Internationalisation: a co-evolutionary perspective

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Abstract

Earlier research has identified several organisational and contextual factors relating to the internationalisation of the firm. However, the relations between these factors and their interaction over time have not been clearly understood. This paper seeks to bridge this gap and to provide a contribution to the internationalisation literature by presenting a co-evolutionary approach whereby the internationalisation path of the firm is seen as a product emerging from the co-evolution of internationalisation activities, organisational resources and industry influences. A longitudinal case study of the internationalisation of Orion Diagnostica illustrates the explanatory potential of the co-evolutionary model and captures the complex and interactive nature of the firm's internationalisation over time. The findings of the study also clarify the constraints that enable or compel a firm to internationalise rapidly and show how and why the status of "born globals" may change radically in the further internationalisation development.

Key words: Internationalisation, co-evolution, capabilities, resources, diagnostics industry

1. Introduction

The internationalisation of the firm has continued to be one of the focal topics in international business literature. The latest discussions have concluded that internationalisation is essentially an evolutionary process, although not necessarily an incremental or a progressive one (e.g. Jones & Coviello, 2005; Lamb & Liesch, 2002; Madsen & Servais, 1997). Researchers have also shown that the internationalisation path of a firm is likely to interact with the evolution of industry (Andersson, 2004), and to be dependent on business network relationships (e.g. Johanson & Mattsson, 1988; Majkgård & Sharma, 1998; Sharma & Blomstermo, 2003) and organisational resources and capabilities (e.g. Andersen & Kheam, 1998; Sapienza, Autio, George & Zahra, 2006). Further, to make it possible for us to address the complexity of factors and processes interacting over time, several scholars have argued that internationalisation should be examined holistically with the help of longitudinal case studies (Coviello & Jones, 2004; Liesch, Welch, Welch, McGaughey, Petersen & Lamb, 2002; Meyer & Gelbuda, 2006).

Indeed, it seems that earlier research has identified most of the core aspects relating to the internationalisation of the firm. However, as recent studies have emphasized (Coviello & Jones, 2004; Liesch et al., 2003; Meyer & Gelbuda, 2006), more attention should be paid to the relations between these factors and longitudinal research that captures the dynamic and complex nature of internationalisation. The purpose of the present study is to contribute to this endeavour. In order to do so a co-evolutionary model for analysing outcomes related to the internationalisation path of a firm will be developed; thereafter a longitudinal case study of the internationalisation path of Orion Diagnostica, a Finnish diagnostics firm, between the 1960s and the beginning of the new millennium will be presented.

The co-evolutionary model offers a new theoretical approach integrating the internal, contextual, and processual aspects of the internationalisation of the firm. Specifically, the

model explains how the internationalisation path, and distinct positions along this path, can be considered as emergent products of the co-evolution of internationalisation activities, organisational resources and industry influences. The case study illustrates how the explanation of a firm's internationalisation path requires an understanding of the nature of the prevailing industry and resource constraints, and how these relate to the international activities and choices of the firm, and vice versa. This, in turn, requires that we understand how these constraints and the available choices have emerged in the first place. Accordingly, the co-evolutionary approach provides a balanced way of considering the combined outcomes of environmental selection pressures and managerial adaptation (including learning and the intentional renewal of the firm's knowledge base) that drive the internationalisation of the firm.

The paper is organised as follows. Section two below reviews the evolution and current state of internationalisation research. This is followed in section three by a discussion of the co-evolutionary model of internationalisation. The fourth section describes the methods and data. The analysis of the internationalisation path of Orion Diagnostica is presented in the fifth section. The paper is concluded by discussing the implications and limitations of the study and proposing some avenues for future research.

2. Literature review

One of the core arguments in internationalisation literature emerged from the behavioural process model of the Uppsala School (Johanson & Vahlne, 1977; Johanson & Wiedersheim-Paul, 1975). This model, which considered the nature of firms as adaptive systems, launched the view that internationalisation is an incremental process toward greater international involvement by way of experimental learning (Andersen, 1993; Eriksson, Johanson, Majkgård & Sharma, 1997; Forsgren, 2002; Welsh & Luostarinen, 1988).

During the 1980s and 1990s, the findings concerning "born globals", also known as "international new ventures" or "global start-ups", questioned the incremental nature of internationalisation (e.g. Hedlund & Kverneland, 1985; Knight & Cavusgil, 1996; Oviatt & McDougall, 1994). Subsequently, studies focusing on explaining rapid internationalisation, and international entrepreneurship in general, began to accumulate (e.g. Autio, Sapienza & Almeida, 2000; Moen & Servais, 2002; Oviatt & McDougall, 1997; Zahra, Ireland & Hitt, 2000). However, this literature, driven by static cross-sectional studies, has been largely unable to capture complex processes (cf. Coviello & Jones, 2004), although Madsen and Servais (1997) did point out that the internationalisation of born globals may also be an evolutionary process.

The weaknesses of the Uppsala model also led researchers to consider internationalisation from a business network perspective. In a seminal study Johanson and Mattsson (1988) defined industrial markets as networks of relationships between firms. According to this view, the internationalising firm creates and reinforces network positions in relation to its counterparts in other countries. Depending on the degree of its internationalisation and the degree of the internationalisation of the market, the firm may be classified as an "early starter", "late starter", "lonely international", or "international among others". A crucial element in this model is that the internationalisation choices and network strategies of the firm are seen to depend on the firm's own environment, i.e. the degree of the internationalisation of the markets (see also Chetty & Blankenburg Holm, 2000; Majkgård & Sharma, 1998). The subsequent internationalisation-related work on networks has focused in particular on the role of experimental learning and knowledge, thus emphasising the power of managerial adaptation (e.g. Blomstermo, Eriksson, Lindstrand & Sharma, 2004; Coviello & Munro, 1997; Johanson & Vahlne, 1990, 2003; Petersen, Pedersen & Sharma, 2003; Sharma & Blomstermo, 2003).

