THE USE OF EXPLORATION AND EXPLOITATION STRATEGIES FOR INTERNATIONALIZATION BY OLD AND NEW ECONOMY SMEs

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ABSTRACT

The focus of this exploratory study is on the international organizational renewal strategies of small- and medium sized enterprises (SMEs). We are interested particularly in whether firms' actions of internationalization are of an explorative or exploitative nature and whether firms' use of exploration and exploitation actions evolves over time. We examine the impact of firm and industry characteristics and focus on the relationship between explorative and exploitative behavior and the level of integration of the firm's international activities (autonomous vs. co-operative strategies). We include two sectors: an 'old economy' sector (i.e. mechanical engineering) and a 'new economy' sector (i.e. software production). Our study shows that conceptual development in this area needs further improvement. Empirical findings indicate that industry is indeed a major determinant of the use of renewal strategies by SMEs.

INTRODUCTION

Organizations need to continuously renew themselves if they are to survive and prosper in dynamic environments. This renewal challenge is even more pronounced in the current business environment characterized by fast changes in customers, technologies, and competition. As Lewin and Koza (2001, p. vi) recently formulated, "organizational forms are in a continuous state of flux and sustained competitive advantage is only fleeting". Although corporate renewal is a 'trendy' term, well established theoretical schools have tackled this issue, e.g. from a 'selection' perspective (Hannan and Freeman 1984, Nelson and Winter 1982), from a 'behavioral/strategic management' perspective (Miles and Snow 1978), from a learning perspective (Argyris and Schön 1978), from a resource-based perspective (Penrose 1959, Wernerfelt 1984) or from an 'entrepreneurship' perspective (Choi and Shepherd 2000).

Teece, Pisaro and Shuen (1997) argue that to analyze the sources of wealth creation and capture by firms, two main paradigms exist. The first (and in the 1980s dominant) paradigm focuses on exploitation of market power, with Porter (1980) as its most prominent exponent. The second paradigm focuses on firm level efficiency advantages, resulting in resource based competitive advantages. In this latter tradition, Teece et al. introduce the dynamic capabilities approach, defined as “the ability to integrate, build and reconfigure internal and external competences to address rapidly changing environments” (p. 517).

Following general strategic management literature, but without explicitly choosing between a market-power or a resource-based approach, Volberda e.a. (2001) propose three dimensions of strategic renewal:

- the *context* dimension (internal vs. external actions).
- the *content* dimension (exploration vs. exploitation-type actions).
- the *process* dimension (speed of renewal actions).

The *context* dimension has to do with the chosen governance structure of the renewal project, i.e. the question to what extent the activities should be integrated in the firm. In the study of Volberda e.a. (2001) internal actions are defined as new business ventures and new product launches and external actions as mergers & alliances. All kinds of arguments such as transaction costs, transfer costs, and the relevance of tacit knowledge may influence this decision (Teece, Pisaro and Shuen 1997). The *content* dimension represents the strategic direction of the renewal process; Exploration actions are aimed at entering new markets and innovation, whereas exploitation actions increase efficiency and rationalize activities (see also the discussion below). Several researchers argue that maintaining a balance between these two types of strategies is very important. Although Volberda e.a. (2001) only mention speed of renewal (i.e. number of actions per time period) as a *process* dimension, other process related elements, such as path dependencies (Teece, Pisaro and Shuen 1997, Danneels 2000, Nooteboom 2000) may be included in this dimension.

In a study on inter-firm cooperation in the pharmaceutical industry Rothaermel (2001) argues that interactions exist between the context and content of strategic renewal processes: exploration co-operations are usually joint ventures, while exploitation co-operations mostly take the form of strategic alliances such as licensing. Nooteboom (2000) posits that disintegrated structures are favored in innovation stages leading up to novel combinations and in the selection process leading to consolidation. Integrated structures are favored in the later stage when generalization follows consolidation. This leads to a continuous ‘cycle of integration and disintegration’.

In this paper we are interested in the strategic renewal in a particular situation; the case of SMEs that use internationalization as strategic response to their dynamic environment. Small business literature offers much discussion about the definition and (supposed) attributes of small firms (e.g. Storey 1994; Bolton 1978; Julien 1998). The main attribute that all agree upon, is the limited scale of small firms' operations. This small scale may lead to all kinds of positive or negative implications. One of the most prominent implications is that the available resources (financial, managerial, etcetera) are limited. For this reason, our theoretical approach will rely heavily on the resource-based approach.

In the next sections, we will present a concise overview of relevant literature on our main theoretical approaches. First, we will take a closer look at the content dimension of the strategic renewal process (i.e. exploitation and exploration strategies). Next, we will discuss extant literature on internationalization paths of SMEs (the process dimension) and its interaction with firm integration decisions (the context dimension). Subsequently we will discuss our research method and our findings. In the last section of the paper, we provide conclusions and some suggestions for future empirical research.

