



Foreign Takeovers in the Nordic Countries

2. Impacts of foreign takeovers in the Nordic countries - what do the company case studies tell us?



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**Impacts of Foreign Takeovers in the Nordic Countries
- what do the company case studies tell us?**

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The main objectives of FOTON are to study how foreign takeovers of firms in the Nordic countries affect local innovation capabilities and how this issue is approached by policy makers. FOTON is made up of three modules:

The first module is a statistical exercise providing an overall picture of foreign industrial ownership in the Nordic countries. A quantitative analysis of the effects of foreign ownership on firms' innovation performance is presented in FOTON report No. 3: *Corporate Innovation Activities - Does Ownership Matter?* Report No. 1 has a short overview of available statistics.

The second module consists of case studies of Nordic firms that have been taken over by foreign companies. To allow for inter-Nordic comparisons, takeovers within two specific industries have been selected: Pharmaceuticals and ICT. The main focus of the case studies is on how the takeovers have affected innovation capabilities, not only in the acquired firms but also – through these firms' linkages to local actors – in the surrounding innovation systems. Module 2 is presented in FOTON report No. 2: *Impacts of Foreign Takeovers in the Nordic Countries - what do the company case studies tell us?*

Module 3 studies policy developments of importance for foreign direct investments in general. The policy analysis is included in FOTON report No. 1: *Summary and Policy Recommendations*.

The reports can be downloaded for free from www.step.no/foton.

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Table of Contents

Introduction.....	1
Impacts of foreign takeovers - some findings from the literature.....	5
Methodology	12
The pharmaceutical and software industries in the Nordic countries.....	16
Case findings - Overview.....	19
National company cases.....	38
Company cases Denmark.....	39
The Danish software case: CSC's acquisition of Datacentralen.....	39
The Danish pharmaceutical case: Nycomed's acquisitions of DAK-Laboratoriet .	52
References	62
Company cases Finland.....	1
The Finnish software case: Iobox.....	1
The Finnish pharmaceutical case: Santen Oy	12
References	20
Company cases Iceland	23
The main features of the Icelandic economy	23
The ICT industry in Iceland	25
The Icelandic software case: The Eastman Kodak takeover of Computer Knowledge Inc.	27
The Icelandic pharmaceutical case: deCODE genetics, Inc.....	38
References	49
Company cases Norway.....	51
The Norwegian software case: The takeover of Zoomit by Kelkoo	51
The Norwegian pharmaceutical case: The Axis Shield Plc takeover of Nycomed Diagnostics	60
References	71
Company cases Sweden	74
The Swedish software case: Internet AB	74
The Swedish pharmaceutical case: The merger between Astra and Zeneca. Impacts on R&D activities in Sweden	86
References	98
Appendix 1 FOTON Module 2: Interview guideline	99
Appendix 2: Theoretical perspectives on MNE organisation, strategy and subsidiary implications.....	101

Introduction

In FOTON module 2 the national research teams conducted case studies of the local innovation capabilities of firms which have been subjected to foreign takeovers. Two case studies of selected firms and their surrounding innovation systems have been carried out in each country, one within the pharmaceutical industry and one within the software industry. For practical reasons, the software industry is taken to include ICT companies producing software as part of a wider service or product range.

The main aim of the case studies has been to assess whether there has been a competence drain or competence gain as a consequence of the takeovers. In this context we have studied whether and how the foreign takeovers have affected R&D activities, the knowledge base and the general learning and innovation processes in the firms acquired and whether these in-firm processes have had an impact upon the knowledge base and innovation activities of the actors surrounding the acquired firm.

There are several reasons why the pharmaceutical and software industries were selected as case study industries. One reason is that they are both so-called high-tech industries with a high level of R&D and innovation in general, and thereby represent dynamic forces for innovation in the innovation systems in which they function.

The pharmaceutical and software industries are furthermore growth industries and adequately represented in the various Nordic countries, which allow for comparisons across the region. The pharmaceutical industry is characterized by many rather large companies, and the selected case studies reflect this fact. As regards the software industry, the cases selected tend to represent small and medium sized companies rather than large firms.

Firstly, the project aimed at uncovering what happens with existing R&D and other innovation activities in firms acquired by multinational enterprises (MNEs). Important questions in relation to the case companies were:

- Is there a tendency for R&D functions (and innovation capabilities more generally) to be relocated or centralized to the MNE headquarters, or do such activities remain in the acquired firm?
- What are the reasons for the strategic choices of the MNE?
- Are innovation capabilities regarded an embedded part of the local firm?
- What innovation enhancing knowledge and resources may be transferred from the MNE to the firm in question?
- Is this dissemination a result of technology transfer or the transfer of other resources from the MNE to the host economy?
- How are the MNE's knowledge and resources taken up and utilized by the acquired firm to enhance innovation?

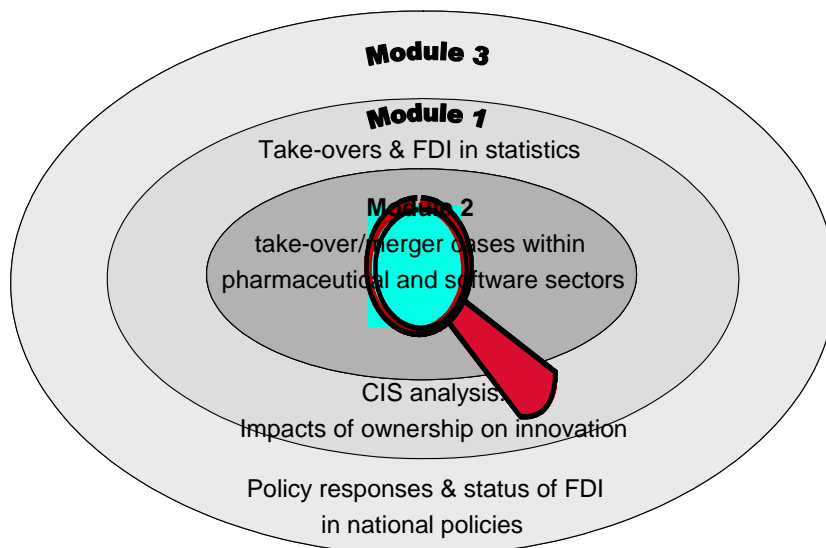
Secondly, the case studies were to give an understanding of positive and negative effects outside the specific firm acquired by a foreign based company. Central questions in this respect were:

- What kind of impacts does the transfer of ownership have on the innovation system surrounding the acquired firm?
- How does the takeover affect the local knowledge base?
- How do MNE strategies affect the local innovation system the acquired firm is part of?

These questions were covered in interviews with company representatives. In some cases, some of the most important stakeholders of the acquired firms were interviewed as well.

The FOTON research team is well aware that two case studies per country cannot shed light upon all the potential aspects included in foreign takeovers. This should, however, not be a major problem if we take into account that the module 2 report is not meant to be a stand-alone type of a document. Rather, the report and the case studies should be read and understood within the broader context of the FOTON project, i.e. the company cases serve to illuminate perspectives not captured by the other modules in the project.

Figure 1 Focus of FOTON module 2



The CIS analysis is presented in report No. 3, the policy analysis in report No. 1. See www.step.no/foton

The selection of company cases was left to the respective national research teams. The main criteria for the case selection were:

1. There should be one case from each of the chosen industries, software and pharmaceuticals (broadly defined in this study).
2. The takeover should have taken place no later than the year 1990.
3. The takeover should not have been too recent, in order for the impacts to be addressed.

On the basis of these criteria, the following company cases were chosen by the national teams:

Table 1 Company cases

<u>Country</u>	<u>Acquired</u>	<u>Acquirer</u>	<u>Sector</u>	<u>Takeover year</u>
DK	DAK-Laboratoriet	Nycomed, Norway	pharma	1991
		Amersham, UK		1997
		A group of investors		1999
DK	Datacentralen	CSC, US	software	1996
FIN	Iobox	Terra Mobile S.A of Teléfonoica Group, Spain	software	2000
FIN	Oy Star Ab	Santen Ltd., Japan	pharma	1997
IS	Computer Knowledge Inc	Eastman Kodak, US	software	2000
IS	deCODE genetics, Inc ¹	An Icelandic company with sites in the US	pharma	1996 (founded)
NO	Nycomed/Axis Diagnostics	Axis Shield Plc, UK	pharma	1999
NO	Zoomit	Kelkoo, France	software	2000
SE	Astra	Zeneca, UK	pharma	1999
SE	Internet AB ²	Deutchnet GmbH, Germany	software	1999

The Swedish software case is dealt with anonymously - the company in question was taken over by a German enterprise but later on the whole concern was liquidated. In this situation the name of the enterprise cannot be mentioned because it is impossible to obtain a permission.

The company case studies are based on available public documents (e.g. annual reports and media coverage of firms) and semi-structured interviews with company representatives as well as stakeholders (suppliers, customers, competitors, collaborating firms, competitors, local or regional R&D

¹ deCODE genetics Inc has not been a target of a takeover, but is a multinational company which has itself acquired companies both in Iceland in the United States.

² The names of the Swedish software case company and the acquiring German company have been changed - or anonymized - by the FOTON team.

organisations etc.). In some cases the researchers have also had the opportunity to use internal company documents as background material. The general guideline for the interviews is supplemented as appendix 1 at the end of this report.

The report is organised into three sections. The first section provides an overview of literature on impacts of foreign takeovers as well as a discussion on the methodological approach - the case study methodology - and its strengths and weaknesses.

The second section consists of chapters summarising the findings from the case studies. We discuss reasons for the sales and acquisitions, before proceeding to the firm level effects of the takeovers and mergers. Then focus shifts to the effects on the local and national innovation systems.

The original case descriptions are presented in the third section of the report.

Impacts of foreign takeovers - some findings from the literature

By Hans de Geer, Tommy Borglund and Magnus Frostenson

Mergers and acquisitions (takeovers)

Mergers and acquisitions are often categorised together and seen as common phenomena. In the research literature the distinction between these two concepts is not always emphasised. However, much confusion is avoided if an explanation of the differences between the two phenomena is given and an account of what the consequences of these differences actually are is provided.

In a purely technical sense the two concepts sometimes converge. A merger of equals, for example, can be technically designed as an acquisition although the decisive influence on the firm is shared equally between the two merging parties.

A helpful conceptual tool for singling out the distinction would for this reason be the concept of *controlling interest* (Calori et al. 1994, Chatterjee et al. 1992). Reserving this criterion for acquisitions is adequate. If a financial transaction is undertaken resulting in one party getting a controlling interest with regards to another firm, an acquisition (or takeover) has taken place.

In general such a controlling interest can be said to exist when a firm gets hold of more than fifty per cent of the voting power in an acquired firm. Sometimes, but not always, this equals fifty per cent of the stock in the acquired firm. In most cases the two parties involved remain separate units.

A merger, on the other hand, is usually understood as a *merger of equals*. This does not necessarily imply identical financial positions before the merger. Rather, the concept of equality in this case refers to the power relations and the degree of voluntary participation in the merger. A reasonable point of departure is that a merger of equals takes place as a result of a financial transaction implying that two firms voluntarily and with relatively equal strength join together in order to carry out all its future business activities within a common structure under a common name.

Why mergers and acquisitions occur is under debate. Copeland et al. (2000) argue that mergers and takeovers are important means of reallocating resources in the global economy as well as tools for executing corporate strategies. Different motives are identified but a common idea seems to be that involved actors strive towards increasing shareholder value, obtaining legitimacy for the organisation, and handling the pressure for structural change in the business. Another important psychological motive is often attributed to the management of the firms involved. Its situation might improve if it initiates and effectuates mergers and takeovers.

In classifying takeovers it is common to use a categorisation developed by the US Federal Trade Commission (Cartwright & Cooper 1990, Kitching 1967, Napier 1989):

- *Horizontal takeovers* refer to acquisitions within one and the same industry where two similar organisations are involved.
- *Vertical takeovers* refer to the combination of two organisations from successive processes within the same industry.
- *Conglomerates* are created when the acquired organisation is in a completely unrelated field of business activity
- *Concentric takeovers*, finally, are the ones that occur when the acquiring firm wants to expand its business to an unfamiliar but related field.

Horizontal takeovers can be said to have attracted most interest in the research literature. These transactions involve firms operating in the same line of business, which implies former competitors joining forces within a new structure. This can in part be explained by an interest in the supposedly laborious task of strategic and organisational integration that befalls the acquiring firm in a takeover situation or both firms in a merger of equals.

Out of the ten case studies within the FOTON project eight can be classified as acquisitions or takeovers in a literal sense. One firm (deCODE genetics Inc) has not been taken over at all, but is investigated with regards to its expansion abroad. Another one (AstraZeneca) is an example of a huge merger of equals. The majority of the cases, however, could reasonably enough be classified as takeovers of the horizontal kind.

The cases are examples of *cross-border* mergers and acquisitions. This may imply special legal and cultural considerations. Most of the firms under investigation have remained separate business units after the takeover. But a special issue concerning mergers is the fact that despite the joint structure, a merged firm must have a legal domicile that is nationally bound. In the case of AstraZeneca, its home country domicile became the United Kingdom.

Consequences of mergers and acquisitions (takeovers)

When studying the consequences of mergers and acquisitions an external as well as an internal focus is possible. An external focus may for example entail a study of the consequences for the surrounding environment. An internal focus could shed light on the organisational consequences of mergers and acquisitions from a financial, cultural or some other perspective.

A stakeholder analysis may be useful for illustration purposes (Freeman 1984, O'Higgins 2002). The merged or acquired firms have different stakeholders with different interests. Out of these some are external (e.g. suppliers and customers) and others internal (employees). Depending on the purpose the relevant stakeholder category is identified and the outcome for this group examined. Some scholars focus on the general impact of mergers and acquisitions for an entire sector or country while others choose to study

individual firms as case studies. Macro and micro perspectives emerge. For natural reasons historical data tend to be used when doing quantitative research and retrospection when qualitative studies based on interviews are made. Studies on the macro as well as on the micro level are often carried out from an outcome perspective. Performance of some kind is measured or estimated.

In general, much attention has been paid to stakeholders, such as owners and employees. From an owner perspective the financial performance of merged firms is of great interest. Often - but not always - financial studies deliver findings that indicate that merged firms underperform financially after mergers.

Sirower (1997) claims that most takeovers fail from a financial point of view - thereby disagreeing with Jensen & Ruback (1983) who claim that strong positive effects can be seen for the shareholders in the target firms and moderately positive effects for the owners of the acquiring firm. Trautwein (1990) stands in between when asserting that the net gainers from takeovers would be the shareholders of the target firms. In these studies parameters such as shareholder value or net profits are used.

Other studies refer to what happens to for example innovation, development and learning in merged or acquired organisations. An outcome perspective is applied and problems and strengths identified. Examples can include Berggren (2003) who suggests that an important problem for merged firms is that too much energy is devoted to adjusting and integrating different technologies into common product platforms. Harmonising activities take too much time at the expense of development.

In a study by Capron (1999) the recurrent synergy argument is problematised. Rationalisations such as cost-cutting, asset divestiture and streamlining production are given priority without attention to revenue-enhancing activities that must complement the picture in order to get a successful result.

A central idea in micro level studies is strategical versus organisational fit (see for example Haspeslagh & Jemison 1991, Löwstedt et al. 2003). Although a firm fits into the overall business context of the acquiring firm, organisational issues may become overriding when it comes to practically uniting two different companies into one efficient organisation. The need for a satisfactory organisational fit has turned attention to the issue of *integration*. How to integrate a newly acquired firm or business unit has become a central topic for many scholars in the field.

Integration seems to contain in its very essence the notion of one superior party making arrangements to make sure that an inferior (purchased) party is smoothly brought into a wider structure. For this reason many researchers have treated mergers and acquisitions from a strategical point of view, indicating a managerial, often normative, perspective. A strategically related prescription can for example be that management should coordinate activities to attain the overall targets of the combined firms (Shirastava

1986). According to this view mergers and acquisitions are essentially planned processes.

One important strand of the literature focuses explicitly on the *human side of mergers and acquisitions* (Buono & Bowdich 1989). Several accounts have been given about how employees react to the sometimes dramatical changes that a merger or takeover may bring. Many accounts paint a dark picture. In many instances employees tend to lose their identity, job satisfaction and relative power positions (Schweiger et al. 1987, Schweiger & DeNisi 1991).

Culture becomes a central concept. Views about how to define culture differ. It is common to treat culture as systems of norms, values and beliefs shared by the members of the organisation (see for example Nahavandi & Malekzadeh 1988), which implies that different cultural systems collide in mergers and acquisitions. Cultural clashes may result in different outcomes. Larsson (1991) and Nahavandi & Malekzadeh (1988) build on Berry's (1980) model of acculturation. When firms merge their respective cultures clash and influence each other. The result may be integration, assimilation, separation or deculturation, all depending on to what degree the two involved parties keep their respective cultures.

Mergers and acquisitions can also be studied on a meta-level. Discourse analysis has been used to investigate argumentation for and against international mergers and acquisitions. For instance have media accounts of mergers and acquisitions been studied in order to pinpoint how a nationally biased discourse is constructed (Risberg et al. 2003, Vaara & Tienari 2002). What happens to merged and acquired firms can also be studied from inside by using a gender perspective (Tienari 2000) or studying national discourse metaphorically within the firms (Vaara et al. 2003). In general, a rationalistic discourse is used by management to justify the merger or acquisition while other ways of expression, for example nationalistic ones, can be found in the media and among non-executives.

Specific consequences of cross-border mergers and acquisitions

It is reasonable to ask for the difference between international mergers and acquisitions on the one hand and national ones on the other. A standard explanation found in the literature is that the difference should be understood in terms of culture (Larsson 1991, Larsson & Risberg 1997, Olie 1994). The concept of culture is fundamental to researchers within cross-cultural studies, although this field is widely defined and understood.