These various approaches have revealed that the internationalisation of the firm cannot be easily captured by a single theory (see also Petersen et al., 2003). Coviello and Martin (1999), for example, examined internationalisation from the perspectives of stage models, networks, and foreign direct investment theory. Jones (1999), in turn, argued that a small firm's early pattern of internationalisation can only be described as a holistic process combining interrelated decisions and processes. The proposal for a holistic approach was also subsequently made by other researchers (Chetty & Campbell-Hunt, 2003; Crick & Spence, 2005; Fletcher, 2001). Even so, in reviewing the existing internationalisation literature, Liesch et al. (2002, p. 28) declared that the earlier research had hardly scratched the surface of internationalisation as a process. They thus called for longitudinal, in-depth case studies that would enable us to identify "the heterogeneity of organizations and complexity of factors and processes interacting on and within organizations over time". This challenge for future research was restated by Coviello and Jones (2004) and by Meyer and Gelbuda (2006).

A conceptual contribution on those lines was provided by Jones and Coviello (2005), who proposed models for internationalisation as a time-based process of entrepreneurial behaviour. Essentially, they claimed that entrepreneurial behaviour evolves over time and interacts with the environment and firm. These suggestions fit in with earlier proposals that internationalisation research should take account of the history of the firm (Eriksson et al., 1997), of broader industry or sectoral factors (Andersson, 2004; Boter & Holmquist, 1996; Melin, 1992), and of organisational resources (Andersen & Kheam, 1998; Knudsen & Madsen, 2002).

Thus, in the light of current knowledge and ambitions regarding further systematic advances in internationalisation literature, it seems clear that we need a more theoretical understanding of internationalisation as a process influenced by the interplay of several internal and external factors and by the preceding development. Further, there is an urgent

need for theory-driven longitudinal research to capture and explain the obviously idiosyncratic nature of the internationalisation of the firm. Therefore, a suggestion for a co-evolutionary model of internationalisation is offered. The model attempts to reveal the evolutionary dynamics of the internationalisation that are based on environmental selection pressures and intentional adaptation by managers.

3. A co-evolutionary model of internationalisation

3.1. Basic setting

Co-evolutionary models have been receiving increasing theoretical attention in organisation and management literature (e.g. McKelvey, 1997; Murmann, 2003; Lewin & Volberda, 1999). However, as Volberda and Lewin (2003) noted, co-evolutionary research is still in the early stage. The same applies to international business literature (cf. Madhok & Liu, 2006), although researchers have shown that the internationalisation of the firm is an evolutionary and holistic process. Nonetheless, these earlier accounts clearly confirm the claim that the internationalisation process occupies a co-evolutionary position in relation to other processes.

Generally speaking, for a co-evolutionary relation to occur it is necessary that two or more processes must have a noticeable influence on each other's evolution (Lewin & Volberda, 1999; Murmann, 2003), although the interactive relation does not necessarily have to be symmetrical. For example, the evolution of a firm often exerts a more modest influence on the evolution of an industry than the other way round. However, as Murmann (2003, p. 22) has pointed out, the establishment of interactive relations between processes is essential if we are to be able to distinguish between co-evolutionary explanations and standard evolutionary explanations based on the variation, selection and retention (VSR) model of change. In this light, the primary purpose of co-evolutionary research is to identify the outcomes of the co-evolutionary interaction between processes and, in so doing, to explain industrial and

organisational change and development more successfully (Lewin, Long & Carroll, 1999; Volberda & Lewin, 2003).

Building on the earlier accounts of internationalisation, it is suggested here that the firm's internationalisation process is essentially in a co-evolutionary interaction between its own internal resources and capabilities and the external industrial context (i.e. the competitive environment consisting of other firms and their relationships). In other words, as illustrated in the model in Figure 1, the internationalisation of the firm can be described as a product of the co-evolution of internationalisation activities, organisational resources and industry influences. Thus, to capture the evolutionary, complex and interactive nature of firm internationalisation over time, we have to look at the way industry pressures compel firms to select particular forms of international operations, and how managers try intentionally to adapt organisational resources and internationalisation activities so as to meet or even surpass the requirements of industry. As a whole, the changes in the internationalisation path can thus be seen as the joint outcome of the two driving-forces: managerial adaptation and environmental selection pressures (cf. Lewin & Volberda, 1999). These relationships are discussed in greater detail below.

Insert Figure 1 about here

3.2. The co-evolution of industry and internationalisation

As pointed out by Andersson (2004), the direction and speed of internationalisation are always dependent on the industrial context, which in turn is involved in continual change through processes of variation, selection and retention (McKelvey, 1997). Thus, explanations as to how industry evolution will influence internationalisation, and vice versa, are always industry specific (cf. Liesch et al., 2002). However, some characteristics can be mentioned

that indicate this bidirectional causality, and can help us to understand the possible consequences of the relationship.

For this discussion the notion of industry lifecycle (Klepper, 1997; McGahan, Argyres & Baum, 2004) is useful. In brief, the industry lifecycle model suggests that young industries first face a period of fragmentation. This is followed by the emergence of a dominant model that produces better results and efficiency than the available alternatives. During the development of the dominant model the industry undergoes a shakeout, as unaligned firms are forced to exit. The industry moves on to maturity, as the dominant model no longer provides the basis for improvements in productivity, and growth in volume reaches the point of diminishing returns. Finally, the industry begins to decline, due to saturated demand or exhausted supply (McGahan et al., 2004).

During the phase of fragmented industry, several product technologies and forms of operation may exist side by side. The level of market internationalisation is also likely to be low (Johanson & Mattsson, 1988). Since the product market is still taking shape, there may not be great demand for each separate product variety in a local area. Thus, in order to get customers, the firm may need to expand its sales area quickly. Consecutively, these selection pressures on the part of the industry have a direct effect on the internationalisation path of the firm, so that it can meet the requirements of the fragmented industry. This usually means export via the distribution network. The firm's internationalisation path, in this case via the construction of the distribution network, also affects the evolution of the industry and the degree of internationalisation of the market.

