPENDIX 4: COMPARING THE ORGANISATION FORMS OF MAJOR PLAYERS IN THE PAPER AND BOARD INDUSTRY AT TWO SNAPSHOTS IN TIME

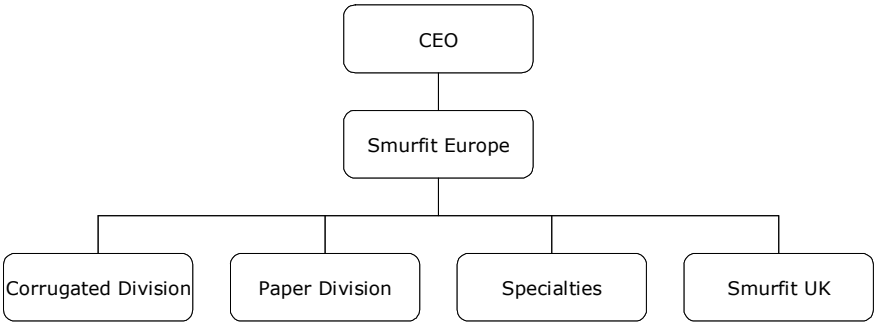
Jefferson Smurfit

The organisation structure of 1999 is the result of a three year programme. In the 1999 annual report the objective of the programme was phrased as follows: "The objective of these initiatives is to streamline the organisation and overhead structure, to centralise procurement and logistics and to leverage our purchasing power. We believe that a flatter organisation structure, a broader purchasing and procurement base and a more efficient processing of information will enhance our ability to service customers and facilitate our drive to be more cost competitive" (Annual report 1999: 28). Furthermore, Smurfit changed the structure of the European operations from a country-based structure to a product-based structure, see Figure 43. "Moving to a product-based structure will separate what are primarily capital intensive businesses, such as containerboard, from businesses which are customer focused, such as corrugated" (Annual report 1999: 28). In other words, market characteristics influence Jefferson Smurfits resource dependence strategy.

Unfortunately public data regarding the situation of recovered paper purchasing, at the mills or centralised, was not available. Smurfit mentions a project that strengthens its purchasing position. "The objective of this project is to use our collective purchasing and logistical activities and to enhance our procurement skills. Over time, we expect that these initiatives will generate significant sustainable savings on purchasing and procurement spend" (1999: 29). The fact that "collective purchasing activities" are mentioned, could indicate that recovered paper is a decentralised activity.

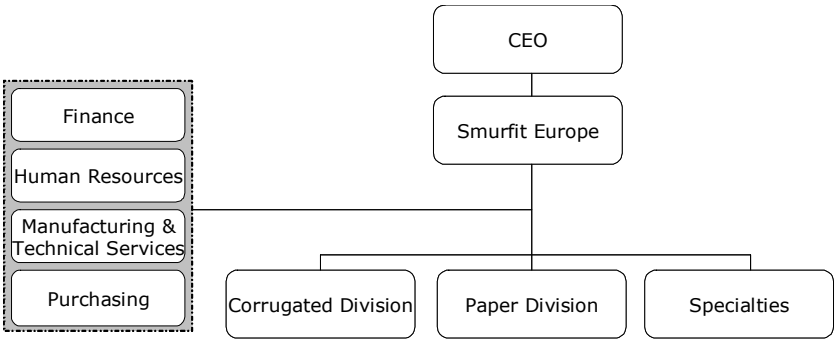
The organisation structure between 1999 and 2003 does not show many differences at corporate level, see Figure 44. The situation with regard to recovered paper sourcing in unknown. Seeing the following quote (annual report 2003): "While we have reclamation operations in Ireland, the United Kingdom, and Germany, we source most of our OCC requirements on the open market", the use of inter-firm resource dependence instruments (e.g. backward integration or long term contracts) to secure the supply of recovered paper seems to be limited.