International cross-culture management is the field where cross-border mergers and acquisitions receive special attention (Boyacigiller et al. 2003). Within this field three strands of research can be found. Within cross-national comparisons culture on a national level is the relevant unit of analysis. Here culture is often regarded as a set of norms, values and beliefs common to a certain (national) group of people, and is a variable that is supposed to differ more between nationals and foreigners than between nationals of one and the same country. This common assumption builds on

an idea of culture as a coherent system that can be attributed to nationality (see for example Hofstede 1980, Zander 1997).

Joining different nationalities and country specific systems within the same structure may be troublesome, according to this assumption, since the lack of similarity between people and systems is likely to be greater than in a national merger or acquisition. Within the field of cross-national comparison this issue is a central topic of investigation. A managerial perspective is often used. Examples of comparisons between leadership styles can be found (see for example Calori et al. 1994, Lubatkin et al. 1998).

Some findings question the idea that increased cultural distance generates more conflicts than similarities. Larsson (1991) points out that the awareness of potential dissimilarities is often more developed in a cross-border context, which means that there is a better readiness for tackling problems associated with culture in these firms.

The concept of culture is strongly problematised within the fields of intercultural interaction and multiple cultures. Individuals in internationalised firms are seen as carriers of multiple identities. This implies a constructivist view of how the identification process in an organisation takes place, which has significance in international mergers or acquisitions. National identities are not seen as given in advance. Rather, interaction and the joint creation of meaning in a certain context are emphasised. What comes out of a cross-border merger or acquisition cannot be understood in terms of a clash between two separate systems. Instead, a process comes about where the creation of a new system of meaning and symbols turns out to be the hallmark.

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Methodology

By Hans De Geer, Tommy Borglund and Magnus Frostenson

The usefulness of case studies

The FOTON project works with studies using quantitative data on a macro level as well as case studies using qualitative data on a micro level. Here we will discuss the methodological issues around the case studies. We will discuss what case studies can be used for and their limitations.

For the FOTON project the case studies give an additional understanding that goes beyond the results coming from quantitative surveys. In combining these methods you can attain both some general explanations about the object under study as well as an in-depth understanding of the processes around mergers and acquisitions when it comes to innovation and knowledge transfer. Qualitative case studies can be used when studying phenomena where the researcher has a need to gain a deeper understanding of a complex and contradictory phenomenon that might not be easy to measure or to study by using quantitative methods such as surveys of a larger universe.

In the FOTON project research questions are of that type. It is not easy to grasp the meaning of findings around subjects like “competence gain or competence drain” without making extensive qualitative case studies that bring life and humanistic understanding to the complex change processes of organisations.

Case studies can be said to be particularistic, descriptive, heuristic and inductive (Merriam 1994). A particularistic study focuses on a certain situation, event, phenomenon or person. It brings up the unique feature and gives you a possibility to study something in depth. It can be used to give detailed information about every day consequences of a major trend or development.

The case study is descriptive in the sense that it gives a thorough and extensive illustration of the things you are studying. It gives the researcher a possibility to make a “thick” description, a complete and detailed description (Guba & Lincoln 1981).

A heuristic case study improves the readers’ understanding of the phenomena under study. It can bring new meanings, give you new experiences and confirm or not confirm your earlier understanding. It is inductive in the way that it can be founded on inductive reasoning. New concepts and hypotheses can arise from the information building on the context of the study. The discovery of new meanings, relations or knowledge is typical of qualitative case studies, rather than investigating and testing hypotheses.

Results from case studies are not to be generalised to a larger universe than the case investigated. Case studies can oversimplify and put too much emphasis on certain factors. The reader can believe that what he is reading is the “reality” when it only is a version of reality as it is turning out in the case study (Guba & Lincoln 1981). Case study researchers are sometimes criticised for not using to the full content of the gathered information (Potter & Wetherell 1987, Alvesson & Sköldbberg 1994).

Moreover, there is a risk of exaggerating the connection between narratives and the actual situation where consistencies are lifted up and non-consistencies are downplayed. This can lead to a selective interpretation where a potential variety of meanings are suppressed in favour of a main pre-supposed meaning.

A case study does however give you a chance to make generalisations to theory. You can do that through analytical generalisation as a contrast to statistical generalisation (Yin 1994). A previously developed theory is used as a template with which it is possible to compare the empirical results. Using analytical generalisation you can discuss and compare findings from a case study with theory. It can help you answer questions of “how” and “why” coming from quantitative surveys or from general theories.

Case studies are useful for research aiming to bring new or better understanding of existing theories. They are also useful for explorative studies giving suggestions to new theories which can be developed through quantitative studies. A case study shows the possible. When a phenomenon has been observed in a case study it is proven that this phenomenon actually can occur in situations like these. A case study can reveal the unique and display things not thought of before, which can bring new understanding to researchers and readers.

The researcher as an interpreter

Qualitative case studies can be made from a hermeneutical perspective and hermeneutics as such is characterised by interpretation and an emphasis on understanding. Positivistic and hermeneutic standpoints are often described as two opposites on ontological and epistemological scales (Morgan & Smircich 1980). Hermeneutics has more of a subjective approach to social science while positivism has a more objective approach. On the ontological scale reality is seen as a social construction in hermeneutics while positivists see reality as a concrete structure.

The basic epistemological stance for hermeneutics is understanding and insight. Interpretations are developed from the pre-understanding of the researcher. As the research goes on, the researcher develops a deeper understanding of the phenomenon at hand, which is - again - a new pre-understanding that can be challenged through discussion and research. This tradition often criticise positivism for oversimplifying the role of the researcher, as the interpretation and the relation between the subject and the object is rarely problematised within such studies.

Qualitative case studies made from a hermeneutical perspective can give you a holistic understanding of the phenomena but do not provide you with an answer as regards some form of objective reality. The question whether an interpretation is “true” or not is not a question to ask in hermeneutics (Alvesson and Sköldbberg 1994). In a hermeneutical case study researchers are not trying to establish a truth, since other interpretations are possible. Positivism embraces quantitative studies making generalisations of an objective reality, while hermeneutics embraces processes of individual interpretation, presenting the researchers subjective understanding without any claims of presenting reality.

What the qualitative researcher can do is to search for credible and relevant interpretations. Adopting a totally relativistic standpoint is perhaps not a very fruitful way of working and can be as hard to defend as any statement of the existence of an objective true reality (Kristensson Uggla 2002). If you only can come up with an interpretation that is just as good as any other interpretation you have not contributed that much. The ambition must be to try to make a statement of why readers should find your interpretation credible and relevant. From this standpoint you can give some suggestions to explanations of the phenomena under study, as a complement to the understanding you are giving the reader. In that sense, there is a process of dialogue between understanding and explanation (Radnitsky 1970).

Ways of gathering information

So, how do we cope with these constraints around the qualitative data in case studies? To get to a deeper structure of a case study it is important to use a variety of methods for data collection. Multiple sources of information reduce the likelihood of misinterpretations and oversimplifications. Triangulation of data from several sources gives a deeper understanding (Denzin & Lincoln 2000). In the FOTON project mainly two ways of gathering information have been used, interviews and the study of documents. To a smaller extent other observations have been included. By combining all of these three ways of gathering information you can build more credible interpretations.

When it comes to interviews much can be learned from the social constructivist perspective (Berger and Luckmann 1966). Interviews can be seen as being constructed by the interviewee and interviewer. The notion of reality is not independent from the interview situation, but is partly created by it. What is expressed is the interviewee’s view or construction of reality. Others can have experienced a situation in other ways and have made different interpretations of it. It is important to make clear to the readers what part of narrative told can be regarded as something experienced by many and what part of the narrative that contains personal views and social constructions from one single actor.

The information coming from written documents must also be read with a critical eye, as we know from the field of historical methodology (Jarrick and Söderberg 1993). The information has to pass the test of identification and authenticity and the researchers must assess the relationship between

the narrator and the object. We must reflect over the credibility of the document itself and of the narrator that has written it.

The use of case studies in FOTON

To sum up, we can say that the case studies made in the FOTON project function as a complement to the more quantitative surveys of the project. Provided that readers are aware of the lack of generalisation of the findings, the case studies bring understanding and tentative answers to questions of “how” and “why”. Suggestions that could be used as hypotheses in further quantitative studies or as something that is to be compared with theory in an analytical discussion.

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The pharmaceutical and software industries in the Nordic countries

By Juha Oksanen & Nina Rilla

Below a short overview of the chosen industries - pharmaceuticals and software - is provided before we proceed to the case study findings. The case study descriptions include a closer look at the industries in the respective Nordic countries.

From an international perspective the five Nordic countries - Denmark, Finland, Iceland, Norway and Sweden - have a lot in common. The countries share a number of common societal characteristics, development trends and closely intertwining histories. At the same time, there are wide variations in the industrial structures in the Nordic countries, which are explained among others by differing natural resources, development trajectories and policy decisions of the past.

Despite of historical divergences the Nordic countries face the same international economic and political trends, including an increasing interdependency between nation states. Three out of five Nordic countries are members of the European Union. Even if they are formally outside the EU, Iceland and Norway are also involved in the economic integration taking place on the European level (i.e. through the EEA agreement).³

The software industry

The FOTON partners agreed to make one case study for each country within the so-called software industry. It should be noted that the boundaries between various types of ICT businesses⁴ are blurred. The software sector is part of the wider ICT sector which contains both information technology and telecommunications. Software products are related to both areas but can be seen to be more related to information technology (Tyrväinen, Warsta and Seppänen 2004: 11).

The software industries in the Nordic countries are characterised by a large number of small companies, with thriving entrepreneurship. This indicates that it is relatively easy to set up companies in this sector - or at least easier than in the pharmaceutical sector where heavy investments are required from the very beginning.

In the recent past a large number of mergers and acquisitions have taken place within e.g. the Danish, Icelandic and Finnish software industries. One

³ The European Economic Area, meaning that they in most cases are part of the European market and adapt and accept EU regulations.

⁴ Information and communication technology. ICT and IT (information technology) are often used as synonyms by the press.

of the characteristics of mergers and acquisitions in the Nordic countries' ICT industries is the relatively large number of domestic buyers. Recently, however, foreign takeovers have become more common within the ICT sector. This applies for instance to the Danish and Finish industries. Foreign firms find large and well developed Nordic software companies very interesting.

The technology boom at the end of 1990's had, naturally, an effect on national economies and software industries. During the blooming years of the ICT industry, the software sector grew rapidly and the need for skilled workers was immense. The downturn in the software sector by the turn of the century caused venture capitalists to withdraw from this sector in many countries. However, signs for recovery can currently be seen.

In many Nordic countries, at least in Sweden, Norway and Finland, the largest area in the ICT sector is data processing services, which include software design, production and consulting. A particular feature common to all the Nordic countries' software industries is the clustering of such companies. These clusters seem to be located near larger cities.

Another common characteristic for all the Nordic countries is the high penetration of both computer and mobile phone usage. This enhances the development of new solutions in mobile as well as in software technology. Still, the economic role of the software sector remains relatively small in all the Nordic countries.

The pharmaceutical industry

Like the software industries, the national pharmaceutical industries in the Nordic countries do not significantly differ from each other. The most striking characteristic over the past years in the pharmaceutical sector has been consolidation; large multinational pharmaceutical companies have strengthened their market position not only in the Nordic countries but all over the world.

Another dominant feature in the Nordic pharmaceutical industries is a series of mergers and acquisitions - many companies have been bought and sold, not only once but several times during their existence. The small domestic pharmaceutical firms have concentrated on niche segments in order to survive in a situation of fierce competition.

The Danish pharmaceutical industry differs from the industries in the other Nordic countries in that the Danish companies are owned by foundations. Their purpose is to protect companies from takeovers. Hence the number of takeovers is smaller in Denmark than in other Nordic countries.

Iceland does not have as developed and large a pharmaceutical industry as the other Nordic countries. A few years ago a small number of pharmaceutical firms were in operation. Recently these companies merged into one rather large company, Actavis, with operations in 25 countries and with over 7.000 employees. The headquarters of Actavis are in Iceland where about 400 employees are found.

Biotechnology is more prominent in Iceland than the pharmaceutical industry. There are about 1.500 employees in biotechnology in all sectors with a turnover of over €180 million.

One feature that has tightened competition among pharmaceutical companies is generic substitution which has been introduced in all Nordic countries. A generic is a medicinal product containing an active substance for which the patent protection has expired. This means that a pharmaceutical company must be able to offer the following in order to be able to gain a strong market position: competitive prices, a wide product range, and fast and reliable delivery.⁵

The pharmaceutical industry is one of the most restricted sectors in Europe. Development of new medicines requires heavy investment and much time. In addition the pharmaceutical industry is highly R&D intensive. New products must undergo strict approval and registration procedures, for example precise documentation and clinical testing before they are launched in the market.⁶

In Europe the United States is considered to be a far more favourable location for pharmaceutical R&D than the European countries. Hence, business prospects and innovation incentives are seen to be more favourable in North America.⁷ Moreover, the small size of the national markets is driving pharmaceutical companies operating in the Nordic countries to expand abroad and to focus on exports.

⁵ <http://www.efpia.org>

⁶ <http://www.efpia.org>

⁷ <http://www.efpia.org>

Case findings - Overview

By Juha Oksanen & Nina Rilla

General observations on the cases

The case companies comprise a heterogeneous group differing from each other in several respects - by the size of the acquiring and acquired companies, the previous ownership structure and the lifespan of the companies, just to name a few factors.

Generally, the buyer is a larger firm than the Nordic company which has been the target of the takeover or merger. Two takeovers stand out when we consider the size of the acquired and acquiring companies. Among the software companies studied, the takeover of the Danish Datacentralen by the US CSC presents a case where both involved parties were large firms. Datacentralen had close to 1.000 employees and CSC 34.000 employees at the time of the 1996 takeover (today more than 90.000).

Among the pharmaceutical companies the merger between the Swedish Astra Group and the UK-based Zeneca is in a class of its own when it comes to size. Just before the merger in 1998 the Astra Group had 24.958 employees, of which 8.060 were employed in Sweden. The other enterprise, Zeneca, was not substantially larger than Astra (after the merger the new Astra-Zeneca had circa 55.000 employees).

At the other end we have small software companies, such as the Icelandic Computer Knowledge Inc with 5 employees prior to the merger with the US based Eastman Kodak Company in 2000. Eastman Kodak and Teléfonica, which took over Finland's Iobox via its affiliate Terra Mobile, represent giant multinational groups with activities around the globe. Eastman Kodak at the time of the Computer Knowledge takeover employed more than 78.000 employees globally. The Teléfonica Group had altogether over 148.000 employees when Terra Mobile acquired the business of Iobox.

The previous ownership structure of the acquired companies varies significantly, which in some instances may have had a bearing on the impacts of the takeovers. Datacentralen was until the takeover a publicly owned independent company in Denmark. On the other hand, the other software case companies can be labelled start-ups owned by founders, employees and private venture capital investors (Iobox, Zoomit, Computer Knowledge Inc and Internet AB).

One group is formed by the publicly listed pharmaceutical companies. Before the merger with Zeneca Astra's largest shareholders were Investor Ab (the Wallenberg family's investment group), the Swedish National Pension Insurance Fund, Robur mutual funds and SPP. Oy Star Ab was part of the Finnish Huhtamäki concern which has been listed on the Helsinki Stock Exchange. The Icelandic deCODE Genetics Inc was listed on

NASDAQ and EASDAQ in 2000. The Danish pharmaceutical case company DAK-Laboratoriet represents an exception here since it was originally owned by the Danish Pharmaceutical Association (Dansk Apotekerforening).

The pharmaceutical companies studied have a much longer history than the software enterprises. Most of the pharmaceuticals were established in the early twentieth century or, as in the case of Norwegian Nycomed, as early as in 1874. deCODE genetics Inc represents a new wave in the development of the pharmaceutical industry which has taken place mainly since the early 1990s based on the rapid development in genetics and biotechnology.

The home base of the acquiring MNEs varies widely. In two cases the new owners came from the United States or from the United Kingdom. In the rest of the cases they came from France, Germany, Japan or Spain. The Icelandic deCODE genetics Inc and the Danish DAK-Laboratoriet are exceptions in this respect. The deCODE story focuses upon a company internationalising its activities and not a takeover per se, whereas the DAK-Laboratoriet case describes a process spanning over fourteen years including mergers, de-mergers and finally a sell-off to a leading Scandinavian private equity firm.

Overall, the process which the ex-DAK-Laboratoriet has gone through is not uncommon. It seems that complex and changing company arrangements are part and parcel of a dynamic business life. A chain of mergers, acquisitions and de-mergers - domestically and/or internationally - is common, particularly in the cases representing the “mature” pharmaceutical sector (cf. Oy Star Ab, DAK-Laboratoriet and Nycomed Diagnostics).

Today, this phenomenon is to be found in the software industry as well. Zoomit has for instance gone through a number of company alignments since its founding in the late 1990s. Before the Norwegian company merged with the French Kelkoo in 2000, it was itself an acquirer of a Dutch startup, Koopwijzer. Kelkoo in turn was taken over by the US Yahoo! in the spring of 2004.

Reasons for the takeovers

The first part of this section focuses on the former owners’ reasons to sell off business activities to foreign based firms. We then take a look at the new owners’ motives for acquiring companies located in the Nordic countries.

The national economies and markets in the Nordic countries are small, and as a consequence, the domestic (financial) resource base for expansion and growth is rather restricted. This seems to be an important point in several of our case studies, among them Zoomit, Iobox, and Computer Knowledge Inc. Nor should the acquired companies’ wish to take part in international business be underestimated. For many companies the fact that they are part of a large multinationals gives them access to wider international markets.

A recently published study on foreign acquisitions of Finnish medical technology companies (Kivisaari & Lovio, 2004) concludes in a similar fashion that shortage of available resources for company growth is a central

explanatory factor for ownership transfer. This especially holds true for new, innovative, small companies which are highly specialised, R&D intensive and export oriented. According to the researchers these companies “need a steady input of capital for their research and development, access to good sales channels in the US and other developed OECD countries, and as they grow, also an increased level of managerial competence”. In this situation, joining a larger domestic or foreign company has been a common solution.