As the industry evolves, the appropriate form of international operations may change. Some firms may find that altered modes of international activity may better serve their business and products (i.e. variation). Thus, managers may create temporary strategic advantages by intentionally redirecting the internationalisation path of their firms. The form

of international operations that results, provided that it actually leads to increasing returns, may begin to develop towards becoming a dominant model, causing a shakeout when unaligned firms are forced to exit (i.e. selection and retention). Such a development is possible in the maturity stage as well. All in all, building on these considerations, it is justified to suggest that the relationship is a genuine case of co-evolution.

3.3. The co-evolution of core resources and internationalisation

The co-evolution of industry and internationalisation gives us a partial explanation only for the internationalisation of firms. To complete the picture, we also have to look at a firm's internal organisation. Indeed, the unique resources of firms (intangible and tangible) have been regarded as the key to achieving sustainable competitive advantage and explaining the heterogeneous market positions of close competitors (e.g. Barney, 1991; Peteraf, 1993). This resource-based view has been followed by a discussion of dynamic capabilities (Eisenhardt & Martin, 2000; Teece, Pisano & Shuen, 1997) that build, integrate or reconfigure other resources and capabilities. International business researchers have also examined the central role of resources and organisational capabilities in the early internationalisation of born globals (Andersen & Kheam, 1998; Knight & Cavusgil, 2004; Sapienza et al., 2006) and of a firm's export strategy (Knudsen & Madsen, 2002).

Recently, Helfat and Peteraf (2003) introduced the evolutionary element into the discussion of capabilities by proposing a model of capability lifecycle. This model provides a useful approach to consider how resources and capabilities co-evolve with the internationalisation of a firm. The capability lifecycle, like the industry lifecycle model, consists of stages. The lifecycle of a new capability begins with the founding stage. This is followed by the development stage until the capability finally reaches the stage of maturity. During – or even before – maturity, the capability may branch out in various forms and

directions as a result of the intervention of a selection event and due to the influence of the subsequent evolution of the capability.

Let us first consider a new organisation without any international operations. Essentially, the new team or organisation is founded to connect separate resources and capabilities and, in so doing, to create some unique resources and/or capabilities (i.e. variation). This founding stage may materialise as, for example, an innovative product. A truly innovative product may find sufficient demand in physically close areas, but international markets may also open up at the same time (i.e. selection). For example, in a high technology industry, such as biotechnology, it is unlikely that the demand in a small domestic market of a small European country would absorb the potential supply of a new product. In other words, as Knight and Cavusgil (2004) have shown, the creation of unique resources and capabilities provides the impetus to launch international operations.

During the development stage of the capability, the firm may need to respond to increasing competition, as substitutes for their product start to appear in the international markets (i.e. retention). Given that the capability development proceeds successfully (i.e. variation), the product or its variants are likely to succeed in the competition, and even to increase the demand globally. This, again, has a direct effect on the direction of the firm's internationalisation path.

The renewal, redeployment or gradual withdrawal of a capability in the maturity stage may also significantly influence the internationalisation path. For example, in order to renew a capability, a firm may acquire another firm from abroad in order to obtain necessary knowledge, raw materials or other resources, and sell the acquisition after it has utilised the particular resource. The decline or death of a capability, in turn, may affect the demand; as a result the firm may be forced to de-internationalise its operations.

A firm's current position in the internationalisation path also pushes it towards developing and maintaining the capabilities that best correspond to the situation. Clearly, internationalisation can be an important source – or even part – of unique capabilities and resources. Whatever the case may be, a firm with a global network consisting of its own subsidiaries, or even one that enjoys market dominance, probably needs to develop other capabilities than those needed by a firm with a distribution network in a small product market segment. Thus, as in the co-evolution of industry and internationalisation, path dependencies (e.g. Eriksson, Majkgård & Sharma, 2000) which are connected with resources and internationalisation will enhance or restrict possible adaptations. In sum, resource and internationalisation paths clearly exist in a co-evolutionary relationship.

The model also depicts a co-evolutionary relationship between resource and industry paths that, indirectly, influences the internationalisation path. However, since the existence of this relationship has been documented elsewhere (e.g. Huygens, Baden-Fuller, Van Den Bosch & Volberda, 2001; Levinthal & Myatt, 1995), we can take it for granted here. In order to examine and illustrate the explanatory power of this co-evolutionary model, the case study of Orion Diagnostica's internationalisation path through three specific positions will be described below. First, however, a note is offered on the methods and data used.

4. Methods and data

Studying the co-evolution of internationalisation, industry and resources calls for a research setting that allows: (a) examining events over a long period of time; (b) capturing organizational adaptation in the historical context of the firm and its environment; (c) investigating the multidirectional causalities from which the outcomes of co-evolution emerge; and (d) capturing the effects of path dependence (e.g. Djelic & Ainamo, 1999; Lewin & Volberda, 1999; McKelvey, 1997; Volberda & Lewin, 2003). The in-depth longitudinal

case study of the internationalisation of Orion Diagnostica (OD) provides a fruitful research setting for this purpose.

First, OD, an independent company belonging to the Finnish health-care company Orion Group, was one of the first diagnostics firms to appear; it has developed along with a whole industry. It was founded in 1974, but the diagnostics business of the parent company, Orion, had started earlier. The case thus provides more than 30 years of data. Second, internationalisation has been one of the most prominent features of OD's development ever since the 1970s, as it has also been in diagnostics and the biotechnology industries in general (e.g. Luukkonen, 2004). The present study thus also sheds light on certain specific questions relating to co-evolutionary forces in the diagnostics industry.

The selected case can be regarded as an "extreme case" (Flyvbjerg, 2004) that offers a wealth of information about the processes under study, thus providing a way of approaching the theoretical construction of a co-evolutionary model of internationalisation. The close demonstration of causal relationships and the conceptual validity that results has been claimed to be as one of the crucial advantages of case study research (George and Bennett, 2005; Siggelkow, 2007). In fact, several scholars have emphasized the importance of case research when existing theories appear to be inadequate (e.g. Eisenhardt, 1989; Halinen and Törnroos, 2005; Yin, 1994).