Figure 43 Organisation Structure Jefferson Smurfit 1999



Source: Jefferson Smurfit Annual report 1999

Figure 44 Organisation Structure Jefferson Smurfit 2003



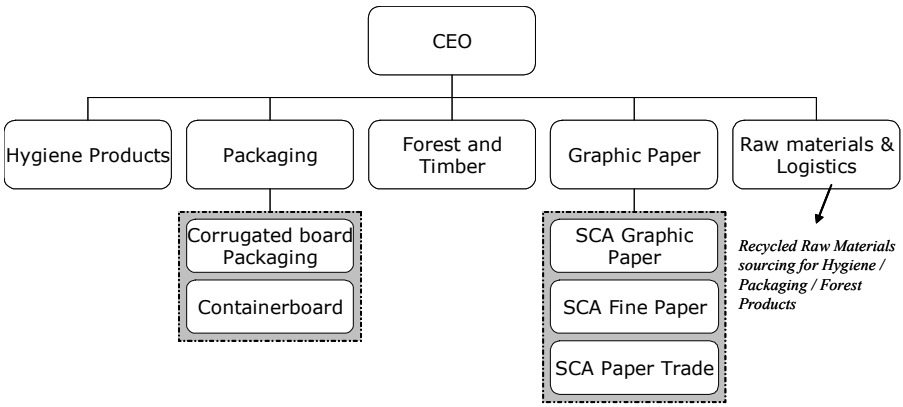
Source: Adapted from Jefferson Smurfit 20F Form 2003

Conclusion: In 1999 Jefferson Smurfit adopted a product-based structure in Europe instead of a country-based structure and in 2003 this is still the case. Based on the limited available public company data for Jefferson Smurfit no predictions could be done with regard to the relationship between a change in organisation form and the firm's recovered-resource dependence. Evidence regarding adaptation of the organisation form in such a way that knowledge processes positively influence recovered-resource dependence management could not be found. In other words, proposition 4C was not illustrated.

SCA

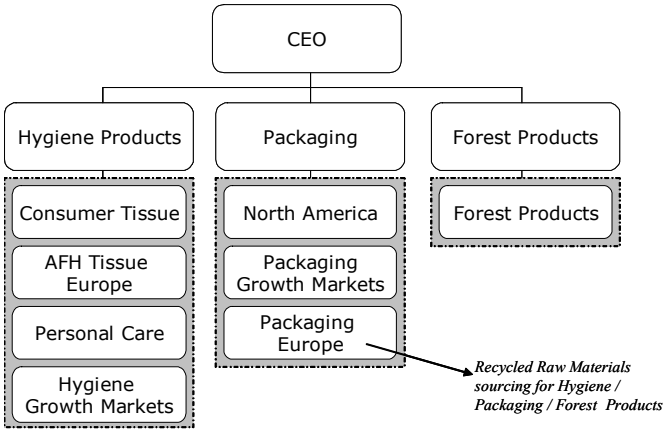
The development of SCA's organisation structures shows more differences with regard to recovered paper supply. In 1998 recovered paper is part of the unit raw materials and logistics, see Figure 45. "Raw Materials and Logistics is responsible for exploiting and developing synergies between the Hygiene Products, Packaging and Graphic Paper business areas" (annual report 1998: 30). In 2003 however, recovered paper purchasing is placed under the packaging division, close to the business unit that is the main consumer of recovered paper, see Figure 46. "Packaging operations consume most of the recovered fibre used within the Group, about two 2.0 million tonnes annually" (annual report 2003: 27).

Figure 45 Organisation Structure SCA 1998



Source: adapted from SCA Annual Report 1998

Figure 46 Organisation Structure SCA 2003



Source: Adapted from Annual Report 2003

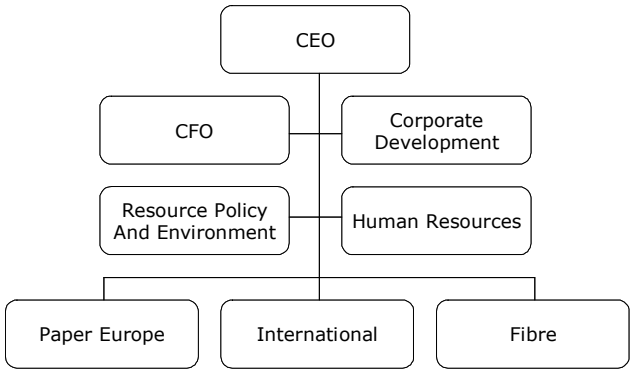
Conclusion: When the organisation structure of 1998 and 2003 are compared it appears that the organisation form and the role of recovered paper purchasing have changed. Recovered paper purchasing has changed from an independent business activity (1998) towards a business incorporated in the Packaging Business segment (2003), the largest consumer of recovered paper in the Group. This means that knowledge processes are concentrated closer to the business that is most dependent on recovered paper. How this influences the determinants of knowledge absorption (Van den Bosch et al., 1999) is hard to predict with the limited available public data. In other words, proposition C4 was not illustrated.