THEORY OF EXPLOITATION AND EXPLORATION

As we explained above, the dichotomy exploitation vs. exploration is one of the key elements used to describe strategic renewal. This terminology stems from a seminal study by March (1991) in which he develops a theoretical model of mutual learning and simulates the effects of various variables on organizational knowledge development. Because this was a theoretical study, no empirical operationalizations of the concepts were necessary. Instead of really defining the key concepts of exploitation and exploration, March used associations (March 1991, p. 71): "*Exploration includes things captured by terms such as search, variation, risk taking, experimentation, play, flexibility, discovery, innovation. Exploitation includes such things as refinement, choice, production, efficiency, selection, implementation, execution."* Since 1991, these first associative definitions have lead to various interpretations; we were not able to find any two authors that used the same definition. Perhaps the associative approach of March has inspired others. Table 1 presents an overview of definitions and descriptions of the terms and some examples of antinomies and processes that authors have linked to exploitation and exploration. Although most researchers interpret exploitation vs. exploration as a dichotomy, we found two examples of authors who propose a kind of hybrid form, in which exploitative and explorative elements are combined. Nooteboom (2000) distinguishes the hybrid situation in which a company has 'closed the variety of content' (i.e. development has been focused on production efficiency and on providing a clear paradigm for generalization) and is succinctly 'opening the variety of context' which yields insight in misfits, in needs and opportunities for adaptation. Similarly, Danneels (2000) develops a typology of strategic renewal (in the field of product development) in which 'pure exploitation' and 'pure exploration' are complemented by a hybrid form in which the firm leverages either its existing technological competence with new customer competence, or the other way around.

Table 1 An overview of exploitation and exploration terminology.

Definitions and descriptions of exploitation and exploration			
	exploitation	**hybrid form**	**exploration**
March 1991	exploitation of old certainties ... refinement, efficiency...		exploration of new possibilities.. search ... innovation.
March 1991 (in Danneels 2000)	increasing the productivity of employed capital and assets ... improving .. existing capabilities ... and systematic cost reduction		prospecting for new opportunities .... innovating, building new capabilities ... investing in the firms absorptive capacity
March 1991 (in Koza & Lewin 2000)	elaboration and deepening of existing capabilities and to incremental improvements in efficiencies		experimenting with or establishing new assets and new capabilities.
Levinthal & March 1993	use and development of things already known		pursuit of knowledge of things that might come to be known
Teece, Pisaro & Shuen 1997	exploitation of existing internal and external firm-specific capabilities		developing new internal and external firm-specific capabilities
Volberda e.a. 2001	elaborate(s) on the current range of activities and fall within the current geographic scope, or rationalise(s) activities		add(s) new activities to the current repertoire of the organisation, or ... increase(s) the geographic scope of the firm.
Nooteboom 2000	closing variety of content	‘exploitation/ exploration’: opening variety of context	opening variety of content

(table 1 continued)

Danneels 2000	new product development draws on existing competences	‘leveraging’: using core competences as stepping stones to develop new competences	new product development requires competences the firm does not yet have
Rothaermal 2001	leverage existing competences		building new competences
Similar antinomies, associated processes			
Arrow 1962 (in Brown and Duguid 2001)	increasing refinement of existing knowledge, with significant sunk costs		search for new knowledge
Argyris and Schön 1978	single loop learning		double loop learning
Gemawhat and Ricart i Costa 1993	strategic efficiency: refinement of existing products, processes or capabilities		dynamic efficiency: development of new products, processes or capabilities
Sadler-Smith, Spicer & Chaston 2001	passive orientation: working with a current paradigm		active orientation: questioning a current paradigm

As table 1 shows, there are some important similarities among these definitions and descriptions. First, most authors mention the development of resources (firm-specific assets, competencies or capabilities) as a major element. Because the exact meaning of competencies and/or capabilities is not always clear, we follow Teece, Pisaro and Shuen (1997) in their preference for the term firm-specific asset. A second similarity among the definitions is the distinction between firm-specific assets that are ’old’ (i.e. exist within the firm) or ’new’ (i.e. do not exist (yet) within the firm). This sounds plausible, but there is a hidden problem. All the studies on exploitation and exploration mentioned in table 1 (implicitly) focus on large firms. This means that when they talk about ’new’ assets, they assume that during exploitation these assets are developed *within* the firm. However, in our opinion, they are mixing up the content and context dimensions of the strategic renewal process! This becomes more evident realizing that as a result of resource scarcity many small firms will not be able to buy or develop specific new competencies, and will try to find other ways to gain control over them. For example by using strategic alliances.
Based on these arguments, we propose the following working definitions:

Exploitation: is a strategic renewal process aimed at leveraging existing firm-specific assets by improving them or by improving their use.

Exploration: is a strategic renewal process aimed at acquiring and/or controlling new firm-specific assets.