The data for the present case study was drawn from several primary and secondary sources in order to secure data triangulation (Miles & Huberman, 1994) and improve the internal validity of the study. The data as a whole can be divided into two sub-sets: one that refers to OD directly, and another that also refers more generally to the industry as a whole. Regarding OD, semi-structured interviews with the previous and the present CEOs of the company were first conducted. The previous CEO had been with the company since the end of the 1960s and the incumbent since the beginning of the 1990s. They could thus provide

precise information about the whole period of the company's development. The interviews lasted for several hours each, and were followed up by email contacts. Next, all the available internal material about the company was collected and analysed. This included annual reports, financial statements, interim reports, and press releases. Finally, a comprehensive search of databases yielded all the articles about OD that had appeared in Finnish trade journals and magazines. These internal and external documents also provided a way of checking the retrospective and potentially biased memories of the respondents.

The OD data also provided information about the evolution of the diagnostics industry as a whole. However, in order to learn more about this, six semi-structured interviews in three other diagnostics companies were conducted. Some of these also offered additional information about OD. All the interviews were digitally recorded and fully transcribed, producing over 180 pages of text in single-spacing. In addition, all public material relating to the diagnostics industry was examined from the databases of trade journals, and earlier research relating to biotechnology (e.g. Luukkonen, 2004) was also consulted. Early drafts of the case study were circulated among the interviewees. The data collection as a whole was a fairly iterative process.

During and after the data-collection phase, the interview and document segments were transcribed into an Excel database, according to the information they provided on activities connected with the internationalisation path, the evolution of core resources and capabilities, and the evolution of the industry as a whole. After this, the database was sorted into chronological order, thus providing a systematic structure for the analysis of the co-evolutionary relationships and the writing of the final version of the case report.

5. The internationalisation path of Orion Diagnostica

5.1. Export to adjacent areas: Position 1

The history of Orion's diagnostics business can be said to have started as early as the 1930s, when the company's microbiological unit was making bacteriological mediums and vaccines. Later, in the 1940s, the production of microbiological mediums began together with the production of penicillin. The products were sold to hospitals and research units in neighbouring local areas. The only competitors were the customers themselves, with their own production. Export could not be considered since the lifetime of the products was three months, and the transport systems of the time were not fast enough.

In the mid-1960s the development of culture processing for diagnosing urinary infections was attracting increasing attention; as a result of this the innovative diagnostic test, Uricult, was launched in 1968. This product was successful in the market and sales began to rise significantly. Uricult's shelf-life was much better than that of earlier products, so it became possible to cover a wider market. Mass production was introduced, using machinery and production lines which were built in-house. As the volume of production grew, active attempts were also made to find customers beyond the national borders. Export to the Nordic countries began. Thus, the first steps had been taken towards internationalisation. The Nordic countries were regarded as a natural first step for business, because of the traditions of Finnish business, familiarities in language and culture, and the similarities of the countries' diagnostics markets.

To start with, Uricult had no competitors. It was the first product in Orion's history to possess the potential to become a global product. And in fact, ever since it was launched, Uricult has been a goldmine for OD. The product has been a market leader for three decades, and over the years has been sold to 152 countries. One error was made at the time of launch: the product was not immediately patented, and more than 150 copies have appeared all over the world. However, the product's high quality and continual improvement have secured its

domination of the markets. At its best Uricult has dominated 40% of the global market, and 70% of the large US market.

To sum up, as Figure 2 shows, the first clear position in the internationalisation path was achieved as a result of the development of firm capabilities and resources that made possible the production of a new innovative product that could be stored for a relatively long time and that was suitable for mass production. Further, since diagnostic technology was still in its infancy, there were no immediate substitutes for Uricult on the market. These were the fundamental factors that enabled OD to take the first step along the path of internationalisation. How this step then affected the industry path as well as the development and utilisation of the firm's resources will be discussed below. However, it is already clear that the firm's resources, the diagnostics industry and the internationalisation of OD were in a co-evolving relationship.

Insert Figure 2 about here

5.2. International expansion: Position 2

Uricult's Scandinavian sales exceeded expectations during its first years on the market. Diagnostics became so significant in the Orion Corporation that in February 1974 management decided to establish its first independent profit centre, to be known as Orion Diagnostica. The profit centre ran its own functions, such as R&D, production, marketing and sales, and was expected to run at a profit and to survive on its own cash flow.

At the same time, OD extended its product range to include specific protein analytics, and started protein and virological production. C-reactive protein (CRP) products and other antiserums were also held in reserve. The development also began of new hygiene tests for microbe detection such as Hygicult and Easicult, and of dental diagnostic tests such as

Dentocult LB. These products are still in OD's product portfolio. At the industry level, diagnostics businesses were also appearing in the Turku and Oulu areas of Finland. The history of OD can thus be seen as unfolding in parallel with that of the Finnish diagnostics industry in general.

In 1975, only a year after OD's start-up, a subsidiary was established in Sweden. This subsidiary was responsible for the marketing and sales of products manufactured in Finland. At that time OD's CEO was a Swede who, with his particular contacts and understanding of the market, presumably played a crucial part in extending the business to Finland's western neighbour. Making a greenfield investment would have seemed a natural option, since diagnostics of this kind were new in Sweden, too, and there were not many operators on the market yet. Nor were there many distributors available and willing to share the risks associated with a new product.

OD's distribution network grew quickly. In the early 1980s, it was already exporting to all parts of Europe, and the export teams were making business trips to Japan, the Philippines, Hong Kong and Singapore. New marketing subsidiaries were established as the sales in a particular market area reached a certain level. By the mid-1980s subsidiaries had thus been established in Germany, Switzerland and the USA. At that time, establishing subsidiaries was a common way of entering foreign markets. It could even be called a fashion; a company had to have subsidiaries to be noticed. Germany was seen as an ideal place from which to cover the whole Continental European market. And, as the USA embraces a large proportion of the world's diagnostics markets, it was vital to operate there too.

However, the subsidiary in Germany was soon closed down, due to heavy local competition. The US subsidiary also had problems, mainly because of the huge and highly differentiated markets. OD was the first diagnostics company in the US to set up its own

comprehensive distribution network, although an external distribution network would have been more flexible in the circumstances.