The takeover of Norwegian Nycomed/Axis Diagnostics by the UK-based Axis Shield Plc in a very illuminating way points out the role access to financial resources has for decisions to merge with foreign owned companies. There was a need to raise new capital for the completion of a planned radical product renewal (known as the Afinion programme). The interviewed company respondents doubted that the large risk capital requirements (around NOK 100 million) could have been met in the Norwegian financial market. Instead, a non-targeted equity issuance in the London capital market turned out to be possible. In addition, the company’s presence in Britain was thought to be a vital means of nurturing the firm’s relationship with international investors.

The sell-off of Datacentralen in Denmark in the early 1990s provides yet another reason for the transfer of ownership. The Danish government wanted to increase competition within the domestic IT sector and particularly the public IT systems by privatising a publicly owned company with a dominant market position. This was the major explanatory factor behind the sale of the company to new foreign owners.

Moreover, the Danish pharmaceutical case, the sale of DAK-Laboratoriet to Norwegian Nycomed in 1991, was at least partly caused by a specific problem. The Danish Pharmaceutical Association was the owner of DAK-Laboratoriet, and needed to abandon its sensitive double role as a producer *and* retailer of pharmaceuticals in Denmark.

The acquisition can be induced by changes in international markets causing new challenges for the companies and/or the former owners’ strategic thinking. The stories of Oy Star Ab and Nycomed Diagnostics are in essence based on the latter reasoning - in both cases the former owners made a strategic decision to focus on a core-business area and to sell-off activities not fitting into the new strategy.

Astra’s decision to merge with British Zeneca can be seen as a proactive reaction to changes taking place in the pharmaceutical industry since the end of the 1980s. Globally, several companies had been acquired or had merged with others with success. Large companies performed well in the pharmaceutical market and size seemed to matter for two major reasons. Firstly, launching new pharmaceutical products on the global market requires relatively large investments in marketing. Secondly, large technology (R&D) investments are needed. In this situation the management and owners of Astra felt substantial growth was needed, as a small or medium sized company cannot afford such investments. There was also the threat of larger companies acquiring Astra.

Last but not least, the case studies show us that it is not unusual that the companies involved have had contacts prior to the takeover. Hence, the eye-care unit of Finnish Leiras had already been participating in R&D projects led by Japanese Santen Ltd. Icelandic Computer Knowledge Inc was very dependent on Eastman Kodak's Health Imaging Division for a long time before the takeover, as Health Imaging had been the exclusive distributor of the Icelandic company's product internationally. Iceland's pharmaceutical case also supports this argument.

The MNE's reasons to acquire the Nordic business

The literature on mergers and acquisitions (M&A) stress that there are four main reasons for acquisitions: Acquiring complementary products or broadening the product line; access to new markets or distribution channels; benefits from additional resources (economies of scale); and new technology for complementing or replacing the ones used (De Man & Duysters 2004: 2-3; Rusten, Jacobsen and Kvinge 2000). The results of this study support the findings of M&A literature: Market-seeking motives seem to be the most prevailing in the cases studied. Seeking growth and accessing new markets were reasons commonly mentioned as reasons for acquiring a company.

Gaining new products, platforms or production lines which complement the acquiring firms' existing assets seem to be a general motive in the cases studied, cf. Eastman Kodak and Computer Knowledge Inc, Telefónica's affiliate Terra Mobile and Iobox, Axis Shield Plc and Nycomed Diagnostics, Nycomed and DAK-Laboratoriet.

Gaining complementing assets refers to asset-seeking strategies in the literature (Rusten et al. 2000: 5). The case studies show market-seeking motives to be more prevailing in the pharmaceutical industry whereas acquiring strategic assets is more common in the software sector. In some of the cases product portfolios were overlapping but complementing each other in terms of geographical markets. Synergy benefits were though more common than overlap in business operations.

Access to new geographical markets was clearly a key argument for acquiring a company in most of the cases. For instance, the US-based CSC's presence in the Nordic countries was quite insignificant prior to the takeover of the Danish Datacentralen. Having sites/offices in various markets and closeness to the local customers is a dimension emphasised in CSC's business strategy. Therefore, after the takeover CSC Denmark became responsible for CSC's activities in the Nordic region.

Moreover, through the acquisition the buyer often got access to wider markets than the Nordic one. In this way the takeover strengthened and expanded the buyer's competitive position. A good example here is Japanese Santen Ltd which wished to expand to overseas markets including Europe. The ophthalmic unit of Leiras Oy exported to many European markets, and had a well-established position in the Russian market. Overall, it seems that complementarity in terms of coverage of geographical markets is an important factor when deciding on mergers or acquisitions.

Interestingly, acquisitions and mergers are an integral feature of the growth strategies of many companies covered in the case studies. Also, one should keep in mind that in some instances small companies or new ventures are purposefully looking for larger companies to merge with. This kind of behaviour seems to be common particularly for the software start-ups founded during the ICT-sector's rapid expansion in the 1990s. The new companies established during the booming years eagerly adopted the prevailing mantra "to grow or die".

Barr, Tessler and William (2002) mention still another potential reason for mergers and acquisitions within the software industry. According to them in liquidation through an acquisition is "the only practical way for entrepreneurs and investors to see any return from their investment at all before the appeal of the company's value proposition declines in the marketplace".

Finnish Iobox, Norwegian Kelkoo and Swedish Internet Ab were all founded in the years of upsurge in communication and information technologies. The firms were textbook examples of "Born global companies" targeting from early on larger international markets and aiming to become leading international actors in their own business areas.

In the cases of Iobox and Kelkoo, private venture capital investments gave the companies the chance to grow organically and at the same time to acquire other companies complementing their businesses. This route to growth was however deemed as too slow. A merger with a larger international company was seen as an opportunity to ensure rapid growth and access to finance. Overall, acquisitions and mergers as part of company strategies can explain both sell-off and acquisition of business units.

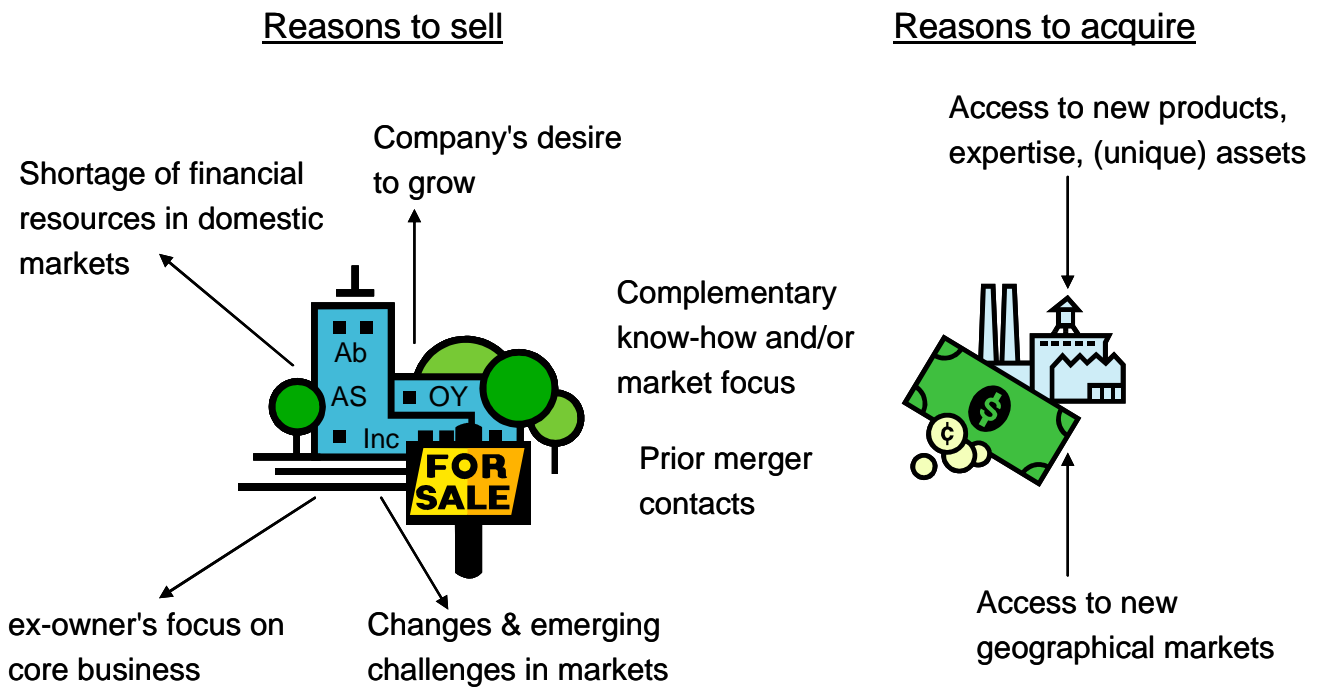
The case of AstraZeneca shows that market structure in many cases is the driving force behind acquisitions and mergers. The pharmaceutical industry is characterised by large companies, a structure that forces companies to grow in order to be competitive.

Gaining relevant complementary competencies and strategic fit between the involved companies in a takeover situation is without doubt an important initial reason for decisions concerning merger and acquisition. It is also a major explanatory factor for the evolvement of the acquired company and its position within the new corporate structure after the takeover.

Acquisitions may be motivated by the wish to eliminate a future, if not actual, competitor. However, this was not found to be a major reason in any of the company cases studied in the FOTON project.

The principal reasons for selling-off as well as acquiring the case companies are presented in figure 2 below.

Figure 2 Reasons to sell and acquire the case companies



The position of the affiliate within the MNE

According to the literature the position of an affiliate within the MNE varies according to the characteristics of the acquiring firm. The home country of the MNE has, for instance, been found to relate to differences in firm structures and strategic behaviour (see e.g. Lam 2003).

Based on existing literature Herstad (2004) concludes that “the internationalisation strategies of MNEs reflect incentives and constraints in their respective home business and innovation systems, and that the very same systems causes them to govern subsidiaries in accordance to experiences and routines developed within them - i.e. as the MNEs would do domestically”. For more details on this issue, see the textbox below.

Textbox: Business system effects and corporate governance of MNE (Herstad 2004).

The perhaps most analytically clear-cut model of “national systems of corporate governance” is found in Porter (red) (1992). Porter argued that characteristics of the external capital market in which a firm is embedded exert strong influence on the internal capital allocation and monitoring system of that same firm, including its strategic objectives and organisational principles. In Porters framework a main emphasis was put on the different logics of communication and co-ordination, both internally and towards owners and creditors, following from differences in external ownership structure.

This highlights a fundamental aspect of the multinational company, as the definitional characteristic of business system variety contained within a common ownership structure indicate a vast potential for information gaps (Tylecote 1994) to be created within it. A fundamental difference in this respect is between what has later been labelled insider or outsider systems of ownership and corporate control and the different degrees of strategic integration that follows (latter point refers to what extent strategic decision makers are integrated into, and hence have first-hand knowledge of, the learning and innovation processes their allocation decisions are influencing).

In the insider systems ownership is concentrated and strategy contingent on the knowledge and preferences of large owners in inside positions within the firm, where they hence have first-hand information about what is going on, in turn enabling the industry and firm specific knowledge accumulation that characterises industrial capital. According to Porter (1992) a main point in this is that short-term market valuation of the firm does not affect buy-sell choices of main owners, and consequently not management behaviour. Such "tight" insider systems are found in Continental Europe and Japan, with the German system often portrayed as the archetypical one. Also the Swedish case are seen to present insider system by its dominance of business groups centred on the "Wallenberg sphere" and Handelsbanken AB (Collin 1998). Co-ordination of information, knowledge and technology within the MNE tend here to be based on investments in *socialisation* (Bartlett and Ghoshal 1998) of key personnel and thus a technology and knowledge transfer policy backed by '*...coherence in vision, goals and strategies*' (Grandstrand and Sjölander 1994).

As the opposite end we find the outsider systems of the Anglo-Saxon economies (Lazonick and O'Sullivan 2000). These are first and foremost characterised by a highly fragmented and stock-exchange driven system of corporate control, where primacy is given to the interests of minor non-committed investors and their short-term desire for company reporting initiated value appreciation on their holdings. Important in this is the lacking willingness and ability of these same fragmented owners to exert direct strategic control through insider positions (inside positions inhibit anonymous entry-exit in the stock). This consequently limits the role of company and industry specific in-depth knowledge in strategic decision making and is complemented by a structure of inefficient company boards representing mainly judicial and generic competencies (Porter 1992, Fukao 1992, Owens 2001, Goergen and Renneboog 2001).

This in turn create a strong focus on generic financial indicators as measures of company success and consequent stock market pricing of the firm, as a basis for buy/sell decisions (owners/investors) and thus as the main strategic driver (management, normally with stock option plans as important incentives). Further those same outside owners are often merely representatives ('institutional agents') of other owners (private investors), hence creating a stratified ownership structure where ownership itself is 'dissolved' highly anonymous and highly driven by buy-sell decisions based on 'valuation by proxies'.

From our point of view it is particularly important to note that these systems, through their internal capital monitoring and evaluation system reflections, reinforce the mentioned information gap inherent in the relationship owners/MNE/subsidiary, thus, by co-ordinating mainly through centralisation or formalisation (Ghoshal and Bartlett 1998) possibly creating a distinct logic of internal communication by generic performance (results) or expectancy (R&D, rate of patenting etc) indicators.

Hence these systems, and MNEs acting as agent for them, contain certain distinct incentives and constraints that translate into different investment behaviour and organisational set-ups, and thus competitive strengths and weaknesses. According to both Porter (1992) and Soskice (1998) the insider model has a distinct strength in its ability to support those complex sets of complementary investments in machinery, skills and R&D that support continuous incremental process and product innovations in industries such as e.g. car production or machine tool production . The outsider model, on the other hand, tend to be biased against such investments while favouring “...stand, alone investment strategies” that represent a “...clear technological discontinuity” and thus generates leaps in position vis a vis competitors (e.g. the so-called ‘new economy’) (Porter 1992) (cf. the Axis Shield case).

The bias against has to do with the lacking transparency of those complex investment, skill-building and R&D programmes needed to continuously build capabilities in these industries, while the bias in favour of has to do with the highly transparent prospect of large leaps in stock market prizing and dividend payments that follow from radical research aimed at patentable product innovations. It is also possible to argue that outsider system, by way of the investor portfolio diversification that characterise these systems, is superior in dealing with the fundamental uncertainty that is inherent in radical technological change.

The applicability of the insider-outside distinction presented in the textbox, and its potential effects on corporate governance practices of MNEs are well demonstrated in some of the cases studied.

In the case of the Norwegian Nycomed Diagnostics unit transfer of ownership to British Axis-Shield meant a direct linkage to the UK equity market, which in turn made financially possible a new large-scale product development project aiming for radical product line renewal. At the same time, the new ownership structure and raising new financial resources through equity issuance in the UK market exposed the company directly to market expectations. For instance, the announcement by Axis-Shield in 2002 that they expected a delay in the product development project immediately triggered a substantial decline in the company’s share price.

Another example of the applicability of the insider-outsider distinction for analysis is provided by the Icelandic pharmaceutical case study. deCODE genetics Inc was from its establishment closely linked to the US financial market. The founding of the company in 1996 was enabled by venture capital from US investors. In 2000 deCODE shares entered into secondary equity markets when the company was listed on NASDAQ and EASDAQ.

Overall, the company's market value developed favourably in tandem with brisk growth: In the five years up to early 2001 the number of employees increased from 20 to 500. However, in the following year deCODE was forced to make major rearrangements and to lay off a third of its employees after its share value fell considerably. Reverberations were felt even in the Icelandic labour market and in the total amount of R&D expenditure in Iceland because of the central position of deCODE in its field.

Based on existing research Herstad (2004) has developed a table in which the "archetypical" characteristics of distinct business systems and mature MNEs of the US, Germany and Japan are presented (see below). The categories and descriptions are inevitably stylised proxies from which actual firms may vary quite a lot.

Table 2 Business system effects and the MNE (Herstad 2004).

	US MNEs	German MNEs	Japanese MNEs
Home-base corporate governance and internationalisation of finance	Short-term shareholder value, highly constrained by capital markets, financially centred strategies. Only group displaying genuine 'global' sourcing of finance	Managerial autonomy except during crises, little takeover risk, conservative and long-term strategies. Tightly linked to domestic owners and key creditors	Stable shareholders, network-constrained management, and aggressive long-term market share oriented strategies. Tightly linked to domestic owners and key creditors
Defined legitimate stakeholders	Judicial primacy to shareholders, thorough minority protection. No employee representation rights at company boards	Inside owners, creditors, suppliers and employees.	Inside owners, creditors, suppliers and employees.
Principle for subsidiary control and co-ordination	Formalisation or centralisation. Tight individual subsidiary <i>financial</i> control. Threat of sell-out.	Socialisation. Fairly decentralised administrative control, technology and market share oriented.	Centralisation and socialisation. Tight subsidiary <i>administrative</i> control.
Competence structures expected by corporate routines	Individual experts at higher hierarchical levels, professional communities enabling strong linkages to external research	Distributed throughout distinct hierarchical levels	Distributed and collective. Internally integrated organisational communities with few, selective external linkages.
Home-base industrial relations	'Variable cost approach' to labour. Harsh industrial relations, limited overall role of labour in organisational learning.	'Semi-fixed cost approach' to labour. Thorough employment protection, significant role of labour in organisational learning.	'Fixed cost approach' to labour. Long-term, bordering on lifetime, commitment of company to employees given full employee commitment to company

MNE internationalisation and acquisition strategy	Rapid entry and exit based on perceived <i>individual</i> company potential, high turnover of subsidiaries, aggressive internationalisation strategy enabled by weak linkages to home-base	Entry and exit based on long-term implications for company or division activity portfolio	Selective and reluctant internationalisation strategies, based on long-term implications for company activity portfolio. Preference for greenfield investments to build new organisations in “own image”.
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Herstad’s analysis of the UK-based Axis-Shield’s takeover of Norwegian Nycomed Diagnostics in this report offers an elegant application of the above described approach in a case study context. Besides the Norwegian case this perspective is however not applied in detail here. The number and diversity of the case studies carried out in the FOTON project do not allow us to make any broader conclusions concerning potential home country effects in takeover or merger situations. For a more thorough presentation of the approach discussed above, please see Appendix 2 in this report.