As we argued, it is importance to separate the content from the context dimension. To clarify this difference, we developed a strategic renewal matrix (table 2) illustrating how our working definitions and these two dimensions lead to four *types of strategic renewal:*

- internal exploitation (through incremental, simple learning)
- external exploitation (using existing firm-specific assets in a different context),
- internal exploration (developing new firm-specific assets through organizational learning)
- external exploration (gaining control over new firm-specific assets developed by other parties).

Table 2 The strategic renewal matrix; four types of renewal strategies.

Strategic Renewal ↓content context→	*internal:*	*external:*
exploitation: to leverage existing firm-specific assets ..	.. through incremental improvements, or ..	.. by using the firm-specific assets in a different context.
exploration: to acquire and/or control new firm-specific assets ..	.. through organizational learning, or ..	.. by using the firm-specific assets of other parties.

The internal strategies will be typically organized around projects (e.g. new product development or new ventures) while the external strategies will often take the form of mergers/acquisitions and strategic alliances. This typology helps us to understand important differences and nuances between the definitions presented in table 1. Volberda e.a. (2001), for example, explicitly include geographical expansion as an explorative action. Applying the strategic renewal matrix, we would need additional information on whether the firm's geographical expansion is built on existing competencies (i.e. exploitation) or new competencies that need to be developed or acquired (i.e. exploration).
Please also note that the two hybrid forms discussed earlier are examples of different classes. Nooteboom's (2000) hybrid form seems to focus on generalizing firm-specific assets to other product/market combinations, which we would classify as internal or external exploitation. Danneels (2000), on the other hand, stresses that existing competencies are leveraged through new competencies, that

may be developed in-house (i.e. internal exploration) or bought from/developed in co-operation with other parties (i.e. external exploration).

Although not of major concern for our argumentation, it is important to realize that similar to many organizational processes, successful strategic renewal implies the management of a paradox. As March (1991, p. 71) put it: "*Adaptive systems that engage in exploration to the exclusion of exploitation are likely to find that they suffer the costs of experimentation without gaining many of its benefits. Conversely, systems that engage in exploitation to the exclusion of exploration are likely to find themselves trapped in suboptimal equilibria. As a result, maintaining an appropriate balance between exploration and exploitation is a primary factor in system survival and prosperity.*" Factors such as increasing returns to experience and the temporal and spatial proximity of exploitation benefits tend to increase exploitation and decrease exploration (March 1991). On the other hand, factors such as individual attribution of causality in case of success, combined with organizational tendencies to promote successful people to authority (rather than unsuccessful ones) create an opposite tendency (Levinthal and March 1993).

As we mentioned earlier, extant literature has not yet tackled the topic of exploitation and exploration strategies in small firms. Now we are able to develop our first research question, which is of an exploratory character:

Research question 1:are SMEs' internationalization strategies of an exploratory or an exploitative nature?

THEORY OF INTERNATIONALIZATION PATHS OF SMEs

The phenomenon of globalization puts pressure on SMEs to develop strategies for internationalization. Currently, SMEs are not yet fully represented in the international economy as large firms (Fujita 1998), although their involvement in internationalization activities is increasing (Lamb and Liesch 2002). In particular limited resources (financial, managerial, information, etc.) seem to frustrate the efforts of SMEs to internationalize (Baird et al. 1994, Buckley 1989, Burpitt and Rondinelli 2000, Fujita 1998). By means of inter-firm cooperation, SMEs may, however, gain access to additional resources and enter markets or enhance revenues in a manner not possible for each firm alone (Contractor and Lorange 1988, Burgel and Murray 2000, Fujita 1998, Hoffmann and Schaper-Rinkel 2001). This implies that integration decisions (or, in other words, the renewal strategy's *context* decisions) are frequent and relevant for small, internationally active firms, With some notable exceptions (e.g., Bell 1995, Coviello and Munro 1997, Holmlund and Kock 1988, Korhonen et al. 1996), empirical research on the internationalization process of SMEs tends, however, to ignore inter-firm cooperation. Inter-firm cooperation is embedded in strategic alliances, and international co-operation is embedded in international strategic alliances (ISA's). An ISA is a cooperative relationship with a foreign partner (operating backward, forward or in the same stage of the value chain) aimed at the development, distribution, and/or production of products in a foreign market. This relationship may be characterized by equity sharing, such as in the case of joint ventures, and/or may be a contractual arrangement without equity sharing.

This leads us to the development of our second research question. In order to renew themselves, and to prosper in dynamic, international environments, SMEs choose to follow specific exploitation and/or exploration strategies. As any other (read 'larger') firm, the SME subsequently has to find a specific strategic renewal context, which enables a successful implementation of the strategy. As we discussed in our introduction, earlier research (e.g. Nooteboom 2000, Rothaermal 2001) points at possible interactions between content and context of renewal strategies. We are interested in the actual choices SMEs are making in these matters.