In fact, by the late 1980s OD's product portfolio had diversified to serve a variety of customers and markets. For example, the hygiene-testing product line had customers in engineering shops and in the food industry, where the laboratory staff conducted the microbiological analysis of products ranging from aviation fuel to dairy products. Even within the healthcare sector, the company was meeting the different requirements of customers ranging from private clinics to university hospital laboratories. This was very challenging for the subsidiaries, especially those catering to geographically large markets whose customers, market structures and operators all varied from one product line to another. In many countries this problem was solved by placing several distributors in the same market area, each one taking care of a specific customer segment. All this meant that there was a rapidly expanding and fragmented distribution network that had to be managed. And at its most extreme, it meant that OD had *as a total* 150 distributors and even *four* distributors in one country.

The product portfolio was also subject to continuous development. Old products were improved and new ones launched, while some outdated product lines such as virus antigens were discontinued. In the early 1980s, when CRP-tests enjoyed a world-wide breakthrough, OD was one of the first producers on the market. One of the most important achievements of the R&D team during that decade was the launch of the first analyser, Turbox, in 1987. Turbox was capable of dealing with large volumes, and made possible the sale of large packages of reagents and antiserums. Since then this analyser has seen three product generations, and the main market areas have been changing continuously as active searching finds new potential buyers. Turbox was first introduced in Western Europe, then in Eastern Europe, and finally in other less-developed markets. Now, after nearly twenty years on the market, the product is reaching the end of its lifespan. Other products and product lines

besides Turbox have experienced similar continuous development and movement on the markets as the products have grown older and the potential customers have changed.

Sales in the Nordic countries continued to grow during the 1980s. In 1990, a subsidiary was established in Norway. Denmark followed four years later. Difficulties in the German, Swiss and US subsidiaries led the OD management to consider very carefully the future mode of operations in the Nordic countries. It was felt that the markets in Norway and Denmark would be sufficiently simple for a subsidiary to handle. These subsidiaries have succeeded well, and for many years were OD's top units as regards sales and profit.

Eastern Europe also made good progress in the early 1990s. OD had already established a sales office in Hungary together with Orion Pharma in 1989. A sales office was opened in Czechoslovakia in 1992. These two sales offices were examples of well-planned market penetrations to countries that had experienced political changes in their social systems, and where distributors were hard to find. Other important changes occurred in the early 1990s, when the European Union began to standardise product-registration procedures. The diagnostics companies were also compelled to meet increasingly tough quality requirements.

The Finnish diagnostics industry was developing in line with the global trends, and by 1992 ninety per cent of Finnish diagnostics production was being exported. By 1995, the distribution network of OD and its partners embraced around 60 countries, compared with 40 in 1992. On the Nordic diagnostics market OD was third in size after two large global enterprises, while its CRP-test for the diagnosis of acute infections was the market leader. Regarding other successful products, the Pyloriset test for the diagnosis of gastrointestinal disorders was the market leader in Europe, while Uricult still had 50% of the world market in 1995. New-product development was active, especially in the field of self diagnosis.

By the beginning of the 1990s OD had thus reached a position on its internationalisation path that involved a global distribution network and several subsidiaries. Figure 3 illustrates

this as a result from the co-evolution of the firm's resources, the industry, and internationalisation. In other words Uricult – successful but unpatented – soon had several competitors and compelled OD to extend its area of distribution. However, high quality and continuing development ensured that Uricult remained a market leader. Moreover, the company's R&D capability enabled not only the development of new products based on the original product platform, but also the utilisation of totally new technologies. In turn, the increasing competition and new products compelled OD to seek customers globally. This was undertaken simultaneously by way of export and sales subsidiaries, depending on the volume of sales in the particular area. The founding of subsidiaries was also encouraged by the general hype about subsidiaries. While OD was capable of producing some innovative products, it could not create a dominant position for itself on the diagnostics markets, apart from narrow market segments in Scandinavia. Thus, the diversifying product portfolio and the rapidly segmenting industry drove the level and direction of OD's internationalisation, which then in a feedback loop forced the company to concentrate on specific product segments and to develop the capabilities needed for the production in question.

Insert Figure 3 about here

5.3. Turbulence in internationalisation: Position 3

After the golden years of Turbox, OD started developing a smaller analyser and searched actively for the knowledge and technology that were still missing. Finally, in 1992, OD bought Photest Diagnostics Inc., a company that was located in New Jersey near OD's US subsidiary and that owned a patent crucial to the R&D process. Photest had been specialising in the lumbering latex test technology that had already been displaced by the arrival of the more developed membrane technology. For a couple of years OD tried unsuccessfully to fit

its test kits into the Photest systems before winding up the company and transferring its knowledge to Finland. Apart from heaps of junk and useless patents, one pivotal innovation did emerge from the acquisition. This was later exploited in the development of the successful point-of-care CRP analyser. A few other minor acquisitions were also made to complement the resources already in the company.

In the late 1980s and early 1990s the Finnish pharmaceutical and diagnostics industries underwent a major structural change when Orion bought a majority of the shares in Farmos, a Finnish manufacturer of cleaning, disinfectant and industrial chemicals. As a result, Farmos Diagnostica, a diagnostic subsidiary of Farmos, was merged with OD. Not only did the merger change the location of the home market operations and the product portfolio, but it also changed OD's business strategy. Hitherto, the Finnish unit had only marketed and sold its own products, but after the merger it also started to market the others' products, as Farmos Diagnostica had done earlier. This strategy was later found to have been valuable in many ways. In addition to financial benefits it provided experience of the practical needs of the clients. It also generated valuable contacts and extensive know-how in the worldwide diagnostics industry network.

During the early 1990s the healthcare system in China experienced a massive transformation and the market began to open for small companies. But operating on the Chinese market put pressure on Finnish companies to reduce the prices and the cost structures for their products. After the merger with Farmos Diagnostica, OD started searching actively for new potential market areas for their older RIA (radio immunologic assay) products. After searching for a year or two, an interesting opportunity came up, and in 1996, OD set up a joint venture in China. The plan was to intensify the co-operation later by forming an equity joint venture, and possibly transferring part of the production and technology to China, while retaining the critical know-how in Finland. The plant, Shanghai SINR Orion Diagnostica, was

built in 1997. After a fairly slow start, the plant has served its purpose quite well. OD has supplied the production technology and the crucial components for the specific RIA-products, while SINR Orion Diagnostica has taken care of assembly and sales on the local Chinese market. As well as finding potential markets for RIA products, the idea of setting up the joint venture has included the penetration of Far Eastern markets.