It would be misleading to maintain that the position of the acquired unit in a takeover process would be unilaterally determined by the new owner. For instance, we could argue that the existing resources of the new affiliate have an effect on its future position within the MNE. Affiliates with specialised know-how could negotiate/gain a better position than companies with less specialised knowledge. In some of the cases, the parties involved in the takeover or merger differed from each other in terms of corporate strengths and primary focus. There is no basis for far-reaching generalisation, but in light of the FOTON cases the Nordic companies’ strengths seem often to be found within R&D and product development.

The above argument is demonstrated well by the acquisition of the Norwegian software company Zoomit by the French company Kelkoo in 2000. The strengths of the two firms were distributed differently and according to the case study, this was reflected in the role Zoomit was given in the French company’s organisation after the acquisition. Expertise in product development was a major strength in Zoomit whereas Kelkoo had clearly focused on business development and had a good track record in this area.

A somewhat similar case is offered by the merger between Swedish Astra and the UK-based Zeneca. After the merger the headquarters for research and development were located in Sweden and the two highest global research managers came from Astra whereas the global managers for marketing and finance were originally from Zeneca. In a similar vein, Finnish Iobox got the responsibility for R&D in the new organisation after the takeover by Spanish Terra Mobile.

The case studies from the pharmaceutical industry show that many of the acquired units have managed to gain a strong position within the MNE.

Hence Santen now coordinates the European activities of the multinational. Norwegian Nycomed continued as a specialised point-of-care unit within Axis-Shield plc. Icelandic Encode remains an independent entity after the takeover.

On the other hand, DAK-Laboratoriet found it harder to define its role in its various new organisational contexts. It is now a development unit. In Astra Zeneca the former Astra takes care of R&D and the British Zeneca unit engages in administrative duties.

The ICT cases show that many of the acquired companies have found their position as development centres after the takeover. Zoomit serves as centre of excellence for product development and is semi-autonomous within Kelkoo. Notwithstanding terminological ambiguousness, a “centre of excellence” can be regarded as a strategically important unit in an MNE organisation.

The Danish Datacentralen became responsible for CSC’s Nordic business activities. In the Swedish ICT case not much attention was given to the local unit’s role after the takeover, and the staff felt that the unit was considered insignificant by its new owner. Iobox Terra Mobile operated as an independent marketing and sales unit, while the technology unit of Iobox took care of the platform development until it was transferred to its new owners. The marketing and sales unit was closed down even before the technology unit. Icelandic Computer Knowledge Inc has maintained its independence as was agreed on during the merger.

From both sectors we can find examples of affiliates that have a well developed knowledge base and a strong position within the MNE. All the case companies in the pharmaceutical industry play important roles, as their continuous existence indicates. We cannot say the same for the ICT sector cases, where two of the companies no longer exist. Still, the other ICT affiliates seem to have found their place in the new organisations.

The transfer period and staff commitment

It is a common observation that new owners bring a breath of fresh air into the acquired firms and increase the commitment of key personnel. With the exception of the Swedish ICT case, none of our case companies lost key personnel after the takeover. On the contrary many of the central managers have maintained their positions and obtained a place in the new companies’ boards. In some cases - especially within the ICT industry (Iobox and Internet AB) - lock-in prevented key personnel from leaving the company immediately after the takeover.

One reason for key personnel staying, was that while the acquired units had held a peripheral position in the old organisations (Oy Star Ab, Nycomed Diagnostics, ex-DAK-Laboratoriet in the early years after the first takeover by Nycomed), their activities were put at the very centre after the takeover. This made employees curious to see how things would develop.

In the Danish Datacentralen case the prior evaluation of the merger was done very carefully. One of the underlying reasons for finding a “perfect partner” was the takeover’s impact on society.

In some cases there was uncertainty about the future of the acquired unit immediately after the takeover (Santen Oy, Datacentralen, DAK-Laboratoriet). At the time Oy Star Ab was acquired, Santen Ltd did not have in place a ready-made model for reorganising the total MNE activity. However, this gave the Finnish unit an opportunity to contribute to the development of new corporate practices.

The transfer period is rarely, if ever, easy. Several cases - including Santen Oy, Iobox and Zoomit - show that the lack of a common language may cause misunderstandings and complicate the unification process. In all these cases, the lack of a common language was mentioned as an impediment in the creation of a common organisational culture.

Moreover, the Computer Knowledge Inc case indicates some differences in corporate governance between Anglo-Saxon and Nordic cultures. These have, however, not created insuperable problems.

The role of internal R&D activities before and after the takeover

The R&D activities of the ICT case firms consisted more in development than research in the strictest sense. In our software firms, the main activities were originally product and technology platform development (the latter holds true for Zoomit and Iobox) or providing consultation and solutions to customers (Internet Ab). In Zoomit and Iobox, the development activities were defined more clearly after the takeover. The acquired units concentrated on what they knew best.

For some of the case companies, the volume of R&D increased after the takeover. The level of R&D in Nycomed’s in vitro diagnostics unit was minor before the merger with Axis-Shield Plc., but subsequently increased substantially.

In the pharmaceutical case companies - which are more research oriented than the software firms - we can observe rearrangements in the location of R&D activities. When DAK-Laboratoriet was part of Nycomed, the R&D function was centralised in Austria. This hindered the Danish unit’s participation in R&D activities. After the de-merger, the R&D activities were centralised in Denmark.

In the case of Santen Oy, basic research was placed in Japan where the MNE had a research centre. According to Lam (2003) this is typical for Japanese MNEs. However, Santen Oy was given more responsibilities in the field of clinical testing since Finland offers good resources for conducting this type of activity. Overall, centralisation of R&D activities in certain locations is typical for pharmaceutical companies.

Icelandic deCODE Genetics Inc and its domestic subsidiary Encode Ltd as well as Swedish Astra represent companies in which research and

development activities have had a key position in the company business strategies both prior to and after the changes in ownership. In the Norwegian pharmaceutical case, Nycomed Diagnostics, R&D activities were strengthened considerably after the transfer of ownership.

Inter-firm interaction and knowledge transfer

The opening up of internal corporate knowledge bases for the acquired companies has been identified as a major gain in the foreign takeover literature. Ylä-Anttila, Ali-Yrkkö and Nyberg (2004) in this context speak of firm specific assets and advantages which are transferable within multinational firms. According to them, “firm-specific assets can be transferred with low cost within - but not between - MNEs”.

Knowledge transfer and inter-firm interaction within the MNE structure does not, however, take place automatically but requires both technical solutions for communication and a social embedding of interaction within the corporate structure. MNEs also differ from each other when it comes to strategies employed to reap the fruits from knowledge and skills residing in various parts of the organisation. Herstad (2004) points out that what is important here is “to what extent the MNE focuses on, and invests in, building internal learning interfaces and hence on establishing a 'corporate industrial system' where the knowledge may be shared and technological synergies harnessed”.

In the studied cases the staff of the different units normally stay in contact with each other by means of e-mail and phone because of the geographical distance. Regular visits between the different units and the headquarters of the MNE are also common - at least at the management level.

The case companies have developed specific arrangements to ensure continuous interaction between their geographically dispersed business units. Santen Ltd has for instance established so called "Global Project Teams" comprising staff members from the major company sites in Japan, the US and Finland. Santen's Global Project Teams are an organisational vehicle introduced to ensure that different regional conditions and requirements are taken into account in development projects. At the same time these teams bring together employees from Santen's sites in different countries.

In some cases, the acquired company - or part of it - has been turned into a competence/development centre or centre of excellence within the global MNE structure. CSC has established competence centres which gather intra-firm experts in certain key areas. For instance, CSC Denmark has a competence centre for health care. CSC's Danish affiliate is also a leading in-house unit in the development of tax-systems and digital government. Other examples are the positions of Norwegian Zoomit within the Kelkoo group and Icelandic Computer Knowledge Inc within Eastman Kodak. In the case of Axis-Shield, corporate R&D functions as an umbrella bridging the various company units together.

In a number of the acquired companies, systematic and thorough documentation practices were introduced in the wake of the takeover. This

holds true for example for Axis-Shield, Santen Oy and Computer Knowledge Inc. This development can largely be explained by the parent company's need to keep track of its affiliates' activities. The physical distance between the headquarters and affiliates increases the need to put in place standardised information gathering systems in order to make the activities of distant units more transparent for the corporate management.

After having bought Swedish Internet Ab, the German parent company harmonised the business information systems used within the group. The SAP-system which was used by Deutschnet GmbH was introduced in the Swedish company as well. The system, which was essentially developed for large companies, placed new demands on the planning and administration of projects. The system also made it possible to measure productivity and control the time used in a more thorough way than the previous practices within the Swedish affiliate has allowed for.

Some of the parent companies have designed various arrangements to ensure that knowledge residing in the acquired company is spread to other parts of corporate structure. These kinds of arrangements may reduce the buyer's risk of becoming negatively affected if the acquired company runs into difficulties. A good example here is Eastman Kodak which has put in place procedures to transfer the knowledge residing in its Icelandic development centre, in Computer Knowledge Inc, to other development centres.

Another interesting example is provided by the Iobox case. A year after the takeover, the acquiring firm Terra Mobile and its parent group Telefónica launched a technology transfer project in order to transfer platform development know-how residing in Iobox' R&D unit in Helsinki to its Spanish counterparts, more specifically to Telefónica's R&D unit. The negative changes in the ICT market presumably triggered this move. The technology transfer project was the last project of Iobox's R&D operations before the shut-down of Iobox activities.

A somewhat surprising finding from the case studies is the relative infrequency of career moves within the MNEs in the wake of the mergers or acquisitions. As pointed out by Rusten et al (2000), career moves between different units is a common arrangement for the transfer of competence and knowledge within multinational enterprises.

Interaction with surrounding innovation systems

In the previous chapters, the main focus has been on intra-firm impacts of foreign takeovers or mergers. In this chapter, focus shifts to the effects takeovers and mergers have on the innovation systems surrounding the acquired firms.

The cases covered in the FOTON project do not provide an unambiguous picture of how foreign takeovers affect the acquired firms' interaction with local or national actors. In some of the company cases, there seems to be a tendency for the links to local and/or national R&D actors and professional communities to have become weaker after the takeover. This could be

explained partly by the affiliate's access to intra-firm knowledge sources and the MNE's contacts with R&D organisations abroad. Becoming part of a large foreign-owned corporation may open up new, alternative knowledge sources for the units taken over. Links to surrounding local actors may moreover be weakened as a result of overall secrecy considerations in the MNE.

Still, it would be too simple to conclude that a foreign takeover necessarily means less contact between the acquired firm and local actors in the host country. External contacts may have been non-existent or lost before the takeover. For instance, the Norwegian Nycomed Diagnostics had few links to the surrounding innovation environment and local R&D actors prior to the Axis-Shield takeover. This was for a large part due to the wide knowledge and competence base that existed within the old Nycomed organisation. While the takeover by Axis-Shield broke the connections with the other Nycomed units, it made available "complementary knowledge and functions from the Norwegian Axis unit".

Moreover, the corporate practices of the parent companies may differ significantly when it comes to co-operation with external actors, such as R&D institutes or higher educational institutions. Corporate practices of parent companies have evolved over time in different national business systems and are step by step embedded into established customs guiding activities. Lam (2003) has for instance noted that collaboration between firms and universities traditionally has been rare in Japan. Instead, Japanese firms have tended to build their own R&D centres and collaborate with other companies. This explanation seems to fit well with experiences from the Santen Oy case.

It should also be pointed out, that the surrounding innovation environment may be far from insignificant for the decision to acquire or merge with a specific firm. Local and national conditions, such as the education system and the supply of qualified workers, may play an important role when decisions about takeovers are made (cf. DAK-Laboratoriet's experience and Computer Knowledge Inc). Mergers and acquisitions may also be motivated by the wish to access more intangible assets, like a country's international reputation as a leading high tech region (cf. the Iobox case).

It is furthermore interesting to note, that in some of the cases national or international policy measures had played a central role in the establishment of the companies involved. The Norwegian software case company Zoomit was established with support from a "public policy scheme aimed at stimulating the commercialisation of research based business ideas". The company which acquired Zoomit, Kelkoo, had its roots in an EU project. Icelandic Computer Knowledge Inc to a large degree grew out of a research and development programme launched by the Nordic Council of Ministers in the early 1980s. According to the case study "one of the main objectives in the programme was that companies were to be founded based on the new products that research teams in the Nordic countries developed".

The degree of interaction between an MNE affiliate and surrounding actors in the host economy may also depend on the kind of business activities the

affiliate is involved in. For instance, Rusten et al (2000) maintains that companies “merely engaged in sales, will produce less regional effects than firms engaged in manufacturing or advanced services”. This is explained by the nature and position of trade in the value chain: In trade, a large part of “the needed supplies have been obtained during an earlier stage of productions, involving units within the company or from elsewhere”.

An interesting perspective on innovation system level effects in the host country is provided if we look more closely at how the MNE transmits embedded operational models from its country of origin to the new environment. Based on this view, table 4 presents a stylised summary of innovation system level effects of MNEs originating from the US, Germany and Japan.

Table 3 The innovation system effect and the MNE (Herstad 2004).

	US MNEs	German MNEs	Japanese MNEs
Home-base national innovation system	Originating in mission-oriented policy environment, strong linkages to higher education, focus on science-intensive high-tech industries	Diffusion-oriented, strong inter-industry linkages, national focus on specialized suppliers and scale-intensive medium tech industries ('diversified quality production')	Strong inter-industry linkages, weak linkages between industry and 'outside industry' R&D
MNE organisational set-up	From financial system driven unfocused risk diversification to financial system driven focus on 'lean structures'. Low degrees of inter-subsidary integration	Varying degrees of focus, but divisionalised according to technology/product market considerations, integrated within divisions	Focused and integrated
MNE preferred supplier relations	Arms-length, contractual and short-term	Stable, selective and long-term	Stable, extremely selective and long-term

An interesting finding regarding regional and local effects of foreign owned companies and FDI has been made in a recent Finnish study. Based on rich statistical data, Maliranta and Nurmi (2004) have analysed effects of foreign-owned companies on entrepreneurial survival in the business sector in Finland. According to their empirical findings, the penetration of foreign owned-companies increases competitive pressures among domestic entrepreneurs. In this sense, FDI can be seen as a catalyst for “creative destruction,” a factor inducing selection of efficient entrepreneurs from inefficient ones. Maliranta and Nurmi further conclude that foreign-owned companies may, besides their potential role in technology diffusion,

“contribute to the productivity in industries and regions by turning the economic environment more competitive in a dynamic sense.”

Conclusions

All in all, the cases covered represent successful takeovers/mergers. Only two of the case companies, the Finnish and Swedish software companies, ceased to exist soon after the takeover. In the case of the pharmaceutical companies, all of them got a central position in the new organisation. The takeovers/mergers have had a positive impact on the resources available in the acquired firms, and the number of employees has also increased in many cases.

Our case companies have done fairly well after the mergers/takeovers. Even in the case of Iobox, which was down-sized after the takeover, the impacts were not only negative. The takeover made fortunes for the previous owners, the staff involved got valuable experience from internationalising businesses and some of them established new companies afterwards.

The degree of autonomy vis-à-vis the rest of the MNE varies among the companies we have studied. Some of them seem to have quite an autonomous status, and some MNEs rely on a hands-off approach which rests mainly on agreed financial targets and transparency of activities. However, an autonomous position should not be understood too literally in this context. A general trend among the FOTON case companies is that the demand for reporting on business performance has grown after the takeover. In certain cases headquarters are closely following activities that require investments. This in turn has set new standards for justifying and getting approval for local plans.

In general, the new owner's demand and ambition level seems to have had an up-grading impact on the affiliate's activities - provided that there is a strategic fit between the acquired unit and the acquiring company, and the targets are well communicated within the new company structure.

In conclusion, it should be noted that in assessing the effects of foreign takeovers, we inevitably face the methodological problem of accounting for the counterfactual position. It is difficult, not to say impossible, to assess what would have happened with companies if they had not been taken over.

Emerging questions

We are well aware that ten company cases representing two industrial sectors in five different Nordic countries do not alone provide any basis for further generalisations regarding the impacts of foreign takeovers and mergers. Therefore, drawing general policy conclusions from the case study findings is not in place here. However, from the company cases there emerge issues and questions which provide policy insights when combined with findings from two other FOTON modules (1 and 3).

Below, we have gathered some issues and questions arising from the material:

- By providing access to the MNE resource base and to international financial markets, foreign takeovers may contribute to a stronger financial position and improved access to resources in the acquired firm. Consequently, the acquired company may become more independent from domestic financial markets and public policy measures.
- The MNE's production plants, offices and networks in various localities may form an important channel for production output and function as a competence source. In many of the FOTON cases, however, inter-firm linkages do not seem to be very strong. From a host country perspective, it can be asked if foreign owned firm's links to innovation systems in other countries are used as a source for inflows of resources.
- When discussing foreign takeovers it should be kept in mind that domestic mergers and acquisitions have been - and still are - far more common. Is there a basis for being concerned about foreign takeovers per se? If yes, then in which sense? Or should we rather try to attract more foreign direct investments as most of the OECD countries nowadays do? Are foreign takeovers just a form of continuously evolving ownership arrangements?
- When focusing exclusively on takeovers we easily fail to take into account impacts of other ownership arrangements. What is the role of financial capital and investment companies? How about primary and secondary markets for shares? A recent Finnish report (Puttonen, 2004) which studies ownership issues argues that "foreign ownership is not a problem for the national economy, but scarcity of domestic ownership is." National incentives and institutional structures may induce or deter both domestic and international companies/investors to invest in a given economy.