Research question 2: what is the impact of exploitation and exploration strategies on the level of integration of the firm?

We discussed the content and context dimensions of the (international) strategic renewal processes of SMEs, but as we explained earlier, a third dimension exists, i.e. the process or time dimension. The 'establishment chain' (stage) theory proposed by Johanson and Weidersheim-Paul (1975) and further developed by Johanson and Vahlne (1977), is of particular significance here, since this is one of the few studies that try to explain changes in internationalization strategy in time. This theory suggests that firms expand internationally through various 'stages': internationalization begins with low risk, low-commitment modes of entry - direct exporting - to high risk, high-commitment modes of entry – the erection of foreign sales and manufacturing subsidiaries - (Johanson and Wiedersheim-Paul 1975, Johanson and Vahlne 1977). This sequence of stages represents an increased commitment in the market because of managerial learning about internationalization (Johanson and Vahlne 1977). Internationalization is thus considered to be a cumulative, path-dependent process, where "the pattern of behavior of firms is contingent upon and a function of its past international experience" (Eriksson et al. 2000). The stage models have received considerable empirical support (e.g. Eriksson et al. 2000, Kwon and Hu 1995). However, the underlying assumptions of the stage models of step-wise progression and forward motion have been criticized as being too deterministic (e.g. Andersen 1997). Although we did not find any extant studies on the development of exploitation vs. exploration strategies of SMEs in time, and the connected decisions on firm integration, the establishment chain theory gives us some first ideas. For example, this theory states that more internationalization experience leads to high-commitment and the use of integrated contexts (e.g. subsidiaries) instead of other contexts (e.g. strategic alliances). This supports the relevance of our third research question.

Research question 3: how do content en context of the strategic renewal process develop over time?

Recent empirical research has indicated that the internationalization process of small high-technology firms ('New economy') differs from the process of firms operating in more traditional, mature industries ('Old economy'). Among other things, these differences relate to the time frame in which the internationalization process occurs (Burgel and Murray 2000, Bell 1995, Coviello and Munro 1997, Crick and Jones 2000). Based on these findings, we posit that the choice for specific renewal strategies is not only a function of structural characteristics of the firm (see e.g. Burgel and Murray 2000, Erramilli and Rao 1993), but also of industry-specific characteristics. In the context of strategic renewal of multi-national financial service companies, Volberda e.a. (2001) reach similar conclusions (additionally, they also found country-specific characteristics). This leads us to our fourth, and final, research question:

Research question 4: do strategic renewal dimensions differ between Old Economy and New Economy firms?

METHODS

As this paper is part of a larger study to gain in-depth insight into the 'how' and 'why' of internationalization strategies, a case study approach was considered most appropriate (Eisenhardt 1989, Yin 1989). The empirical part of the study consisted of a multiple case comparison methodology, involving a series of in-depth interviews with senior managers about the internationalization process of their company. In each firm, we had interviews with at least two or three informants to ascertain internal validity. These informants were owners/managing directors, and/or senior managers responsible for marketing or production with extensive knowledge of the firm's internationalization developments. In total, 26 in-depth interviews were conducted in 12 firms, each of on average one to two hours. The interviews were tape-recorded and later transcribed to ensure accuracy. Based on the interviews we constructed case descriptions that were returned to the interviewees for possible revision and consent. Although the primary vehicle for gathering information was the series of in-depth interviews conducted at each firm, we also had access to other relevant documents such as newspaper articles, company advertising material, and business reports. To gather the needed data from the managers, a semi-structured questionnaire was developed that contained open-ended and close-ended questions. The questionnaire resulted from an examination of the literature on internationalization processes and was refined through discussions with experts and academics. The interviews concentrated on the following main areas: 1) company and industry context; 2) internationalization strategies/steps and changes in these strategies over time; 3) the stimuli, barriers and impediments facing these firms in their internationalization process.

We selected the Dutch firms from the commercial database of MarktSelect that contains one million enterprises in the Netherlands. In order to be selected, a firm had to be an indigenous and independent entity (i.e. not belonging to a larger corporate group), had to have no more than 250 employees, and had to operate in the computer software or mechanical engineering sector. From the firms that could be retained, we examined which firms had gone beyond 'plain' exporting. We did this by examining different information sources, amongst others, the website of the firms (if present), membership lists of relevant organizations in the field internationalization, interviews with experts, and sector reports. Based on this information we made a list of the firms that complied with all of our criteria. From this list, we interviewed informants from 12 firms using a random sampling process stratified by sector. Because all firms were randomly selected from a list of firms sharing a similar profile, we have little reason to believe that the responses of those firms contacted differ from those not contacted. A summary of selected characteristics of the firms in our sample is presented in appendix A.