During the 1990s, however, OD's US subsidiary was having increasing problems. First, it did not have enough registered products on the US market; secondly, the market area was too large and diversified for a fairly small subsidiary. The original promising growth in sales slowed down, and OD decided to wind down the subsidiary's business operations and to go back to distribution. In 1998 a perfect buyer was found: Princeton BioMeditech Corporation, Inc. (PBM) was looking for a sales force. The subsidiary was sold and its employees began working with LifeSign L.L.C, a new company established by PBM. LifeSign started selling OD's products in the USA and Mexico, while OD continued to sell PBM's tests for drug abuse in the Nordic and Baltic countries, the Czech Republic, the Slovak Republic and Hungary. The parties also agreed to co-operate on product development, combining the rapid test technology of PBM with OD's analytical know how.

In the late 1990s there was a trend on the world market towards decentralised diagnostics, so-called point-of-care (POC) testing, in which OD had a long track record with its unique capabilities. As a result, OD's new goal was to become the leading company in selected niches of POC. OD continued to introduce innovative products on the market. The new QuickRead CRP was launched in 1998 and sales immediately took off. Old products, such as Turbox and Uricult, were simultaneously updated.

The world diagnostics market in general had a hard time throughout the 1990s. Profitability was relatively poor and growth was weak. Companies began to reduce their areas of operation and to concentrate on their core businesses. The 1990s started promisingly for

OD, as sales grew regularly up to 1994, with turnover reaching 200 million Finnish marks (€33.6 million). After that, sales declined somewhat. Due to the positive development of the distribution business, however, OD was able to maintain a tolerable level of profitability for most of the 1990s.

The new millennium started positively; OD achieved outstanding results for the year 2000. Operating profit rose by 44.2% and net sales reached €32.2 million. The pace of growth then slowed down a little over the next few years, but profitability remained satisfactory throughout. OD's strategy of modernising the product range and sharpening the focus on POC testing can be seen to have been successful. Indeed, the QuickRead product family proved to be OD's second goldmine after Uricult, and the sales of the new generation system set new records in 2002. The expansion of the QuickRead product line continued. Currently, 80% of the net sale is generated by proprietary products based on in-house R&D.

In 2005 OD's products were being sold worldwide through subsidiaries in Sweden, Norway, and Denmark, sales offices in Hungary and the Czech Republic, and a distribution network covering more than 60 countries. The main traditional market areas – the Nordic countries, Continental Europe, Japan and the USA – continued to be focused, but more recent export markets such as China and Iran, have also reported favourable growth in recent years. Potential market segments have been actively sought all over the world, but so far business in Africa, South America, Eastern Europe and Asia has remained small-scale. Developing market areas are usually targeted with older products that no longer sell on the Western markets. Large-scale penetration of the potential markets of India has been blocked by high customs tariffs. The low market potential and price level of Eastern Europe has restricted sales efforts in the region, but the market is still covered. The industry is now approaching maturity. While large companies are seeking bigger market shares by acquiring companies, small companies like OD are forced to specialise in specific niche sectors. The focus for

seeking for potential business opportunities has shifted from geographical areas to narrow market segments, which also means that distributors often have to be changed.

Thus, by the beginning of the 21st century OD's internationalisation path had not only just brought the company into new areas (China) as the result of a joint venture, but had also involved it in one setback at least in terms of traditional internationalisation theory. This position in the internationalisation path was once again a result of co-evolution with the firm's resource bases and the industry constraints and opportunities as depicted in Figure 4. For example, the acquisition and subsequent closure of Photest is a good example of the way the development of necessary resources had a direct effect on the level of internationalisation. Similarly, after many years experience in the US market, OD's own subsidiary was transformed into an external distribution network – a form of international involvement which fit in better with the company's own resources and capabilities and with industry pressures.

Insert Figure 4 about here

5.4. Epilogue

Why did Orion Diagnostica start to export and then quickly expand its distribution network? Why were a group of subsidiaries established, and why then were some of them subsequently closed? And why, after 35 years of international operations, do most of the company's sales still come from export via the distribution network? The examination above suggests that these and other positions on OD's internationalisation path can be described as results of the co-evolution of resources, industry and internationalisation.

It was found, for example, that the main impetus behind the start of internationalisation came from the evolution of the core resources and capabilities; that the pressure to expand the distribution network quickly was a result of increasing competition (resulting also from OD's

international operations) and of the new product variants being produced by OD; and that the internationalisation path, as a feedback loop, constrained the firm to focus on specific product segments and to develop the necessary capabilities. We can thus conclude that these three paths did genuinely co-evolve, and that the proposed co-evolutionary model of internationalisation does have explanatory power.

6. Discussion

6.1. Contribution to the literature of internationalisation

Recent accounts of the internationalisation of firms have shown that we need, first, to see internationalisation as a complex process influenced by interaction between a number of internal and external factors and, secondly, to undertake longitudinal research to account for the dynamic and complex nature of internationalisation in a meaningful way. In order to bridge these research gaps this study began by presenting a co-evolutionary model of internationalisation that allows for detailed explanations of how the outcomes, or positions, on the internationalisation path are produced jointly by several interacting factors arising from intentional adaptation and environmental selection pressures. Secondly, the explanatory power of this model was tested by examining in depth a case of the co-evolution of internationalisation, organisational resources and industry influences in a longitudinal setting. This study thus represents a step forward in the internationalisation literature by demonstrating how the evolutionary and interactive nature of firm internationalisation over time can be captured and described. These findings are further discussed in the context of existing internationalisation theories below.