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National company cases

Company cases Denmark

By Martin Tølle & Jørgen Lindgaard Pedersen

The Danish software case: CSC's acquisition of Datacentralen

The software industry in Denmark

The Danish IT sector has experienced a turnover growth of 60% from 1995 to 2002. In 2002 the sector had a turnover of 189 billion DKK of which 51 billions are exported. The sector employs 92.480 full time positions in 2002⁸.

Currently the industry is undergoing a consolidation process⁹. A recent survey by Deloitte shows that 51% of the best performing IT-companies plan takeovers in 2004 and around 21% of the slowest growing IT-companies plan to sell their business or part hereof¹⁰.

Within the last years there have been a lot of acquisitions within the Danish Information- and Communication Technology (ICT) sector. The following table outlines some of the most recent takeovers that have received the most attention in the media.

Table 4 Takeovers within the Danish ICT sector

Company	Acquirer	# Employees in acq. comp	Date	Short description
Mærsk Data	IBM (USA)	2.868	August 2004	IT services and consultancy.
Dmdata	IBM (USA)	330	August 2004	IT services and consultancy.
Aston Business Solutions	Tectura (USA)	600	August 2004	IT services and consultancy
IO interactive	Eidos (UK)	140	March 2004	Advanced 3D computer games.
Scandinavian IT Group	CSC Denmark (USA)	1200	Dec 2003	IT consultancy within the airline industries
Navision	Microsoft (USA)	1300	May 2002	Integrated software solutions for small and medium-sized businesses.
Catalog international	Intentia (Sweden)	30	Feb 2002	Applications for non-production e-procurement and B2B sell-side e-commerce.
Scandihealth (60%)	CSC (USA)	264	Nov 2000	IT for the health section, including electronic patient journals.
Datacentralen	CSC (USA)	900	March 1996	IT solutions for the public sector.

⁸ IT-Brancheforeningen, "IT-erhvervet, Nøgletal", <http://www.itb.dk>

⁹ Berlingske Tidende, "De store æder sig større", 4 October 2004

¹⁰ Computerworld, "Mantraet 'Voks eller dø' vender tilbage", 24 September 2004, pp. 140-141

Selections of case

One of the main criteria for selection of the case was that the takeover should not have been too recent in order to address the real impact of the takeover. Other criteria were that the acquired company should have had a history of its own prior to the takeover. Based upon the identified takeovers within the Danish software industry the following two cases were identified as the most interesting:

- CSC's acquisition of Datacentralen in 1996.
- Microsoft's acquisition of Navision in 2002

After first contacts with the enterprises it turned out that CSC was interested in participating in the project whereas Microsoft declined to participate. Accordingly, the CSC case was selected as the Danish case within the software industry. In the following the case will be described based upon interview and other literature.

CSC's acquisition of Datacentralen

This description is based upon interview and emails with Market Development Director/Marketing Manager in CSCs Nordic Division David J. Seifried (DJS) conducted in July 2004.

Addition sources include information from the homepages of CSC such as annual reports as well as other sources primarily from the general press, cf. reference list.

Datacentralen

Datacentralen (DC) was founded in 1959 as a partnership between the central government, the municipalities and the counties of Denmark. From the start, Datacentralen's mission was to be the IT service bureau of the Danish government and to develop and operate the large and complex systems required by the state as it entered the computer age (Seifried, 1997, p. 30). DC was established as an independent company based upon the expectations that a state company would have difficulties in attracting the most competent employees if the salaries had to follow the state levels. This gave DC a competitive advantage compared to state owned IT companies in other countries which had a hard time to attract the most competent people.

At the time of the takeover DC had around 1000 employees. From around 1970s and up to today DC has a 75% share of the market of large state-enterprise companies in Denmark. Customers include: the internal revenue services, police, defence and the ministry of finance.

CSC

CSC was like DC founded in 1959. To some extent it can be seen as the DC of the USA because, although CSC was never state-owned, it likewise

started with creating IT system for the public sector. In the middle of the 1980's CSC began to provide services to private sector with success. Thus, at the time of their offer they could prove that they managed to serve the private sector as well. Today 75-80 % of their turnover comes from the private sector. However at the same time they have managed to keep their share in the public sector. Thus, both sectors are important for CSC today. At the point of the takeover CSC had around 30.000 employees; today the employ more than 90.000, cf. table below.

Table 5 Turnover and number of employees, CSC

CSC	1996	1997	1998	1999	2000	2001	2002	2003
Turnover (Bio. \$.)	4,2	5,6	6,6	7,7	9,4	10,5	11,4	11,3
# Employees (in 1000)	34	41	45	50	58	68	67	90

Source: CSC Fact Book, February 2004

Reasons for takeover

Reasons for selling DC

The primary reason for selling DC was the wish of the Danish government to increase the competition within the Danish IT sector in general and the public IT systems in particular. The general thought was that DC had enjoyed a sort of monopoly, and the sector could benefit from increased competition. Additionally, the Danish government wanted to ensure that Denmark maintained and built a position as a country with an effective, well-functioning government sector and administration, and believed that IT, while already important, would play an even more important role in the future. Furthermore, first attempts towards privatisation had proved successful, cf. below.

CSC reasons for acquiring DC

The main reason for the takeover was to get access to the Nordic region. At the point of the takeover CSC was not significantly represented in the Nordic countries.

Privatisation process

The first step towards privatisation of DC was taken in 1992 when DC together with Mærsk Data created Dan Computer Management (DCM) on a 50-50 basis. The business of DCM was the operation of systems. DCM was considered a success. The customers were satisfied and the mix of the two cultures turned out fine.

The success made the government pursue the possibility of a full privatisation. As a result a process was initiated together with McKinsey, the Ministry of Finance, the Ministry of Research & Information Technology, Kammeradvokaten, and DC. They invited potential buyers to meetings. Around 10 international companies were invited as potential buyers, and these were asked to answer a set of questions and present their ideas. In January 1996 the Ministry of Finance narrowed the number of potential buyers down to three candidates: CSC, IBM and EDS. Soon after EDS dropped out of the candidate field leaving CSC and IBM¹¹.

The candidates were assessed by a steering committee, in accordance to four criteria:

1. **Vision** (to what extent did the company's vision fit the expectations of DC and the Danish Government) To what extent did the potential buyer has a vision that was attractive for Denmark; what were the philosophy and thoughts behind the bid?
2. **Business solutions**
 - a. Value added to DC (How would they add value to DC, increase innovativeness, customer satisfaction, etc?)
 - b. Cultural fit (Does the philosophy of the company fit DC? They had to show that they planned to take care of the Danish employees.)
 - c. Partner quality (turnover, level of earnings, solidity, etc.)
3. **Industry structure** (plans regarding the IT service industry in Denmark, e.g. plans regarding changing (increasing/decreasing) the competition in Denmark)
4. **Terms** (how much are they offering)

Ultimately the Danish state chose to enter into final negotiations with CSC. The contract was signed March 23rd 1996. At first CSC bought 75% of DC. The remaining 25% was acquired in 1999. One can only speculate if 25% ownership was initially maintained as a symbolic decision that made the privatisation easier to accept politically. Soon after the takeover CSC went into negotiations with Mærsk to buy out their 50% share in DCM. In August 1996 the agreement was in place and in September 1996 CSC got ownership of DCM with its 250 employees¹².

¹¹ IBM sagde først nej, *Computerworld* 29, March 1996, p. 26

¹² RB-Børsen, Mærsk Data sælger DCM-aktiver til CSC (2. opdat.), 8 August 1996 kl. 1731

Impact of takeover within the acquired firm

Philosophy of CSC

While we cannot conclude as to why specifically that CSC was chosen as the acquirer of DC the business philosophies of CSC may have been one of the primary reasons. CSC philosophies:

- **Local First, Global Second.** CSC believes in the local management, languages and culture (of the approximately 24.000 employees in Europe only around 1 % are Americans, compared to e.g. EDS where around 10-14% of their European employees are Americans.) CSC presents itself as a local company with access to a global network.
- **Long-term Focus.** CSC perceived the takeover as a long-term investment. Thus, they did not have any dramatic plans regarding DC. The general perception of some of the other candidates were that that they perceived the culture of DC to be old fashioned and one on which a future could not be based. Thus, there was a fear that they would disintegrate the company into smaller parts, conduct massive layoff and so on. CSC however made clear that their philosophy was not to buy and destroy but to have a more long-term goal.

In relations to the philosophies however, it should be mentioned that the larger freedom also could be related to the general growth within IT at the time of the takeover. The liberty of action is greater during good times.

Impact

Turnover and employees

The development in the number of employees and revenue in DC/CSC Denmark can be seen in the following table. In the late 1980s the number of employees was around 1800. However, technological improvements such as the change from punch cards to new technology reduced the number of employees to 885 in 1994, while at the same time keeping their customers.

Table 6 Turnover and number of employees, CSC Denmark

CSC Denmark	1994	1995	1996/ 1997	1997/ 1998	1998/ 1999	1999/ 2000	2000/ 2001	2001/ 2002	2002/ 2003
Turnover (Mio. DKK)	968	1008	1317	1219	1320	1459	1643	1970	2008
# Employees	885	930	1054	1070	1137	1188	1508	1705	1667

Source: CSC Danmark Årsregnskab 1998/99, CSC Danmark A/S Årsrapport 2002/2003

From 1996 up to 2000 the growth has been primarily organic. Since then the growth has also been based on acquisitions such as Scandihealth in 2001

(employed 264, turnover: 202 millions DKK)¹³, e-huset in 2001 (173 employees) and Scandinavian IT Group in 2003 (Employed 1200, turnover: 1,64 billions DKK)¹⁴. Today, CSC Denmark employs around 2600¹⁵. In general the turnover of personnel has been relatively low. Many of the employees from the days of the DC are still here. 25 years anniversaries are relatively frequent. CSC's philosophy has been to use existing employees. Motivate them, up-qualify them, give them new additional tools, procedures, and access to the global knowledge network.

Uncertainty in the first years

In the first years after the takeover there was a lot of uncertainty. A somewhat negative feeling started to emerge around the employees. The combination of lack of new orders, loosing one of the first re-competes, low customer satisfaction, low growth and earnings all contributed to the negative feeling. In addition the customers started asking about the lack of big changes. CSC however, kept calm knowing that such a process of change takes time. They announced that they had a long-term goal.

In addition cases like the AMANDA started to get a lot of negative press in the media. AMANDA was a project started under DC and taken over by CSC. The system was developed to support the employment services. From its first day of operation it was reported that the system had a lot of problems slowing down the productivity of the employment offices. The mood in the company was not great and some employees started to doubt whether their jobs were safe. After the first difficult years the mood started to change. Among other things a new CEO facilitated this change.

Customer satisfaction

In 1996 CSC conducted a survey to identify the satisfaction among its existing customers. Only one of the big customers was satisfied. Customers representing more than 100% of the surplus were not satisfied (i.e. the satisfied customers didn't generate any profit!). Today the satisfaction level is high (4+) on a scale from 1-5. (82% of the customers are satisfied or very satisfied according the a recent study¹⁶)

Market and competitors

At the point of the takeover the primary market of DC was the public sector, accounting for around 90% of the turnover. Today the ratio between public and private market is about 50/50. Throughout the process (from around 1970'ies and up to today) CSC has had a 75% share of the market of IT

¹³ CSC-køb på plads, *Computerworld* 21. November 2000, p. 29

¹⁴ CSC køber Scandinavian IT Group, *Computerworld* 18. December 2003

¹⁵ According to www.csc.com/dk

¹⁶ CSC Danmark A/S,

systems in big public companies in Denmark. Thus, the change in the public/private ratio is based upon growth in the private sector.

One of the fears after the takeover was that CSC would lose some of its big public customers as a part of re-competes (renewal of existing contracts). The challenge of CSC was that due to EU regulations all big public service contracts must undergo public invitations to tender. CSC actually expected to lose some of their big customers, partly because of their low customer satisfaction. In reality CSC only lost one major deal with one of their big clients. This however was one of their first big re-compete after the takeover, so it frightened them. It was a big defence system called DEMARS which they lost to IBM¹⁷.

The biggest competitors of CSC/DC are IBM and Kommunedata (KMD). So far however KMD is more a potential than an actual competitor. So far they have in a somewhat oligopolistic sense each had different focus. CSC has focused on the national level, whereas KMD has focused on the municipality level. Potentially however, KMD could be a big competitor. Among other things they have a huge saving which potentially could be used to dump prices. Other competitors include CAP Gemini and Ementor in addition to other medium sized companies that support smaller public tasks. CSC is performing very well compared to their competitors which currently are experiencing low or negative growth and earnings. Thus from the outset as a state owned company, CSC has managed, with the same employees, to turn from general low performance and low customer satisfaction to performing better than the global competitors.

Impacts in innovation

Neither DC nor CSC focused on conducting pure research. They focus on the application of technology. Their innovation is how they can create value for their customer through application of available technology.

The DC strategy was less focused. On one side they wanted to be the best house of system developers and system operators in Denmark, on the other side they started to 'play' with developing new products to the mass-market. In the beginning of the 1990s they established an investment fund with around 25 million DKK for new products to the mass-market, but the investments never succeeded. Few of the products were finished. A possible reason for the failure was due to it being a completely new market for DC. The expertise of DC is related to the market of complex customised system and not the mass-market. Among other things they lacked knowledge on how to market and sell on the mass-market.

The takeover has influenced the toolbox of the employees in terms of additional tools and methods. As a large company CSC can afford to invest in good methods and methodologies. An example of this is their business change methodology called *Catalyst*, that not only addresses the technical

¹⁷ Recently CSC has lost two more re-competes [Berlingske Tidenende, *CSC taber store ordrer*, 9. October 2004]

aspects but also how to carry out the change process, addressing 'soft issues' such as humans, business values, having a clear objective, and so on. In this respect it should be noted that James Champy, one of the two authors behind the book, *Reengineering the Corporation* that proliferated Business Process Reengineering (BPR) in the 1990ties, was a leading manager in CSC. Thus, BPR are one of the trademarks of CSC. Accordingly, CSC highlights the need for not just supporting existing processes with IT but to re-consider (reengineer) the processes before adding IT support.

Generally the employees of DC had a rather technical approach, most of them being computer scientist and only a few of them academics. One of the first things after the takeover was the establishment of a large investment programme that invested training enhancing their competences of employees and learning them additional tools and methods. This is based upon the strategy that innovations can emerge when people have the right options and tools, and they are challenged to think creative. Furthermore, CSC added knowledge sharing as a new concept. The employees are encouraged to exploit and contribute to the global knowledge network of CSC.

Improved hit rate

If the company got a new AMANDA order today the staff would address it differently. First of all they would apply methods such as Catalyst (cf. previous section) which first principal states that they should develop a system that satisfies the customers need at the time of the delivery. And not as in the AMANDA case where the requirements consisted of numerous binders, which were given at the time of the order, many years prior to the system handover. This can be a problem in public procurement, where one often ends up creating an arm's length relationship, instead of partnership. In a world of changing needs and high-complexity, partnership, ongoing communication, and flexibility are all important to delivering systems that meet customer needs at the time of delivery. Another aspect is that they have to understand that technology is about people. They have to be in a dialog with the end-users and manage their expectations.

Furthermore, a new sales method called *Pioneer* has been introduced to ensure a fit between what they sell and their overall strategy. That is, they should put more thoughts in which orders they pursue, more systematically select the tenders and target their sale. Pioneer links the sales process with the developers creating a team spirit under the reasoning "if we can't deliver it we shouldn't sell it" and "what can I do to help you?" This new process is very motivating and positive. As a result their hit-rate has improved dramatically. In 96/97 they won around 1/3 of their bids. A year after the process was introduced it was increased to 69%, since then they have won around 75% of their bids.

Competence centres

As mentioned the takeover has not resulted in a extensive reallocation of people. However, in some situation where the solutions are more global they

have gathered people in competence centres. An example is in Norway where they have gathered a group of people responsible for developing solutions for the financial sector. In Denmark CSC has a competence centre for health care (after the takeover of Scandihealth) and is among the leading within tax-systems, and digital government. As a consequence they have helped their colleagues in USA developing tax-systems.

However, the big difference, compared to for instance IBM, is that it is the local division and not a global business unit that has the final decision of the market segment. The main responsible of solutions to the Danish public sector should be located in Denmark (and not in a foreign business unit far away). This is not to say that they do not exploit expertise of foreign colleagues. In practice, the customer could choose between the most competent person within CSC or the most competent Danish speaking person within CSC. Thus, projects in Denmark are conducted with the participation of CSC employees from all around the world.

Investments

In terms of investment CSC Denmark can make their own decisions regarding on what to pursue, however to get global funding professional business cases must be created and argued for. For instance they developed a solution for web-technologies. CSC Denmark did not have all the money locally so CSC international supported them. Likewise the takeover of Scandinavian IT Group was also a result of work carried out by CSC Denmark but where the money came from CSC International. Thus, the takeover has extended the possibilities and given access to bigger funds.

Sponsorship

In relation to their quest for being perceived as a local Danish company, their first sponsorship was to support The Royal Theatre in Denmark, and the second was the bicycle team managed by Bjarne Riis. Thus, through the sponsorship their aim was to support CSC's desired position of being a Danish company first, with access to global competencies.

Not least the sponsorship to the bicycle team has been a door opener. They are aware that among the general population the knowledge regarding CSC and its business is not that impressive. However, it helps to give the general impression of it being a Danish company. With regards to their primary target group in Denmark, which consist of probably not more than 120 key persons, most of them already know CSC (regardless of the sponsorship). But the cycle team keep their name fresh in their mind and not least the sponsorships enables CSC to invite their customers to non-traditional customer arrangements such as the tour the France. Accordingly of the many invitations (~ 300) an average CEO receives to various arrangements and seminars the invitations from CSC has a good chance of being meet positively. Hence, it enables them to get in contact with the CEOs and not 'just' the IT people within the customer companies. Although the latter have the technical knowledge, it can often be the CEO who has the final say in

large, IT decisions. The sponsorship has given CSC Denmark a higher than average press. Within the whole group CSC Denmark is having a high growth and is leading on outsourcing.