Norske Skog

In 1999 Norske Skog changed its organisation structure. "The organisation and management systems were changed in 1999, and adapted to the company's structural development following the sale of activities and the increased concentration on publication paper. The new organisation is divided into three business areas" (annual report 1999: 8), see Figure 47. These business areas are Paper Europe, International, and Fibre.

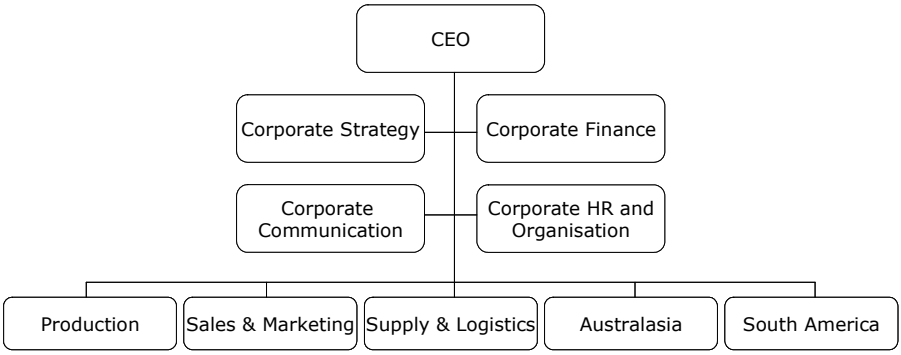
In 2000 the organisation structure changed again. "Following major changes in 2000, Norske Skog has become a new company with a new organisation, changed leadership structure and a governance model which reflects the Group's larger, global activity" (annual report 2000: 44). Its operative activity is now organised under four geographic regions: Europe, North America, South America, and Australasia. The regions are fully responsible for their business operation. In 2003 Norske Skog has adopted an organisation structure are presented in Figure 48. Unfortunately there was no public data available on the supply of recovered paper at the two points in time.

Figure 47 Organisation Structure Norske Skog 1999: Three business areas; Paper Europe, International, and Fibre



Source: Norske Skog Annual Report 1999

Figure 48 Organisation Structure Norske Skog 2003



Source: Norske Skog Annual Report 2003

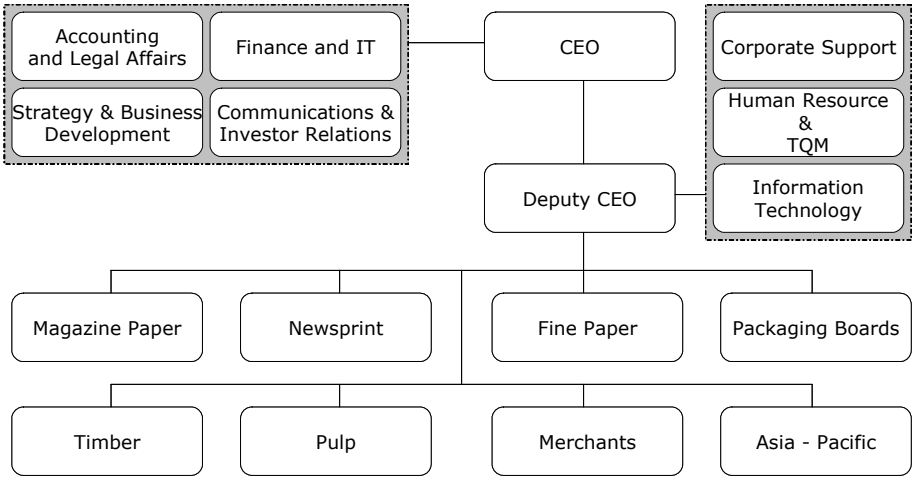
Conclusion: When the organisation form of Norske Skog is compared in 1999 and 2003, the major changes can be found in the organisation of the business unites. The company has become a global player with activities in Europe, North America, South America, Australasia and Asia. Based on public information, the place of recovered paper purchasing could not be traced. Proposition C4 was not illustrated.

StoraEnso

StoraEnso changed its organisation structure as well. In 1999, see Figure 49, there are eight different business units reporting to the deputy CEO. StoraEnso makes use of as well virgin as recovered resources. "Stora Enso's strategy is to optimise the utilisation of natural characteristics of the fibre raw materials – to use virgin fibre for products where this creates more value through its special properties and recovered fibre for standard newsprint. The market trend is towards more customised, various types of newsprint speciality grades" (Annual report 1999: 23).