Our sample of 12 firms is equally divided between the mechanical engineering ('Old economy') and the software production sector ('New economy'). The mechanical engineering firms were on average 45 years old and the software firms eight years. The offerings of both the mechanical engineering and software firms were typically targeted at 'niche' markets. The mechanical engineering firms spend, on average, less of their annual sales revenue on R&D than the software firms do, which reflects the average industry trends. The software firms have an export percentage of 33 percent and for the mechanical engineering firms this is 58 percent. On average, the mechanical engineering (ME) firms had 89 employees with an annual turnover of less than 13 million Euro. The software production (SP) firms had on average 34 employees and an annual turnover of less than 3 million Euro. The average personnel size of the firms in our sample is thus comparatively low. This is a consequence of the construction of the wider

Dutch business system: it has a 'waisted' structure, with a great deal of employment in both large and small companies. A sampling that targets Dutch enterprises necessarily leads to more firms with 100 employees or below, since these are so prevalent (i.e. although our sampling criterion includes firms with less then 250 employees, 11 of our 12 sample firms have less then 100 employees). This consequence of the Dutch SME firm population has the effect, which is welcome here, of zooming in even more on a stratum of firms, which experience resource scarcity more acutely. Our whole study design and natural selection bias is therefore geared to shed light on what firms do and experience, for which internationalization beyond direct exporting seems attractive, but which at the same time face resource scarcity in a more acute way. This problem area leads us to the particular firms to be studied, and through this selective and purposeful focus, the exploratory character of the study may be compatible with furnishing more generally interesting findings.

Variables and Measures

For analyzing the qualitative case findings, in this paper we mainly use simple methods such as categorizing and counting frequencies. In this section we will explain the variables and measures used in these processes, which are based on the literature review presented above. These variables and measures relate to the following topics:

- Measuring the use of exploitation and exploration strategies.
- Measuring the level of integration of international renewal strategies.
- Measuring the time dimension of the international renewal strategies.

In order to measure the use of exploitation and exploration strategies by the case firms, we will use the working definitions and the strategic renewal matrix as developed in our theoretical section.

As regards the level of integration, we argue that an SME may either choose for the strategic option of a 'go-it-alone' or autonomous strategy (by direct exporting and/or creating fully owned foreign subsidiaries) or for a cooperative strategy, using ISAs. We thus conceptualize entry modes choices as 'binary' (for a similar approach see e.g. Burgel and Murrey 2000, Erramilli and Rao 1993). Many firms will probably use both strategies at the same time, but we expect that one of these types of strategies will be dominant in most firms, and that this dominance may shift over time.

Firms that use an *autonomous* internationalization strategy act, as the term already indicates, in an independent way. Firms engaged in direct exporting using their own export sales staff or independent intermediaries operate in an autonomous fashion. Firms that have their own foreign sales offices and/or their own production facilities in foreign markets also operate in an autonomous fashion. The autonomous strategy may be referred to as the 'classic' strategy of cross-border activities, which was typical for larger firms for a long time. It is likely that, in an ideal world, any firm would prefer to be in charge of its own destiny and would choose a go-it-alone strategy. Yet, the latter is most probably often outside the reach of SMEs because of resource constraints.

Firms that use the *cooperative* internationalization strategy partly and deliberately give up their autonomy for the purpose of cooperating in order to facilitate internationalization. Inter-firm relationships may overcome resource constraints (Fujita 1998, Burgel and Murray 2000). These relationships do, however, create costs, such as the creation of incentives and monitoring mechanisms, while revenues are typically shared between the partners.

Table 3 explains the four types of strategic renewal that our operationalization of content and context of strategic renewal leads to.

Table 3 Strategic renewal matrix as used in the empirical study.

Strategic Renewal ↓content	context→	*internal/autonomous:*	*external/co-operative:*
exploitation:		autonomous exploitation	co-operative exploitation
exploration:		autonomous exploration	co-operative exploration

Measurement of the development in time is performed as follows. For all cases, time-ordered matrixes were constructed that describe the major stages in the development of the firm from birth to specific plans for the near future. These matrices show how specific international activities were initiated, adapted, continued, or terminated. Each adaptation was labeled as a transition from an old to a new strategy. The actual moment of transition is not relevant. This means that every transition may have taken place somewhere at the beginning of the time-path, in the recent past, or even in the near future.

ANALYSIS AND RESULTS

The measurements described above were used to construct tables in which for each case firm the content, context and process dimension of the strategic renewal process were summarized. By doing so, our first finding was that exploration and exploitation strategies were much more varied then expected, based on the literature on this topic. To better understand the complexities of this dichotomy, and to get a first idea of the actual behavior of our case firms, we will first describe this variety of strategies and develop a more detailed classification of exploration and exploitation strategies. Next, we present the aggregate empirical results that will be discussed in the next section.

Classification of observed exploitation and exploration strategies

Overall we were able do distinguish between five kinds of exploration and exploitation strategies that were used by the firms investigated. This classification is presented in table 4.

Table 4. Empirical findings: a classification of international exploitation and exploration strategies of SMEs.