Leadership

In general, the type of leadership executed from CSC international has been a type of hands off. That is, as long as they perform as promised, e.g. with regards to key figures such as revenue and profit, CSC Denmark has a high degree of freedom, which from the interviewees point of view is very motivating. However, as is true in most companies, in periods of slower growth, there is greater central oversight.

Innovation through bids

Bids on large, complex IT-solutions can be very expensive, sometimes costing between 2-5 million DKK. Accordingly, CSC needs to be careful at which orders they pursue. The high cost of a bid is associated by the complex nature of the solutions, high customisation level and the need for assessing if they possess the right competencies or should pursue to develop them. Thus, their investments in new innovations are related to creation and latter fulfilment of new bids.

CSC has an *opportunity review committee* that assesses which opportunities to pursue and which competencies to develop in order to enable future innovations and solutions. They want to be customer and market-driven while supporting CSC's strategy. An example is the FESD initiative (Fælles Elektronisk Sags og Dokumenthåndterings), where CSC Denmark assessed it to be an important future market. Thus, they decided to invest in developing the competencies needed. Solutions such as FESD (including electronic patient journals) require local knowledge. Thus, if the knowledge is not present it needs to be developed locally; it cannot be imported from foreign partners.

Market matrix

CSC applies a 3-D matrix to divide the market and the corporation. The matrix consists of three dimensions:

- *Horizontals* divided according to competencies (e.g. consulting, systems integration, outsourcing)
- *Industries* (e.g. public, healthcare)
- *Geography* (underlining that the contact to the customer should be local)

The customer added value is among other things generated through the local customisation, which makes the system stand out from a standard system.

Negative aspects

In general the takeover has been positive. Some of the negative aspects have for some people been the change from being part of a smaller local company to a global enterprise. They have lost a few persons on that account.

Impact in the surrounding innovation environment

No big difference

The takeover has not influenced the partnership with local companies. CSC has contributed with global partners where they can get good discount and the like. But in terms of partners CSC Denmark primarily interacts with local partners, for instance cooperates primarily with Oracle Denmark and not Oracle USA. In addition CSC also has cooperation with the Danish IT association where they address the local/national challenges.

Regional strengths

CSC Denmark is responsible for CSC's activities in the Nordic region. Their focus is local. Compared to export companies they want to be in close proximity to their customers (cf. previous description of their philosophy). For that reason they have national offices in each of the Nordic countries serving the local customers. In some aspects where the solutions are more global they have however gathered the people in competence centres, as described earlier.

Policy recommendations/lessons learned

Cultural fit

It is very important to consider the cultural fit. That is, the Nordic countries should hold onto the Nordic values and not give in to the international business environment with weekend work and high divorce percentages. Thus, it is important to look at the intensions of the acquirer. Ownership is one thing; another thing is the philosophy of the takeover company. In case of CSC the philosophy has been the most dominant factor.

Type of ownership (public/private) vs. foreign owned (global/national)

The takeover of DC by CSC not only included a change from Danish to foreign (USA) owners but also a shift in the form of ownership from being public to being privately owned. CSC's acquisition of DC, and thus the change of ownership form, has had a significant impact on DC's development. While DC was trying to keep pace with modern management techniques, financial management, customer satisfaction, etc. the results were limited. CSC brought with it a higher-level of professionalism, a

clearer, more-focused strategy, higher expectations, and greater access and investment in tools, methodologies and services.

After an initial start-up period, DC under CSC's ownership began to grow and develop significantly. In an 8-year period, turnover and employees doubled and customer satisfaction increased dramatically. And during this period, CSC began to be seen as a major and professional brand within IT services in Denmark. According to the interviewee, it is highly unlikely that these same results would have been achieved without a change of ownership. Additionally, CSC has given local staff and customers access to expertise, competencies, and references/project experience that were not available earlier. In an increasingly complex world, being part of a global network of 90.000 employees allows new challenges and questions to be addressed more quickly and increases the available experience base significantly.

The privatisation of DC can be seen as one of the most successful privatisation process initiated by the Danish State. It has not only created workplaces but also increased revenues and done so by building the business with the staff that was there at the time of the privatisation. Today CSC stands as a strong and successful brand in Denmark, and few even remember that CSC started with the acquisition of DC.

Privatisation

The basis driver behind privatisation should not be to gain a short-term income. The driver should be a more long-term goal in relation to increased value such as improved quality and lower prices. Sometimes love eventually appears after a 'forced marriage', but nonetheless the starting point should be more long-term. In the case of CSC the takeover is a success today but it was not perceived as such in the first years.

Outsourcing

Acquisition has a parallel in outsourcing. Outsourcing can also be seen as a type of acquisition. When CSC competes to get outsourcing contracts, the main competition is not about technology. In relation to outsourcing the most important aspects are related to people. Such as how good they are to take over the employees, keep the employees, motivate them, further enhance them, etc. For instance when cleaning is outsourced the task of the cleaning personnel changes from being peripheral to core business. Accordingly, the cleaning person gets the latest equipment, new training and the like and suddenly experiences that her/his work is very important. While strong technical skills are an absolute must, experience with transforming organisations and people is the key competitive differentiator.

Change process

CSC success is closely related to their focus on the human aspects. Furthermore, they were aware of the fact that there are negative elements

related to every change process (cf. *Managing at the speed of change* by Daryl R. Conner, 1993). Thus, they have a long-term perspective and prepared their employees for the process.

Success with existing people

Another important lesson from the takeover has been that it has been possible to build a future on the existing employees. The interviewee thinks that it has surprised many that CSC has managed to change the company to a success by motivating the existing personnel and providing them with new tools and methods.

Establishment of ownership

A means to success is that they have managed to establish a feeling of ownership among the employees. The DC employees have taken part in the birth of CSC Denmark.

The Danish pharmaceutical case: Nycomed's acquisitions of DAK-Laboratoriet

The pharmaceutical industry in Denmark

The Danish pharmaceutical industry has traditionally been split up in two very different segments:

- The research based industry
- The generic pharmaceutical industry

The research-based part of the pharmaceutical industry in Denmark accounts for more than 90 % of the total industry measured in employment, value added and other relevant figures.

The companies in the generic pharmaceutical industry (the so called "generic companies" or "copying producers") produce pharmaceuticals where the patent of the active substance has expired. Hence they usually do not have comprehensive R&D departments to develop new substances and can thus compete by selling generic products to very low prices compared with the patent protected original products.

The whole market for pharmaceuticals in Denmark has increased over the years. In 1999 the total pharmaceutical sales in Denmark were 10.662 million DKK, in 2003 the total pharmaceutical sales in Denmark were 14.678 million DKK.

The total Danish pharmaceutical export in 2003 came to DKK 34,4 billion. The export has more than quadruple since 1990 where the export was 7,7 billion DKK. Today about 90% of the Danish pharmaceutical production is exported. In comparison the export of the Danish industry as a whole amounts to about 60% of the production¹⁸.

Denmark's import of pharmaceuticals in 2003 was 11.373 millions DKK, increasing from 3.088 millions DKK in 1990¹⁹. The largest import countries were Germany (15,6 %), UK (13,3 %), Sweden (13 %), and Spain (9,8 %).

The total employment in the pharmaceutical industry in Denmark was in year 2000 15.131 persons. In total 3.735 persons were in R&D activities. Of which 1.599 persons were academic educated people in research and 2.136 were non-academic educated people. The growth in employment has during the period 1993 – 2000 been 29,5 %²⁰.

¹⁸ The Danish Association of the Pharmaceutical Industry (Lif), www.talogdata.dk

¹⁹ The Danish Association of the Pharmaceutical Industry (Lif), www.talogdata.dk

²⁰ The figures are based upon a questionnaire among the members of the Danish Association of the Pharmaceutical Industry (Lif). Accordingly the number are less than the employment in the whole industry. (www.talogdata.dk)

In European pharmaceutical industry the total employment in 2002 was 588.091 persons of which 100.503 in R&D. The annually growth in total employment has since 1990 been 1,2 %.

Selection of case

The pharmaceutical industry in Denmark differ from other countries in the way that many of the Danish pharmaceutical companies are owned by foundations that have as one of its main purposes to protect the companies against takeovers. This type of ownership model is especially prevalent among the research-based pharmaceutical companies. As a consequence few Danish pharmaceutical companies has been taken over and most of these are generic companies. Among these the research team identified two potential cases:

- GEA taken over by the German Hexal group in 1998
- DAK-Laboratoriet taken over by Norwegian Nycomed in 1991.

After first contacts with the companies it turned out that Nycomed was interested in participating in the project. Hence it was selected as the Danish pharmaceutical case. In the following the case will be described based upon interview and other literature.

Nycomed's acquisitions of DAK-Laboratoriet

This description is based upon interview with Alejandra Mørk (AM), senior vice president, international product development in the Nycomed Group. The interview was conducted in June 2004.

Addition sources includes information from the homepages of Nycomed such as annual reports as well as other sources from the general press, cf. reference.

DAK-Laboratoriet

DAK-Laboratoriet was created in 1922 by the Danish Pharmaceutical Association. The purpose of DAK-Laboratoriet was to create pharmaceuticals for the Danish pharmacies. At the time of the takeover in 1991 DAK had 320 employees and an annual sale of 520 million DKK²¹.

Nycomed

Nycomed's activities started in 1874 with import and manufacturing of pharmaceuticals for the Norwegian market. In 1990 the company had around 1000 employees. In recognition of the company's strengths in both imaging and pharmaceuticals, Nycomed AS was split into two companies in 1990 - Nycomed Imaging AS and Nycomed Pharma AS.

²¹ Berlingske Tidende, "Apoteker sælger deres produktion", 15 December 1990, 2. section, erhverv, p.1

Nycomed was established in Denmark as a result of the acquisitions of (cf. Table 4):

- pHarma Medica in 1988
- DAK-Laboratoriet in 1991
- Benzon Pharma in 1991

In 1997 Nycomed merged with Amersham creating Nycomed Amersham plc, cf. Table 4.

Nycomed Holding A/S was a dormant company until May 14th, 1999. On that date the investors behind Nordic Capital and Nycomed Amersham subscribed for 68,9% and 31,1% of the shares respectively, and the company acquired the Nycomed Pharma division from Amersham plc²².

In September 2001, the investors behind Nordic Capital acquired the remaining shares from Nycomed Amersham. This gave Nordic Capital approximately 98% of Nycomed Holding A/S. Management of the Nycomed Group owned the remaining shares²³.

Nyco Holding ApS was founded October 1, 2002 and is today the ultimate parent company in the Nycomed Group (the Group)²⁴.

On November 29, 2002, an investor group led by CSFB Private Equity, together with certain employees and members of the Group's management, made capital contributions to facilitate the acquisition by the Group of all of the outstanding shares in Nycomed Holding from Nordic Capital²⁵. The acquisition of Nycomed Holding was done through the established Nyco Holding ApS.

Table 7 Nycomed history in brief ²⁶

Year	Main events
1988	The parent company changed its name to Hafslund Nycomed AS. <i>Pharmamedica AS</i> and <i>Basoderm AS</i> in Denmark (dermatology products) and <i>Varilab AB</i> in Sweden (optothermic spectroscopy) were acquired.
1990	Nycomed had approximately 1,000 employees. Nycomed AS was divided into two companies: Nycomed AS (Imaging) and Nycomed Pharma AS.
1991	Several mergers and acquisitions expanded Nycomed Pharma's activities in the Nordic countries. These activities included <ul style="list-style-type: none"> ▪ a merger with <i>Collett Marwell Hauge</i> in Norway (OTC products)

²² Nycomed Holding A/S, annual report 2001, p.5

²³ Nycomed Holding A/S, annual report 2001, p.5

²⁴ Nyco Holding ApS, Annual report 2002, p. 7

²⁵ Nyco Holding ApS, Annual report 2002, p. 7

²⁶ The history of Nycomed is based upon interview with AM and information from the websites <http://www.nycomed.com>, and <http://www.nycomed.dk>

	<ul style="list-style-type: none"> ▪ marketing collaboration with <i>Benzon Pharma</i> in Denmark (prescription drugs) followed by a takeover in 1991 ▪ the purchase of <i>DAK Laboratoriet</i>, Denmark's largest pharmaceutical manufacturer of generics.
1992	<p>The Hafslund Nycomed Corporation acquired <i>Hydro Pharma a/s</i>, Norway, through Nycomed Pharma. The Hafslund Nycomed Corporation thus became one of the leading Scandinavian pharmaceutical companies and among the largest suppliers of drugs in Norway and Denmark.</p> <p>The <i>Christiaens International BV group</i> was acquired to strengthen Nycomed Pharma's sales and distribution network in Europe and to establish a solid market presence in the Benelux countries.</p>
1996	<p>Hafslund Nycomed's pharmaceutical business became Nycomed ASA. Hafslund Nycomed ASA changed its name to Hafslund ASA and focused primarily on energy production.</p> <p>A new sales and distribution centre for pharmaceutical products was established in Novosibirsk, Russia. Contract production of sterile products was started in Russia.</p> <p>By the end of 1996, Nycomed had 5,600 employees world-wide.</p>
1997	<p>The Research and Development units in Linz, Vienna and Bioreg (Oslo) were closed down and the activities were transferred to other units.</p> <p>Nycomed ASA and <i>Amersham International plc</i> merged into <i>Nycomed Amersham plc</i>. Total revenues was at the time approximately NOK 15,000 million and the total number of employees amounted to approximately 11,600.</p>
1998	<p>In December 1998, Nycomed was <i>demerged</i> into <i>Nycomed Pharma Holding AS</i> and <i>Nycomed AS</i>. Nycomed Pharma Holding AS became then the owner of the Nycomed Pharma Business. To further strengthen the multioffice profile, a reorganisation into fully integrated legal entities was decided and implemented from 1999 in Norway, Denmark, Belgium and Austria.</p>
1999	<p>Nycomed Pharma was sold to <i>Nordic Capital</i>, a leading Scandinavian private equity firm.</p>
2002	<p>Nordic Capital has entered into a definitive agreement to sell Nycomed to a company owned by <i>CSFB Private Equity</i>, <i>Blackstone Capital Partners</i> and <i>NIB Capital Private Equity NV</i>.</p>

Turnover and employees

Since its separation from the Amersham the development in terms of turnover and number of employees has been as following:

Table 8 Turnover and number of employees, Nycomed

Nycomed Holding	1999*	2000	2001	2002	2003
Turnover (€ in millions)	256.3	462.0	508.3	562.9	635.5
Average # of employees	2240	2306	2418	2665	2831

Source: Nycomed Holding Annual A/S Report 2000, Nycomed Group Annual Report 2003
 * the turnover for 1999 include operations for a period of seven months covering the period after the separation from Amersham in May 1999. The turnover is converted from DKK with an exchange rate of 7,42 DKK/€

Today Nycomed is present in 19 European countries²⁷.

As of December 31, 2003, Nycomed had 2.795 full-time employees, of whom²⁸:

- 1.045 were employed in marketing and sales;
- 1.095 were employed in operations;
- 128 were employed in international product development;
- 353 were employed in finance and administration; and
- 174 were employed in international marketing and business development, quality assurance and human resources.

Around 600 of their employees are located in Denmark of which 500 are in their headquarter in Roskilde, Denmark. In general Nycomed has around a 10% turnover among their employees.

Type of development

Neither Nycomed, nor the three Danish companies including DAK-Laboratoriet can be considered research companies. All of them focus on development activities related to generic products, such as applying known substances in new improved products. An example would be a new method for absorption such as a plaster instead of a pill. Another example is to apply a known substance in a new setting.

Although the company does not perform pure research the development process is still relatively long. The development time for new pills is minimum 3-4 years, and to develop a new plaster takes around 7 years. The long process consists of the following activities: first the product has to be developed; then its durability has to be proven; then the toxicology has to be tested e.g. on animals; then clinical test on people; finally registration of the product. Compared to the industry Nycomed's development function is only around 20-25% the size of their generic competitor such as Forest Laboratories.

Reasons for takeover

Reasons for selling DAK

Before the acquisition by Nycomed the association of pharmacies in Denmark, Danish Pharmaceutical Association (Dansk Apotekerforening) owned DAK-Laboratoriet. Thus before the acquisition the association of pharmacies in Denmark was positioned at both the side of the table as the producer and pharmacies. This was not expedient from a politic point of

²⁷ Nyco Holding ApS annual report 2003

²⁸ Nycomed Group Annual Report 2003 to Bondholders, p. 46

Nycomeds reasons for acquiring DAK

Nycomed vision was at the time to establish a European therapeutic-pharmaceutical division as a road to growth in addition to their contrast media business. Nycomed had a stable income from their contrast media business and wanted to invest in a new area as a mean to future growth. The vision should be reached through acquisitions. The primary reason for the acquisition was to get marked access. In addition to the three Danish acquisitions (DAK-Laboratoriet, Benzon-Pharma, and Pharma-medica) Nycomed acquired the Austrian CL Pharma Group (Chemilens) and some years later a sales company in Belgium (Christiaens International BV group), cf. Table 4.

Impact of takeover within the acquired firm

Changeable period

Seen from the point of view of an employee in a development function it has been a very changeable period since the takeover. DAK-Laboratoriet was shaped for the sale. One of the prime mechanisms for shaping was through reduction of activities including development activities.

Movement of R&D centre

After the acquisitions the R&D centre was moved to Austria. The Norwegian R&D manager was moved to Austria, and the Danish development-division became a subsidiary of the Austrian centre. In the years after the movement to Austria the expectation to the pharmaceutical market was not fully met. The projects were too expensive compared to their relative earnings. As a consequence the centre was reduced over a period of time ending out with a total close down of the Austrian R&D centre²⁹.