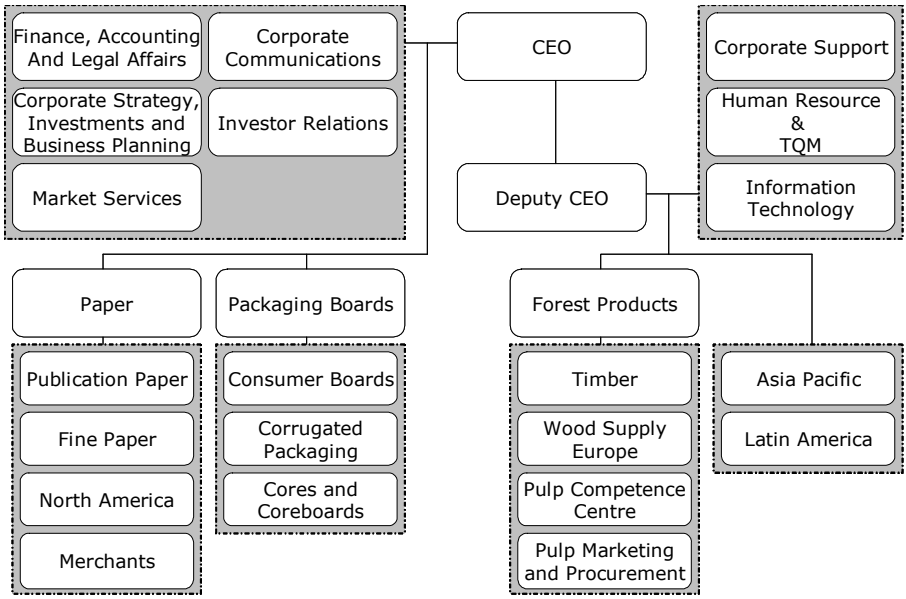
In 2003 the business units are grouped, see Figure 50. "In May 2003 Stora Enso was reorganised in line with the Group's strategic principle of being operated and managed as one industrial group. The organisation structure dating from the merger that formed Stora Enso has functioned well, so it only needed to be modified, but not changed fundamentally. The new organisation is streamlined around Stora Enso's thee core product areas: Paper, Packaging Boards, and Forest Products" (annual report 2003: 14). The main raw materials for StoraEnso are wood, recovered paper and purchased pulp. The following quote indicates that pulpwood is more important for the company than recovered paper. "The most important elements of the fibre strategy are own production of pulp and wood products, and sourcing of wood from mainly external suppliers. Stora Enso ensures the availability of different types of fibre from multiple sources through its fibre sourcing and pulping operations" (annual report 2003: 9).

Figure 49 Organisation Structure StoraEnso 1999: Eight different business units



Source: StoraEnso Annual Report 1999

Figure 50 Organisation Structure StoraEnso 2003: Three core product areas: Paper, Packaging Boards, and Forest products



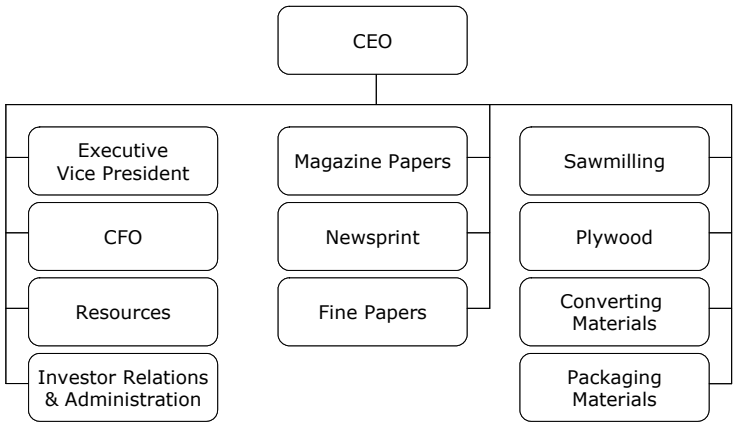
Source: StoraEnso Annual Report 2003

Conclusion: When the organisation structure of StoraEnso in 1999 and 2003 are compared it appears that the eight business units in 1999 are grouped around three core product areas (Paper, Packaging Boards, and Forest Products) in 2003. There was no public data available concerning where and how recovered paper purchasing takes place in the organisation. In other words, proposition C4 was not illustrated.