According to the Uppsala process model (Johanson & Vahlne, 1977), the internationalisation of OD should be explained as a result of incremental and experimental learning about foreign markets. While the Uppsala model does not account for the beginning

of OD's internationalisation, the first step towards internationalisation in the shape of export to Sweden fits the model's explanatory frame nicely, as does the establishment of the first subsidiary in that country. However, the following phases are more difficult to explain in terms of this model. OD started to export to all parts of Europe at more or less the same time, while also beginning to look for customers on other continents. Also at the same time, it set up several subsidiaries in areas both physically close and more distant. Learning, obviously, played an important part in this period, but the development was not particularly incremental and market knowledge did not lead to commitment decisions. In fact, development was mostly in the opposite direction. The opening and closing of subsidiaries in Western Europe are good examples of this. Moreover, a new and physically remote market area – i.e. China – was tapped directly, as part of a joint venture. In turn, in the USA an acquisition and its subsequent closure were not motivated by gaining market knowledge relating to the particular area. Altogether, while the Uppsala model as such is not a relevant subject for evaluation, the co-evolutionary model of internationalisation clearly offers a new approach capable of explaining, in a straightforward way, several aspects of internationalisation that have eluded explanation with the help of more conventional approaches.

The co-evolutionary approach also offers new insights on the subject of born globals. First, the model accounts for the fundamental forces that enable or compel a firm to internationalise rapidly. In the case of OD, the main impetus for entering the international market came from the evolution of the core resources and capabilities and the absence of direct international competitors. While OD may not be a perfect example of a born-global firm, the relationship between organisational resources and industry structure also explain in a general way why born globals internationalise quickly. Often, for example, it is the unique combination of resources and capabilities in a born-global firm that enables it to bring out an innovative product which, in turn, makes it possible to penetrate some particular global niche-

market. Further, by focusing only on domestic markets a firm may not find sufficient demand for a niche-product. Thus, it has no option but to internationalise rapidly. Altogether, the co-evolutionary model provides a theory-driven basis for capturing the specific characteristics of the entry phase of a born global's internationalisation.

Secondly, as has been pointed out in the earlier literature (e.g. Coviello & Jones, 2004), we lack genuinely evolutionary studies of born globals and, even more importantly, we do not know much about the long-term internationalisation paths of born globals. Certainly, rapid internationalisation does not automatically mean long-term survival. As this study has shown, after its initial entry the rate of OD's internationalisation substantially increased and came to resemble the born-global model (cf. Chetty & Campbell-Hunt, 2004). However, after this phase OD's internationalisation lost much of its forward-moving nature. The analysis above has shown that this was a result of co-evolutionary changes in the resource and industry paths. While OD retained a strong position in some of its core product segments, it was no longer a first mover. It was compelled to focus more on cash-cow products and to find new market areas, mainly in the less developed countries. This situation also had certain drawbacks, such as the closure of some subsidiaries. Altogether, the co-evolutionary perspective offers a robust theoretical basis for the consideration of how and why the status of born globals may change radically in the further internationalisation development. This is also a very important topic for future research.

6.2. Limitations and directions of future research

The co-evolutionary model of internationalisation is not necessarily expected, in itself, to yield predictions about the appropriate direction or choices relating to the internationalisation of firms. This may also be regarded as a major limitation of the model. However, the importance of co-evolutionary models lies essentially in their explanatory power: they

provide a way of making various – usually processual – phenomena easier to understand. This, it is claimed here, is one of the most crucial managerial tasks in any internationalising firm.

Specifically, decisions regarding internationalisation should always be based on a careful analysis of their relationship to the organisational resources and capabilities, as well as to existing and emerging industry constraints. Growing competition, for example, may compel a firm to continue to explore new resources and capabilities while simultaneously continuing to exploit existing resources and practices in order to enable such exploration. This, in turn, means that the level of internationalisation should support, or at least permit, these activities. The co-evolutionary analysis provides managers with more knowledge about their organisations' current situation and the forces that are likely to affect their future development.

The limitations of this study raise some important questions for future research. Since the goal of the study has been to describe a co-evolutionary model of internationalisation and to use a longitudinal case analysis for the purpose of illustration, more empirical work now needs to be done to illustrate the outcomes arising from the co-evolutionary interaction between processes. Although the co-evolutionary model of internationalisation has been evaluated here in the context of a high-technology industry, with the limitations that this implies in terms of generalisability, this does not automatically limit the applicability of the model to other contexts. However, future researchers should consider the explanatory power of the co-evolutionary model in the context of other industries.

Although the evolution of resources and capabilities and the evolution of industry and competitive environment are the crucial processes influencing the speed and direction of the internationalisation process of the firm, the co-evolutionary approach may also benefit from further extensions and specifications. For example, in the spirit of Johanson and Mattsson's

(1988) network approach, researchers could examine how network strategies co-evolve with the resources and capabilities and the competitive environment. Researchers are also encouraged to consider how co-evolutionary interaction patterns influence the mode changes in the international operations of firms.

As was already pointed out, particular attention should be paid to analysing the evolution of born globals after their initial internationalisation. It is important to know how firms enter global markets, but it is even more important to know how these firms can successfully sustain their presence there in the long run. All in all, to provide credible explanations for internationalisation, we cannot only concentrate on the static aspects of isolated entities, as the reality is neither isolated nor static. We have to examine the co-evolving and continuously changing processes inside and outside the firm. This is also the case in the examination of born globals.