Merger with Amersham

In 1996 Hafslund-Nycomed was split into Hafslund focusing on energy production and Nycomed focusing on the pharmaceutical part including imaging. In 1997 Nycomed merged with the British based Amersham. Amersham integrated the imaging part of Nycomed into its business and chose to sell the pharmaceutical part of Nycomed. During the time when pharma was a part of Amersham there was only a little interest in it and a very low investment in research and development.

²⁹ A more subjective assessment from AM was that seen from the Norwegian headquarter it was probably also easier to carry out reductions in Austria compared to in the motherland.

Demerger – sold to Nordic Capital

Nordic Capital a private equity firm bought Nycomed pharma in 1999 in a pursue to trim the business of Amersham-Nycomed. The research employees felt this as a big turning point (a liberation), which changed the purpose (raison d'être) of the business from making capital to the other branches of Nycomed to creating their own business.

With regards to the research and development activities the sell off caused a clean up of the activities. At the point of the sale Nycomed Pharma had a development departments with around 120 person divided between a few activities in Austria, approximately 50 persons in Norway, and 50+ persons in Denmark.

Centralisation of development activities in Denmark

In the pursuit to establish a critical mass it was decided to centralise all the development activities in Denmark. Why Denmark? The official story was that the access to competencies was better in the Øresund region compared to Oslo region. Another possible subjective reason for the choice of Denmark could be that at the same time other activities were centralised in Denmark including the movement of the headquarter. Yet another reason for choosing Denmark was that the Danish department possessed the most relevant competencies from the point of view of potential for creating new products in relation to the identified future focus of Nycomed Pharma.

AM assesses that the primary reason for choosing Denmark was the access to competence. Hence, the development centre would probably have been placed in Denmark anyway even if the headquarter was kept in Norway. Thus the decision was based upon where the most relevant competencies were and where the best access was to new competencies. Most of the Norwegian colleagues were offered to be transferred to the new centralised development centre in Denmark. However, only a few persons (3+) accepted the offer; 2 of them are still in Denmark. Today the development department consist of around 130 persons. Furthermore, the Øresund region today works as a very important means for recruiting experienced and qualified personnel.

New ambitious owners

In the years between the takeover of DAK-Laboratoriet by Hafslund Nycomed to the sell of to Nordic Capital there never was a long term strategy. They never managed to carry their development project through. All the time they were evaluated on a more short term, which was very frustrating.

The sale first to Nordic Capital and latter the group around CSFB Private Equity (cf. Table 4) has been liberating for Nycomed. Both groups of owners acquired Nycomed as an investment and have been nurturing it accordingly. That is, their investment is depending upon the success of the company. Whereas in the previous constellations the pharma division was

functioning more as a mechanism, that delivered capital to other divisions in the group. The previous owners did not have an ambition for the pharma part. The new owners have a high ambition in terms of high growth expectations. They have coherent strategy plan for the business in terms of a relationship between the desired growth and activities. As a part of the new ownership the management was changed replacing the management with experienced industry people. The old management team was also experienced but that have not managed to deliver sufficient results.

One of the experiences with having investors as owners without any detailed knowledge of the industry had been that it is much easier. That is they put up clear goals related to the development of the business, but leaves the operation of the business to people who are knowledgeable in that.

New market possibilities

The international Nycomed is different from the Danish Nycomed (and the previous DAK-Laboratoriet). In Denmark the business of the company traditionally has been closely related to medicaments for the pharmacy market such as Kodimagnyl and Hjertemagnyl.

Currently, Nycomed aims at a pan-European business based upon product specialised for hospitals. That is, in the recent years the focus has changed towards whole of Europe. Thus, the development function is focused on more innovative products developed for the international hospital market. This shift is a result of the new owners' analyses of where the biggest growth potential was. Their European focus enables them to offer access to the European market for other companies in terms of sales and marketing as well as knowledge regarding final development, test, and registration of new products where other companies have concluded the more basis research.

Learning process

It has been a long process from the small Danish companies in the late 1980s up to today. This is not to say that the time couldn't have been shortened with some years, but in general such a change process is a learning process that takes time. The expectation at the time of takeover of DAK-Laboratoriet by Hafslund Nycomed was that the acquisition would give access to the Danish market, and then the rest would follow. However, they had to acknowledge that the companies were very different and that the product pipeline did not match all the sales companies. The new ownership since 1999 has had the courage to look at the pipeline and move towards the hospital segment. Hence, today's business seems more thoroughly considered.

Impact of takeover in the surrounding innovation environment

Partnership

Nycomed's current growth strategy in relation to its products is that they primarily buys up products already developed by other companies. (In addition to developing a few products from scratch on their own.) The only buys up products that have been tested on people and proved that it works (i.e. fairly late in the process). One of the strengths of Nycomed today is their knowledge of the European market, in terms of registration authorities and marketing and sales channels. Hence, they offer their partners everything from conducting clinical test in Europe, registration and marketing in Europe. In comparison they could only manage the Nordic region in 1997-98.

New product ideas

New product ideas primarily come from internal Nycomed employees in a combination of: development personnel, clinicians, technologists, and marketing personnel. The products are developed based upon research coming from a combination from:

- Clinical/medical research at hospitals
- Market development
- Technological development

Movement of development activities

As it is today they would not consider to move any of their development activities to a new location, e.g. in relation to some of their product sites. Their production as such does not have a potential in relation to the development activities.

Two scenarios could speak for a movement:

1. if they got engaged in a long-term partnership with another company possessing key competencies related to a geographical area
2. in case of a merger with a company (this is hypothetically, they have currently no plans) with a larger development department they would consider to move.

That is, the decision would be related to the location of competencies.

Network primarily from overseas

As mentioned previously the Øresund region is a very important base for recruiting new and experienced employees. The region is primarily applied

for recruitment and not for shared innovation projects. They have a network with Danish and Swedish biotech industries. However, most of their new products and shared development project are with partners that come from overseas.

Lessons learned

Motivation behind acquisition – market or competencies

In a takeover situation one of the most important aspects that can influence the success of the takeover is the acquirer's motive for buying the acquired company. For instance, as the case of Hafslund Nycomed acquisition of DAK-Laboratoriet, if the most important arguments for the acquisition is to get access to new markets then the R&D department ceteris paribus would have a harder time to keep their competencies locally after the acquisition. In this situation it is not that strange if the development department feels neglected and confused. On the other hand if the primary reason for an acquisition is related to possession of competencies then the development activities would be nurtured more.

Hence, the people that are not related to the motivation of the acquirer (e.g. R&D or sales) would have a tendency to feel neglected. Looking at the takeovers in Denmark the majority of the takeovers have been market driven.

Difference between acquisitions and demergers

In a takeover situation the challenge is related to integrating the two businesses and getting synergy out of the acquisition. In most cases the management would be occupied with managing the transition process and maybe already focused on conducting further acquisitions. In a demerging situation where a company is split into smaller pieces, the complexity of the demerged part is smaller and accordingly the leadership can be more focused. Thus, the odds for a better leadership are higher.

Success today, not 6 years ago

It should be noted that the takeover of DAK-Laboratoriet by Nycomed took place in 1991 and that a lot have happened since then. As mentioned the time up to Nycomed pharma was sold of the Nordic Capital was very frustrating for the development people. Thus, had the interview been made 6 years ago it would have presented a totally different story. The success today is related to the demerging and not least that there has been time to undergo the change process.

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Company cases Finland

By Juha Oksanen & Nina Rilla

The Finnish software case: Iobox

Introduction

The roots of Iobox can be traced to year 1999 when it was established in Helsinki. The tale of Iobox lasted only to the beginning of 2003 but has remained as success story from the technology boom that brought on many unsuccessful stories as well. Iobox was bought by Spanish Telefónica's affiliate called Terra Mobile in summer of 2000.

Iobox offered mobile internet services that were accessible from computer or mobile phone. At the time of buyout Iobox's customer database constituted of nearly million registered users being the largest in the field. The number of employees grew rapidly employing over 120 workers by the year 2001.

Iobox case offers us an example of software company operating during the technology boom in the early 21st century. Different phases in its existence happened rapidly creating some disappointed and some extremely satisfied persons. Traces of Iobox were cut short and for example financial information was impossible to obtain.

The software industry in Finland

The Finnish software industry and software entrepreneurship have grown particularly rapid since the early 1990s. Success stories of Finnish high technology firms entering to global markets with Nokia as the leading figure has prepared the way also for software companies. Nowadays the software industry is among most prominent industry sectors in Finland even though it is still relatively small. Depending on the source and used criteria the estimated number of software companies varies from about 1,100 to more than 3,000.

Since the 1970s, the Finnish software industry has mostly focused on providing technological solutions to business-to-business niche markets. Ground for software product development and production has developed gradually from the 1980s onwards, but the number of pure software product companies in Finland is still rather small (Toivanen, 2000). Companies' business ranges from infrastructure software and data security solutions to various Internet and wireless applications.

Small domestic market, low degree of productization and internationalisation are assessed to be weak points especially when

compared to US based firms in the packaged software segment. A positive turn is nevertheless identified here: development is moving from custom software developed for local markets towards mass-market software intended for international distribution (Lamberg, 2003).

The Finnish software industry has followed a different development path in comparison to countries where the initial thrust for the software industry came from needs of a strong military industry. A recent report (Tyrväinen, Warsta and Seppänen, 2004) maintains that development of Finnish software industry and broadly defined software cluster has been affected by development in other industrial segments using software products and services. In the 1970s automation in industries, in the 1980s electronics industry and in the 1990s telecommunications have successively left their tracks in the domestic software industry. Retail- and wholesale trade, banking and financing sector as well as media sector have also contributed significantly to growth of Finnish software industry through the demand for software based solutions.

The software and knowledge-based industry has had a special position in Finnish technology policy over the last decade. The government has been active in funding technology programmes targeting ICT sector. The reigning approach to technology and industry policies has paid a particularly close attention to active support for new and established technology-based firms — new firms in particular are given active counselling and support. Autere and Autio argue that because of this approach good practice recipes have been rapidly and widely disseminated in the closely-knit community of technology based new firms in Finland. (cf. Autere & Autio, 2000)

Until very recently the takeovers of Finnish origin software firms by the foreign based companies have been relatively rare phenomenon. Even the internationalisation of the industry is still in an early phase at large. This should come as no surprise when we remember the fact that the majority of software companies are very small and with restricted resources. The companies are mainly owned by their founders and their family members, with only minor foreign and external ownership. Even in the "Born Global" companies the ownership is often shared between firm's management, employees and venture capital companies from Finland and/or abroad.

Within the last year there has been signs that interest in Finnish software firms is growing among foreign companies. Swedish based WM-data AB acquired in the beginning of 2004 Novo Group Oyj which was a leading IT services company in Finland. In July 2004 Finnish Saunalahti Group Oyj divested its international Mobile Entertainment operations by selling its wholly owned subsidiary, Jippii Mobile Entertainment Oy to iTouch plc. The buyer originates from South-Africa but headquarters nowadays in the UK and specialises in mobile value added services. Further, in late summer 2004 TeliaSonera reached an agreement to sell its wholly owned Sonera Zed Ltd to Wisdom Entertainment, which is a Spanish interactive media group. Zed was an independent aggregator and reseller of digital content to mobile phone users. Wisdom Entertainment's subsidiary LaNetro provides similar services to Zed's in Spain and Latin America. The divestment was reasoned

from TeliaSonera's side as another step in strategy to focus on its core business.

There has been also a small amount of larger domestic software companies to whom acquisition of other firms has been an important part of their growth strategies. The history of Finnish-Swedish Tieto-Enator Corporation exemplifies this kind of evolvement — the company came into existence in 1999 when Finnish firm Tieto Corporation (founded 1968) and Swedish Enator Ab (founded 1995) merged. Since the mid-1970s the Finnish Tieto had carried out over 20 strategic acquisitions mostly in Finland, but also in Sweden, Norway and Latvia. Especially during the 1990s the company experienced rapid growth through a number of acquisitions, mergers and strategic alliances. The pace has even accelerated after the formation of TietoEnator: the company has strengthened its expertise of the chosen industries by acquiring IT service companies and outsourced IT units both in Finland and other countries.

Iobox in brief

The roots of Iobox go back to year 1995 when a young Finnish entrepreneur founded company called GNW Finland Oy. The company opened its first free e-mail service in late 1997. From early on the service was targeting not just domestic but also international markets. Originally the service was available in five languages, in Finnish, English, Swedish, German and Italian. Earlier, comparable services were provided by US-based companies, such as HotMail-service. Contrary to the American counterparts the free email service was not based on expected cash flow from ad-incomes but on on-line sale of ICT and cellular phone articles and utensils through the Internet. The free e-mail service was seen as a way to make company known among potential customers. The number of subscribers increased rapidly and less than three months the new service had more than 10 000 users, most of them still from Finland.

A new company, Iobox was established in January 1999 with three employees. Original owners comprised the founders, private investors, so called business angels, and three Finnish venture capital firms (Eqvitek, Capman, SFK Finance) and a US based venture capital company (Alta Berkeley Associates). The new company's mission was to provide added value services within telecommunication sector linked with Internet.

In late 1999 the company had 20 employees and in next summer 2000 already 120 employees of which about three quarters in Finland. Key personnel had background in bigger companies. For instance, Iobox's two top executives had a several years of experience from large international consulting offices, whereas technical staff came mainly from Nokia, Sonera and other Finnish high-tech firms. According to ex –Iobox manager firm's personnel strategy was to recruit the best professionals in their field. The best employees were allured to the company with various extravagant compensations as was the custom during the Internet boom in the early 21st century. The company's aim was to be a leader in the mobile business and it

resolutely worked towards that target. Finally, at the time of selling, the company had the largest mobile platform in the world.

Iobox qualifies genuinely as a "Born Global" company which according to literature (e.g. Autio, Lummaa and Arenius, 2002) are characterised by "aspire for a rapid international growth from early on their lives" and implementation a global strategy since inception of the new venture. Reaching out for international markets from the inception is a common way to internationalise for small high technology firms. Iobox was quick to raise a second round of venture capital funding already in mid-December 1999, when a syndicate of investors led by Morgan Stanley Dean Witter Capital Partners made a decision for \$13 million of new equity funding for internationalisation. In next spring the company established its new headquarters in London, UK.

From a company perspective Finland offered a superb test market for its services but real potential for growth was seen to exist in the Central-European markets. On the basis of successful trials in domestic market, Iobox launched e-mail and m-commerce services targeting European markets. Services were tailored to be compatible both with existing GSM-standard mobile phones and the new generation of Internet-ready mobile handsets using WAP (the Wireless Application Protocol) standard.

At that time Iobox had 350,000 users spread throughout Finland, Sweden, Germany and the UK. In addition to services for consumers, Iobox was focusing on developing a platform which were allowing partners — such as operators or media firms — to rapidly develop wireless services. There were also plans to launch company services in Italy, Spain and France where number of mobile phone users was foreseen to increase substantially in coming few years.

In public Iobox, engaging in the development of technology and the provision of wireless Internet services, became known as a company that offers mobile telephone users a wide choice of ring tones and icons for mobile handsets. The company got additional visibility in early 2000 when a leading US technology journal, Red Herring, named Iobox among the world's 100 most important companies "most likely to change the world". The only other Finnish company on the list was Nokia.

Terra Mobile in brief

Terra Mobile was founded just a few months before Iobox acquisition by Telefónica Móviles and Terra Lycos, both being subsidiaries of a Spanish based telecommunications group, Telefónica S.A. The Spanish origin multinational has a strong presence especially in the Spanish and Portuguese speaking markets in Europe and Latin America with more than 100 million customers worldwide. Its shares are traded on the Spanish Stock Market and on those in London, Paris, Frankfurt, Tokyo, New York, Lima, Buenos Aires, São Paulo and the SEAQ International Exchange in London.

The underlying reason behind establishing a new mobile service company was an aim it to be listed on stock exchange. Representative of former Iobox

revealed that listing during the Internet boom was seen as the one and only way of developing your business. However, in no longer than six months from the merger listing was cancelled due to unfavourable market conditions.

In the heydays of ICT revolution Telefónica Group was vigorously expanding its international businesses and carried out substantial internal reorganisation involving allocation of assets among the various global business lines. From the perspective of Iobox case the most important decisions were creation of two new global businesses: Terra and Telefónica Móviles, in 1999 and 2000 respectively.

Terra got wide publicity when it acquired the US based internet portal company Lycos Inc. in year 2000 and formed new Terra Lycos. In the end of the very same year Telefónica Móviles, which comprises the group's mobile operations, was listed on Madrid and New York Stock Exchanges. In addition, in line with the parent group's internationalisation goal Telefónica Móviles successfully bid in 2000 and 2001 for five UMTS licences in Europe including Spain, Germany, Italy, Switzerland and Austria.

Telefónica Móviles launched in June 2000 a wireless internet service portal (WISP) "e-moción" in Spain and Latin America. The new joint venture Terra Mobile S.A. was intended to establish, develop and operate the Telefónica Group's global mobile portal in all of the countries where Telefónica Móviles operates. Terra Mobile's mission was to boost the development of Internet services using cellular technology — in practice to create, promote and operate a mobile Internet portal enabling customers to access a wide range of e-services.

Takeover

In July 2000 Terra Mobile S.A. acquired whole capital stock of Iobox for 216 million euros. The purchase was made in cash, and that could said to be a spectacular move when such big money was in question. The buyout got wide publicity in Finland and abroad.

The operations of these two merging companies did not largely overlap as Terra Mobile was still on its start-up phase as were its technological projects as well. Iobox's technological solutions and customer base were carefully evaluated before the merger, evaluation period took long time leading to the purchase in the end. The buyer wanted to be assured that the platform's technology was able to handle large customer base and users of the portal were real customers.