UPM-Kymmene

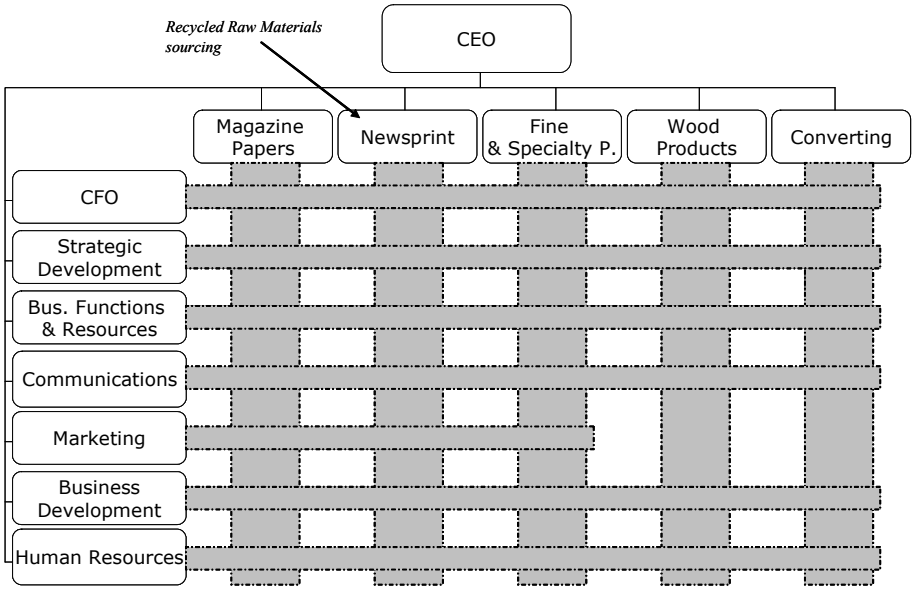
The organisation structure of UPM-Kymmene shows quite a change. In 1998 the firm is organised in divisions with their own responsibilities, see Figure 51. In 2004 UPM-Kymmene has adopted a different structure, see Figure 52, that comes close to a matrix structure, more suited for knowledge transfer (Van den Bosch et al., 1999). How this change in organisation form impacts recovered-resource dependence, however, is hard to predict based on available public data. In 1998 and 2003 the supply of recovered paper is a responsibility mainly that rests at the newsprint division, which is also the largest consumer of the resource at UPM-Kymmene, seeing the following two quotes. "Following the investment at Shotton, some 75 per cent of all UPM's newsprint is produced from recycled fibre" (Annual Report 2003: 21). "UPM makes varied use of different fibre raw materials in its paper production. Recycled fibre pulp now represents around one quarter" (Annual Report 2003: 33). Placing the responsibility for the supply of recovered paper at the business unit that is the main consumer of the resource is a strategy that was followed by SCA as well.

Figure 51 Organisation Structure UPM-Kymmene 1998: Divisional form



Source: UPM-Kymmene Annual Report 1998

Figure 52 Organisation Structure UMP-Kymmene 2004: Matrix form



Source: UPM-Kymmene Annual Report 2004

Conclusion: when the organisation structure of UPM-Kymmene in 1998 and 2004 are compared it appears that the organisation form has changed from a divisional form towards a matrix structure. Recovered paper purchasing remained at the Newsprint division, i.e. the main consumer of recovered paper. Based on the public available data proposition C4 was not illustrated.

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Recovered-Resource Dependent Industries and the Strategic Renewal of Incumbent Firms

A Multi-Level Study of Recovered-Resource Dependence Management and Strategic Renewal in the European Paper and Board Industry

Managing resource dependencies and strategic renewal is crucial for incumbent firms to survive. For firms operating in "recovered-resource dependent industries", i.e. industries that to a large extent depend on recycled end-of-life-products for the continuation of production processes, this is even more complex. To create and maintain a sustainable competitive advantage, the return of these products has to be strategically organised and managed as well. This study seeks to extend research on resource dependence theory to the context of recovered-resource dependent industries. Based on several theoretical lenses a conceptual managerial framework is developed incorporating internal and external factors influencing strategic renewal and recovered-resource dependence management. A multi-level research design encompassing eight research settings is used to illustrate the conceptual framework. The results indicate why the European Paper and Board Industry and large incumbents belong to the best performing with regard to recycling rate. Furthermore, it is shown how management can influence a firm's strategic renewal journey and recovered-resource dependence, using several resource dependence instruments, in order to contribute to sustainable competitive advantage.

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