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Figure 1 Co-evolutionary model of internationalisation

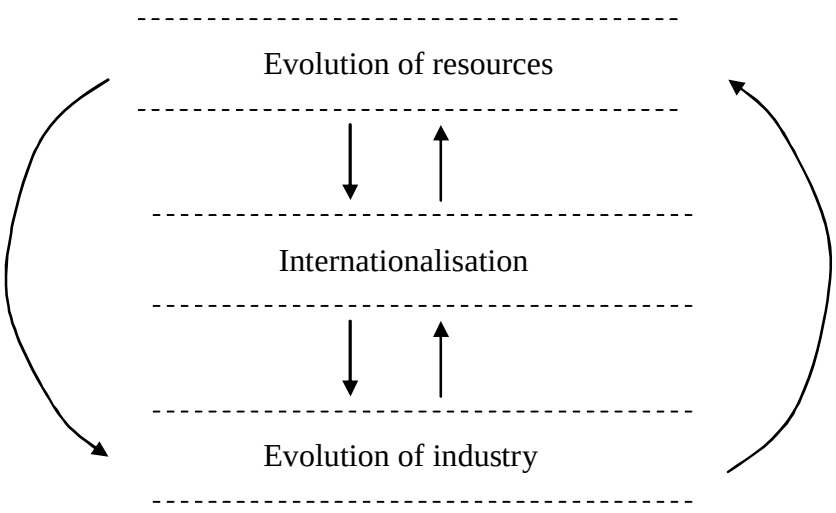

Figure 2 Co-evolution towards position 1

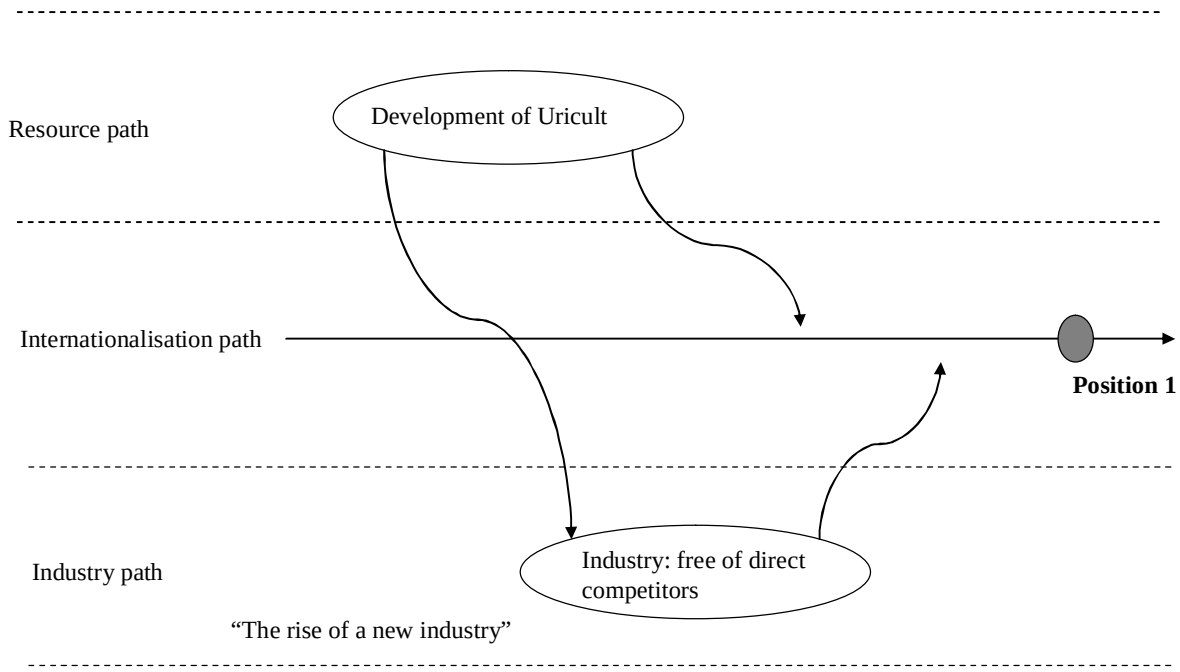

Figure 3 Co-evolution towards position 2

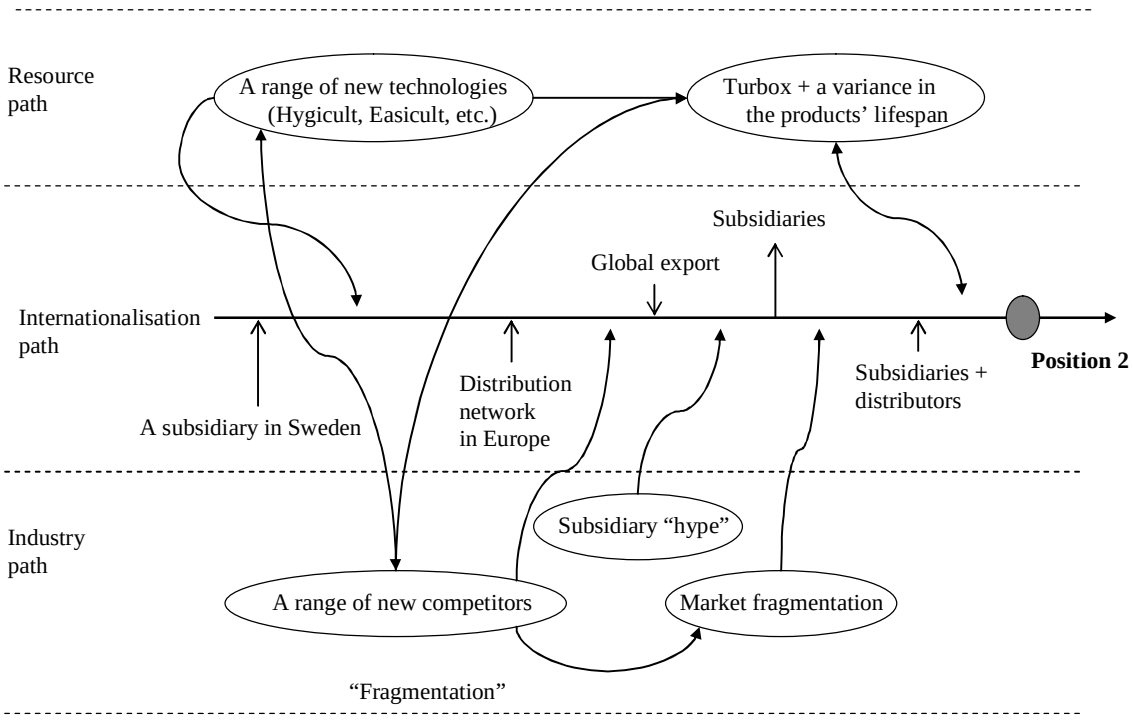

Figure 4 Co-evolution towards position 3