Content of renewal strategy:	**Aimed at:**	**Typical examples:**
Exploitation		
New market exploitation	New markets	Entering new foreign markets with mature products (standardized, rest-niche) or following existing customers. Typically motivated by expected scale and scope benefits.
Low cost exploitation	Production efficiency	Move production to low cost foreign region to lower production costs, sometimes forced by large customer.
Specialization exploitation	Focus on core competencies	Improvement and more efficient use of competencies by outsourcing pre-and post sales activities.
Exploration		
New market exploration	Customer competencies	Developing international strategic alliances in order to use and/or acquire specific market knowledge. Typically, this involves highly innovative and/or customized products which limits scale and scope benefits.
Innovation Exploration	Technological competencies	Developing international strategic alliances in order to use and/or acquire new technological knowledge

As regards *exploitation* strategies, we observed three different kinds of strategies. First, a number of case firms had developed strategies to enter *new markets* that they were able to serve adequately with only little additional knowledge. This is only possible in relative simple situations, such as a major customer that starts activities abroad and asks (or forces) the firm to come along. An example is the software firm S1 that followed it largest customer to the Belgian market, and could easily start to target similar local customers. Another relative simple situation in which this strategy can be successful is when the firm is operating in an international rest-niche. S5, for example, had succeeded in obtaining the exclusive rights for a specific (more or less outdated) communication system for

which a specific and limited target group exists. We did not find this strategy with any of our machine engineering case-firms.
A second exploitation strategy that we observed is what we call *Low Cost exploitation.* Firms following this strategy in an international context are using their knowledge about efficient production-organization in a new environment in which factor costs are relatively low. We found this strategy both in the SP as in the ME industry. S2, for example, started a production subsidiary in India, which failed due to an underestimation of senior management of the cultural and geographic distance, which made the costs supersede the returns. Another software firm, S6, started production in cooperation with a local supplier in Eastern Europe. This strategy did work, and the company is now planning to develop more similar co-operations in other European countries.
In the ME industry we found only one firm (M2) with a clear-cut Low Cost exploitation strategy. This firm started this strategy because the major customer demanded it. After some time, however, the firm gained experience and local knowledge and now sees more opportunities to profit from this strategy. Other ME firms used a low cost exploitation strategy in combination with a new market exploration strategy, which will be discussed below. Obviously, scale and scope effects are more easily realized in the mechanical engineering sector then in the software production sector.
A third exploitation strategy was only observed in the software production sector, we labeled this strategy *Specialization exploitation*. In this strategy the firm aims at using its limited resources as effective and efficient as possible, and deliberately outsources activities that most firms would prefer to keep in-house. Software production firm S3 for example developed a close network of consultancy firms that take care of all pre- and post sales activities. This strategy gives S3 the opportunity to focus on exploiting its specific (technological) knowledge instead of loosing time and energy to commercial activities.

In addition to the three exploitation strategies, we observed two main types of exploration strategies in our case-firms: New Market exploration and Innovation exploration.
New Market exploration is a strategy in which the small firms wants to enter new foreign markets that differ from present markets to such an extent that new competencies have to be developed or a strategic partner has to be found. S3 for example, whose customers are in the financial services sector, started subsidiaries in London and New York because its customers demanded local presence and familiarity with the local 'inner circle'. In the ME sector we found that four of the six case firms followed a New Market exploration strategy, but combined with a Low Cost exploitation strategy. M1, M3, M4 and M5 started co-operative alliances or opened subsidiaries in for example China, Vietnam, Spain and the

US. All those markets were characterized by cultural differences with markets presently served, and local factor cost advantages (mainly labor in low wage countries, and land prices and environmental costs in the US). For these firms combining two strategies in one seems to be an efficient path.

The fifth and final strategy that we observed is *Innovation exploration*, the more classical case of exploration. Theoretically, firms following this strategy either develop new technological competencies themselves, or gain control over them by merger/acquisitions or strategic alliances. However, we only found examples of the latter kind, which is understandable considering the SMEs' limited resources. All software production case-firms follow an Innovation exploration strategy. Of the ME firms only two out of six firms followed this strategy (M1 and M5), these are the firms whose specific niches depend heavily on technological innovation. M4 has plans to develop a similar strategy, but for another reason. The core technology of its main product is getting obsolete, and this firm simply needs to renew its technological core competencies to have a viable future.

Most firms combined several of these five strategies at the same time, dependent on the cultural distance with the foreign region, the availability of local partners, etcetera. We did not find any firms that combined the Innovation exploration strategy (aimed at customized products) and New market exploitation strategy (aimed at standardized products). This could again be explained by the limited size of the SMEs; they usually do not have a broad portfolio of strategic renewal projects but are focussed niche players.

In general, the co-operative strategies of the ME firms are somewhat more complex then those of the software firms. Within one strategy, they have more different partners, for example by having a similar strategic alliance with licencees in various countries, or by working together in a strategic alliance with more then one partner at the same time.

Table 5 puts the five identified strategies in the earlier developed strategic renewal matrix (cf. table 3). We see that we did not observe any autonomous Innovation exploration strategies in our sample. As discussed earlier, this is probably due to the limited resources of the small firms; developing new technological competencies is expensive, and although many of the case-firms have relatively high R&D expenses (see appendix A), they are just not able to develop all needed technology in-house.

Table 5 A strategic renewal matrix with the five observed types of international exploitation and exploration strategies of SMEs .

Strategic Renewal ↓content	context→	*autonomous:*	*co-operative:*
exploitation:		New market exploitation Low cost exploitation	New market exploitation Low cost exploitation Specialist exploitation
exploration:		New market exploration	New market exploration Innovation exploration

Use of co-operative vs autonomous strategies per sector

Table 6 summarizes our findings as regards the actual use of exploitative/explorative and autonomous/co-operative strategies.

Table 6. Observed frequencies of various types of renewal strategies and their development in time.

		old strategies (t=0)	**new strategies (t=1)**	**stable strategies**[a]	**strategy transitions**[b]
Software Production (n=6)	exploitative	5	5	2	3
	explorative	5	9	5	4
	autonomous	2	4	1	3
	co-operative	8	10	6	4
	total	10	14	7	7
Mechanical Engineering (n=6)	exploitative	2	3	2	1
	explorative	10	13	9	4
	both	2	5	2	3
	autonomous	4	5	3	2
	co-operative	10	16	10	6
	total	14	21	13	8

a content or context of strategy on t=0 is equivalent to t=1

b content or context of strategy on t=0 changes to t=1

This table should be read as follows. In the software production sector, the six case firms together follow 14 different renewal strategies. In time, the total number of strategies had increased from 10 to 14. Of these 14 new strategies, seven had remained stable in time while the other seven had changed in content and/or context. On a more detailed level table 6 shows how the content of the strategies develops in time (e.g. from five to nine explorative strategies in the SP sector) and how the context develops simultaneously (from eight to ten co-operative strategies in the same sector). The last two columns show us that in the SP sector explorative strategies are more stable then exploitative strategies, and that co-operative strategies are much more stable then autonomous strategies. In the next section, we will discuss these findings.

DISCUSSION

This discussion will be structured around the research questions developed earlier. The answers to the third and fourth question will be combined with the other two.

Research question 1, 3 and 4: are SMEs' internationalization strategies of an exploratory of an exploitative nature? How does this develop over time, and are there any differences between sectors?

Looking at the first two columns of table 6, this question can be answered quite easily. A first observation is that ME firms clearly use more different renewal strategies then SP firms (a total of 35 vs. 24 strategies). In some cases specific renewal strategies had clearly both an exploitative and an explorative nature, we labeled these in table 6 as 'both'. These cases were all ME firms.
In their earlier lifetime, SP firms follow a balanced path of exploration and exploitation while as they grow and gain more experience, the balance is clearly tilted towards more explorative strategies. We may explain this by the fact that SP firms often start with a new business idea; in their first stages they first try to exploit this idea in combination with working on new competencies for the future. Sometime later their first idea becomes obsolete (and in this sector this can happen very fast), and attention shifts to more explorative actions. We see that in the time-period studied, half of the strategies are adapted (seven strategy transitions).
In the ME sector the situation is clearly different. For ME firms explorative strategies are clearly dominant. In time this dominance does not change, we do see however that more ME firms choose for strategies that combine exploration and exploitation. One explanation for this finding is that the ME firms are much older then the SP firms and in later stages of their organizational/product life cycles. In order to survive in their international niches, exploration was and still is necessary. The less turbulent environment of the old economy firms leads to relatively stable renewal strategies, 13 out of 21 present strategies have not changed in the time-period studied.

Research question 2, 3 and 4: what is the impact of exploitation and exploration strategies on the level of integration of the firm? How does this develop over time, and are there any differences between sectors?

The results presented in table 6 show that both SP and ME firm have a clear preference for co-operative strategies. The developments in time, however, are quite different. In the software sector, the number of renewal strategies used grows in time, but autonomous strategies grow relatively faster (from two to four strategies vs. from eight to ten). This growing preference for autonomous strategies could be explained by the recent turbulence in the ICT-sector. This turbulence led to large customers going bankrupt, large partners changing technological platforms, etcetera. In such an environment, a dependence on co-operative strategies drags the small software firm into unexpected and uncontrollable situations. Once managers have experienced this, they develop a preference for more autonomous strategies, even if that means slower growth or less ambitious other goals. Our findings indicate, however, that the software firms do not easily implement these autonomous strategies. Table 6 indicates that the autonomous strategies are less stable then the co-operative ones.
In the ME sector, in which the environment is much less turbulent, we see a contrasting development; the share of co-operative strategies grows in time. Moreover, both the co-operative and the autonomous strategies are relatively stable in time as well.

Limitations

The main limitations of our study are the following. Since we do not have sufficient data on firm growth, we cannot determine whether growth is a result of the chosen international renewal strategy, or vice versa. Our study is thus unable to provide any conclusions on long-term performance implications of the different strategies. It should also be noted that our conclusions are drawn from a limited number of case studies in one specific country. Some caution should thus be exercised concerning the generalizability of our findings. Finally, our study is of an exploratory nature. Because no earlier studies on exploration and exploitation strategies in SMEs exist, we can not compare our results with similar studies. Future research will has to fill this gap.

Future Research and Implications

Additional research is necessary in several directions. First, the impact of organizational size merits additional research effort. As discussed in our methodology sector, the Dutch 'waisted' business system causes our sample firms to be relatively small, even for SMEs. What happens if similar issues are studied in somewhat larger SMEs, i.e. between 100 and 250 employees?

Second, it would be worthwhile to look into the problem deeper and focus on explaining the trajectories that lead to specific strategic renewal decisions. Especially the classification that we developed distinguishing between exploitation strategies aimed at New Markets, Low Costs or Specialization, and exploration strategies aimed at New Markets or Innovation needs further development and empirical support. But it would be also interesting to make paired comparisons at a case level, instead of looking at aggregate frequencies as we did in this paper.
Third, although we tried to provide some first explanations for our findings, additional research is necessary. Our case data can provide some information, but probably additional empirical research is needed. This also provides the opportunity to use the definitions and classifications as developed in this paper.
Finally, as Volberda e.a. (2001) argue, in addition to firm and sector variables, country of origin could have an important influence on strategic renewal decisions. This means that replication of our study in other countries would be relevant as well.
A more general implication of our study is that future studies on corporate renewal that include exploration/exploitation should pay more attention to adequate definitions and classifications of exploration and exploitation strategies. To start with, the three dimensions of strategic renewal, i.e. context, content and process should be acknowledged and included in operationalizations. Our literature review showed that the concepts are still rather fuzzy, which really hinders further development and integration of empirical findings.

CONCLUSIONS

Our findings indicate that type of industry is indeed a major determinant of renewal strategies. 'Old economy' firms have more, and more complex international renewal strategies then 'New economy firms'. We also find differences between sectors as regards the strategic goal of the renewal strategy; we developed a classification of two different types of exploration and three different types of exploitation which were more or less dominant in the various sectors. As regards the balance between the content and context of the renewal strategies and its development in time additional differences were found.
'New economy' firms tend to follow strategies that both exploit their capabilities and resources to the full, while they also try to upgrade and innovate. New economy firms thus seem to follow a balanced path, although in the earlier phases the internationalization process is more tilted towards co-operative behavior and in the later phases towards explorative behavior. The strategies of 'old economy firms' are predominantly of an explorative and co-operative nature, especially in

the later stages co-operative strategies are dominant. We also found combined strategies of exploration and exploitation that seem to be unique for the ME firms. Major explanations for these differences are environmental turbulence, possibilities for scale and scope effects, stage in the product life cycle and the individual preferences of the CEO. Our aggregate findings indicate that SME exploration strategies are mostly of a co-operative nature which complies with expectations based on general theory (e.g. Nooteboom 2000) and specific small business theory (e.g. Fuijita 1998). The level of integration of the international activities reflects a trade-off between optimal exploitation/exploration versus resources availability and transaction costs.

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APPENDIX A: Characteristics of the Sample Firms

Mechanical engineering	Empl.[a]	Turnover EURO[b]	Founded	Description Products	Export intensity	R&D intensity
M1	160 (180)	25	1960	Purification systems	95%	6%
M2	80 (80)	15	1988	Pipework for ships	10%	1%
M3	90 (107)	15,7	1961	Machines for the recycling industry	90%	high[c]
M4	50 (51)	5	1883	Equipment/systems for starch production	70%	5%
M5	32 (34)	4,8	1985	Hydraulic systems	25%	high[c]
M6	80 (80)	7,5	1957	(Stainless steel) pressure vessels and heat exchangers	60%	2%

Software	Empl.[a]	Turnover EURO[b]	Founded	Description Products	Export intensity	R&D intensity
S1	75 (75)	4,5	1998	Development of web design and - consulting	5%	25%
S2	58 (58)	3,8	1995	Software for better internet and intranet use	0%	5%
S3	27 (29)	n.a.	1990	Development of Information management solutions (software) for financial institutions	70%	very high[c]
S4	25	1,7	1986	Software and hardware for industrial control systems	50%	17%
S5	5 (5)	n.a.	1988	Software solutions for information management	65%	high[c]
S6	14 (14)	1,4	1999	Total (digital) media software consulting and production	5%	10%

a. In bold: Employees in home country; between parentheses: employees in total.
b. Average turnover of 1998-2000, in millions of Euro
c. Relative to industry average