Telefónica Móviles owned 49% and Terra Lycos 51% of Terra Mobile's stocks. Terra Mobile on the other hand was a single owner of its new purchase, Iobox. Iobox name remained as the official company name after the takeover and it operated as a head of all Finnish operations. Under Iobox group were its subsidiaries, e.g. Terra Mobile Finland and Iobox's technology centre which was separated as an individual unit. Iobox's headquarter stayed in London to where it had moved earlier to enhance its internationalisation wishes.

At the time of the takeover the Finnish mobile portal and content provider had more than one million registered users in Europe. In Germany alone, the number of users was over 782,000 at the end of 2000. The number of active users was larger than any of today's portals has. The new owner acquired not though only customer contacts but also the technology platform and business concept of Iobox, which were after the deal transferred and integrated into business of the parent companies.

Terra Mobile paid large sum of Iobox's mobile portal but as former manager of Iobox says, "...they, i.e. Terra Mobile, got current and valuable merchandise. They got one of the world's fastest and largest mobile platforms".

Reasons for merger

As Iobox operated mainly on venture capital the legalities of lucrative business forced it to search for strategic partner as its outgoings exceeded income. In the words of former manager of Iobox, "Iobox was actively searching for strategic partner in spring 2000". The buying company, Telefónica A.S which is the parent company of Terra Mobile, was able to offer ready made market access to Spanish and Latin American markets as well as resources for research and development.

Terra Mobile' strategy was based on swift approach — by testing advanced technological solutions and quickly adopting promising ones the company aimed to provide services interesting and useful for customers. This aim did not diverge markedly the ideas driving already Iobox business: around half of the staff at Iobox was involved with product development even though in words of a key partner of the company "the company was closer to marketing company than the one focusing on research. The company products were partly developed internally, partly integrated solutions made by others outside of the company". Prior to buyout Iobox and Telefónica had customer relationship that showed that companies were not completely unknown to each other.

At the time of acquisition Terra Mobile needed a mobile platform that was able to serve large amount of users. High technology markets are fast moving and new products are developed continuously. Because of this Telefónica was looking for a ready-made business which would suit to its requirements. As was mentioned earlier the aim of Telefónica was to create company that concentrated on mobile services and was meant to be listed in the stock exchange. Iobox fulfilled Telefónica's requirements completely.

However, the reasons behind the merger stayed unclear to Iobox's former employees as comments former manager of Iobox, "We could not understand why Telefónica did not use our know-how more broadly." Telefónica's strategy was to compete its projects externally no preference was given to its own affiliates. According to employee of Iobox Telefónica did not make full use of its purchase, he implies that it could have entered to European mobile ringing tone and logo market if it wanted. Nowadays

Telefónica operates only on Spanish and Brazilian markets, European markets have stayed unconquered.

After the merger

Soon after the deal Terra Mobile became one of the leading European mobile portals with its 4.7 million subscribers. The mobile services were marketed in the UK, Germany, Sweden and Finland under the Iobox brand, whereas in Spain and Brazil the services were launched under the Terra Mobile brand. In 2001 Terra Mobile had over 200 employees in Madrid, London, Helsinki, Oulu, Stockholm and Munich.

The Finnish affiliate, Terra Mobile Finland Oy was parent company's sales and marketing organisation in Finland. The tasks included development and marketing of innovative mobile services both independently and in co-operation with partners. In addition, Terra Mobile had in Finland an independent technology centre which had a major role in development of mobile portal and in its launch on international market. The number of staff working at the technology centre peak over 80 employees. The technology centre was responsible of maintenance and development of platform while supporting functions were given to other affiliates.

Level of R&D was significant at Iobox before the takeover. New platforms were developed at high speed. At the time of merger company had constructed the third Generation platform which replaced its predecessor the second Generation platform. Iobox's technological unit even bought one Finnish firm which concentrated also on software development. Iobox's strategy at that time was to invent country customised services and to set up business in Spain as well. We could say that R&D was more market than technology initiated. As former employee of Iobox says, "Markets however were technology driven". R&D stayed at Iobox after merger since they were the developers of mobile platform and possessed know-how for its further development.

In first comments the deal was deemed to be good for Finland's information technology sector as a whole. The deal was thought to open up new international channels/markets for other Finnish IT companies developing and marketing mobile applications and services. Terra Mobile took into use a service platform which was common for country versions. Terra Mobile Finland was seen as a gate through which promising mobile service innovations developed by the Finnish IT-firms could get entry to international distribution.

Before the deal was publicly announced, it was expected in market that Iobox would be listed in a stock exchange either in Helsinki or somewhere else. Although the entire company was sold to Terra Mobile, the CEO of Iobox did not see it as a corporate takeover: "We did not sell the company, we just found a strategic partner. Operations will continue as they have so far," he said in a press conference when the news about deal was released. He also stressed that Iobox had not actively looked for a buyer. After the completion of the acquisition the acquired company was consolidated in the

financial statements of the Telefónica Group by the global integration method.

Terra Mobile's headquarter stayed in Madrid and Terra Mobile Iobox's in London after the merger. Technological department of Iobox was situated in Helsinki while platform hosting operations remained in London to where they had been moved before takeover.

Impacts of takeover within acquired firm

The acquisition made fortunes for the founders of Iobox. Also in short history of Finnish venture capitalism the exit from Iobox meant for the three domestic VCs profits unheard of before. At the time of sell off Iobox 77% of the company's shares were owned by corporate investors. After the deal a representative of the venture capital company Eqvitec noted in a press interview that "Iobox was unique, something that won't happen again".

After the merger the former CEO and the founder of Iobox continued as a deputy CEO of Terra Mobile. He had also a seat on the board of directors in the new company. Another founder of Iobox was assigned as the director of the company's European operations. The former product-marketing director of Iobox was nominated as a managing director of Terra Mobile Finland Oy. The managing director had joined Iobox in its infancy and was a member of company board and responsible for product and service development at that time. It could be interpreted that key personnel stayed in the company after the merger. Employees were interested to see how merger would turn out, as former manager describes it "People were curious to see the outcome. Naturally, also Telefónica's bonus system which was under construction kept employees committed to Iobox and Terra Mobile".

The two business cultures collide

Unification of two business cultures in the situation of buyout is hardly ever straightforward. It needs possibly even more attention when companies from two differing countries are in question. Iobox and Terra Mobile did not either avoid difficulties in the merger process. According to former manager of Iobox issue that hampered creating a common working culture at the first was language – more specifically lack of common language. When communication is deficient misunderstandings are unavoidable. Spanish counterparts, nevertheless, learned English in order to overcome communication difficulties. Sometimes the language barrier does not exist even though there is not a common language, as former manager of Iobox reminds, "Technical staff usually can easily communicate to each other as do for example marketing people but difficulties arise in management".

Even though the language barrier was hindering the unification it was not the only obstacle. Spanish and Finnish working cultures differed quite largely. On behalf of Iobox employees' frankness and trustworthiness were appreciated while Spanish counterparts did not always stick to deadlines and standing up against your supervisor was unheard of. Some difficulties

constituted the fact that management of Terra Mobile and Telefónica did not exactly understand what Iobox's produced. Nor did Iobox's management apprehend why they as a whole were bought up. Despite these obstacles the two differing companies learned to work together at the end.

Co-operation

Iobox co-operated with other firms in some extent prior takeover, for instance with game developers. Nevertheless after the merger co-operation projects were approved by Terra Mobile that made Iobox to terminate some of its co-operation projects started prior takeover. However, new projects arose after the merger.

After the buyout Iobox had some co-projects with Telefónica's R&D centre, which was independent unit inside Telefónica Group. However, as former employee of Iobox points out, "Terra Mobile got a lot in the buyout. The number of employees was 120-150 people which meant that manpower was quite large, and was able to produce large amount of services by itself. There was not a huge demand for co-operation". Certain co-operation projects were started when first signs of shutdown were seen, these projects were related, for example, to transfer of technology.

The collapse of markets

The turnabout of ICT markets globally in 2001 hit hard also the new owners of Iobox. In November 2001 Terra Mobile refocused its business model and decided to withdraw from Finnish and Swedish markets. Reasons given for the move were the "aim to rationalize internal synergy and optimize cost structure of the owner companies Telefónica Móviles and Terra Lycos" and concentration on the most significant markets.

Making profitable mobile-services business on Finnish and Swedish markets were seen extremely difficult. As a result of the decision the company gave notice to circa 60 employees, of which most (over 50) were located in Finland. At the same time Telefónica Móviles and Terra Lycos announced that their customized services for Nordic markets were about to be closed by the end 2001. According to Terra-Mobile it had more than 5.8 million registered users of which 1.2 million customers in Finland and Sweden in the end of fiscal year 2001.

The last songs of the ex-Iobox can be found in the Telefónica Group's Annual Reports for 2002 and 2003. In the Annual report 2002 it was announced that Telefónica Móviles wrote off €154 million which were attributable to the cancellation of the goodwill of the Terra Mobile subsidiary Iobox, as a result of the restructuring of company's operations outside Spain.

This was however just a drop in the ocean — Telefónica wrote off assets and restructuring costs valued at €12 341 million relating to the foray into UMTS business in Germany, Austria, Italy and Switzerland. At the end of 2002 exposure in Germany, Austria and Switzerland was totally eliminated

and a write-down was taken for the goodwill of Terra Mobile which centred its activities in Spain, its principal market. In total, Telefónica Group recorded a €5,576.8 million net loss for the 2002 fiscal year, compared with a €2,106.8 million net income the year before. This result can be attributed to the posting of €16,217.9 million in extraordinary results.

The close down

A year after the takeover technology boom showed signs of deceleration. Terra Mobile was forced to cut costs that lead to redundancies at Iobox's operations. The hosting centre from London was moved to Madrid, and a technology transfer project was launched in order to transfer platform development know-how for Spanish counterparts, more specifically to Telefónica's R&D unit. Former R&D manager of Iobox says that the period was devastating for many Iobox employees but sees it also as a logical outcome given the market situation at that time. The technology transfer project was the last project of Iobox's R&D operations at the end of 2002.

"Even though the ending of one saga was unfortunate the close-down was managed well on behalf of Telefónica and Terra Mobile", says a former R&D manager. Management had the right tools for redundancies, and fair compensations were paid to employees. The closing down process was managed communally; managers of Iobox took part into the process as well.

Impacts of takeover in the surrounding innovation environment

In the early 2000 Finland was regarded as one of the leading countries in the mobile business. Many small prospering companies and skilful employees existed in Finland. Finland's technological knowledge and know-how was widely recognised at that time. A Finnish Iobox having the largest mobile platform of the world attracted many buyers. Finnish companies had credibility in mobile business. However, after the technology boom investment and trust on mobile technology was almost non-existing. "Nowadays the markets are refreshing a bit. There is investors who again believe in the mobile business", says a person working in mobile business in Finland.

Former employees of Iobox are well situated in Finnish high technology environment. Ex-managers of Iobox have found challenging posts from other high tech companies that shows their experiences are valued in the field. Furthermore few companies have been established by former Iobox employees. While the technology boom was flourishing the pool of skilful employees was not wide, employees were trained in-house. Training has paid off from the societal point of view since professionals in the field of mobile technology are increasingly appreciated today when high technology markets show signs of recovery.

Conclusions

Ibox as a takeover case is without doubt an extraordinary example which highlights features closely linked to a specific historical moment — the ICT boom. Therefore the case has to be analysed cautiously and broad sweeping generalisations about the impacts of takeover must be avoided.

At first sight the story looks like an exemplary case in which foreign takeover leads to transfer of accumulated knowledge and assets abroad and the close down of business in the country of origin. On the other hand it is clear that Terra Mobile's decision to acquire the Finnish company was based at that time on assumed market potential of Ibox mobile portal solutions. In this sense, Terra Mobile was buying know-how tested in the market as well entry to Central- and Northern European markets.

Overall, the picture we get from impacts of takeovers changes with time. This holds true also for Ibox case. It can be argued that at the time of the acquisition -- and shortly after -- the transformation of ownership was interpreted positively reflecting the attractiveness of the Finnish ICT industries and know-how internationally. Accordingly, for the involved domestic venture capital firms the exit from Ibox was an exceptionally profitable deal.

The situation looked quite a different when ICT sector harboured in difficulties and Terra Mobile decided to close down its activities in Finland and Sweden and withdraw from markets there. In the short run, the decision had negative impacts for the employees who lost their jobs. It is, however, extremely difficult, if not next to impossible, to estimate if effects of the takeover and subsequent close-down of activities in Finland in the long term were either positive or negative. There are arguments for both views as seen above.

In case of Ibox we can speculate that a lot of experience gained during the internationalisation of the company has stayed in Finnish business in spite of close-down of activities in Finland. Former employees of Ibox have in many instances found challenging posts from other high tech companies. In addition, few companies have been established by former Ibox employees.

This is not to say that impacts of close-down would always and in every sector be alike. Rather, sectors differ quite markedly from each other when it comes to the "ease" to establish new business activities. In this sense the software industry presents different end of a continuum compared to the more mature pharmaceuticals sector. The software industry involves generally speaking less investment in comparison to other capital intensive sectors. In addition, in rather new and rapidly developing industries like software sector the pace of technology development and markets may decrease barriers to new firm establishment and entry on market.

The Finnish pharmaceutical case: Santen Oy

Introduction

Santen Oy, former Oy Star Ab, operates in the ophthalmic industry.³⁰ It produces ophthalmics to both European and American markets, and specialises on glaucoma.³¹ Oy Star Ab, founded in 1922, was sold to Japanese Santen Pharmaceutical Co. Ltd in 1997 when former owner Huhtamäki re-organised its businesses and forfeited its ophthalmic unit. Santen Ltd wished to broaden its operations to Europe when ophthalmic unit of Huhtamäki owned by Leiras, i.e. Oy Star Ab was on sale. Oy Star Ab offered prosperous European wide exporting markets, know-how in R&D and production facilities for Santen Ltd's purposes. Santen Pharmaceutical co. Ltd is one of the three largest ophthalmic companies in the world.

While Santen Oy has been affiliate of Japanese Santen Ltd its operations has steadily increased. The number of employees has doubled and heavy investments have been made on manufacturing and R&D facilities in Finland. Santen Oy acts as an independent affiliate and is heading corporation's European operations.

Background information of pharmaceutical industry in Finland

The Finnish pharmaceutical industry has developed in phases in the past decades. Already in 1950's the international co-operation was common among pharmaceutical companies. However, in 1960's international co-operation decreased due to removing import control and tariff protection but centralisation moves on industry started. Imported products captured nearly half of the Finnish medicine markets in the 1970's. This forced pharmaceutical companies into specialisation and strengthened competition between international companies.

However, many domestic pharmaceutical companies did not have resources to meet these challenges. In the 1990's co-operation with various actors in the pharmaceutical industry became increasingly important as research and development costs increased. International conglomerates started to centralise their businesses that led to various acquisitions in pharmaceutical sector. Today some pharmaceutical companies are converting into companies concentrating on marketing and selling while others invest in research, development and own production. (Leiraksen Käytännön Lääkäri, 2003: 4-5.)

³⁰ Of or relating to the eye; ocular.

³¹ Any of a group of eye diseases characterized by abnormally high intraocular fluid pressure, damaged optic disk, hardening of the eyeball, and partial to complete loss of vision.

Today around 160 pharmaceutical companies operate on the Finnish market. Some companies operate directly, having their own office in Finland, some through representatives. The three largest companies in the field are Pfizer, Orion Pharma and AstraZeneca. Multinational companies have acquired many Finnish pharmaceutical firms. Among the ten largest players on the market only one domestically owned company, Orion Pharma, can be found. Orion Pharma is the largest domestic employer in pharmaceutical industry, employing 3 400 people in Finland. Many Finnish pharmaceutical companies have ended up into foreign ownership. Nowadays Leiras Oy is part of German multinational Schering AG. Tamro Corporation became a subsidiary of a German pharmaceutical wholesaler Phoenix Pharmahandel AG in 2003. (Kivisaari & Lovio, 2004; <http://www.orion.fi>; <http://www.pif.fi>; <http://www.tamro.fi>.)

The total sales of medicines in the year 2003 in Finland at retail prices were €1.5 billion. Over half of the industry's turnover constitutes of international operations. Finnish pharmaceutical companies have gained international appreciation of their development of successful medicines, such as for Parkinson's disease. Exporting is mainly aimed at the European region. (<http://www.pif.fi>.)

The Finnish pharmaceutical industry's investment in research and development is of good international standard; annual investment being 17% of industry's turnover. New medicine development is risky and long term projects. It has been estimated that cost for developing a new medicine is around €60 million, and the whole process from concept to sale takes on average 12-13 years.

Finland's pharmaceutical industry has been active in conducting clinical trials, 409 clinical trials were carried out in year 2003. Finland's success in clinical testing is due to suitable conditions that it offers for conducting clinical trials, e.g. professional health care workers, high level of medicinal science, a long tradition in keeping country-wide registers and favourable attitude of patients and authorities. (<http://www.pif.fi>.)

Another characteristic of Finnish pharmaceutical markets is the law on generic substitution, which means that pharmacies change subscribed medicine to cheapest or nearest cheapest generic medicine (<http://www.nam.fi>). Law was introduced in April 2003.

We could conclude that Finnish pharmaceutical industry has evolved following international trend of companies' concentration on producing and marketing only few pharmaceuticals. Large multinational pharmaceutical companies have established foothold also on Finnish markets.

Santen Oy in brief

Santen Oy, affiliate of Japanese Santen Pharmaceutical Co. Ltd is located in Tampere, Finland. Its turnover is around €78.3 million, and is 100% owned by its Japanese parent company. Around eighty percent of turnover constitutes from exports. Santen Oy exports products to 30 countries and has subsidiaries, representative and sales offices in various countries such as

in Germany, all Nordic countries, Estonia, Lithuania, Latvia, Poland, Czech Republic and Russia. Its worldwide specialisation is on glaucoma but R&D concentrates also on ophthalmitis, allergies and dryness of the eye.

Company employs total 448 people in Finland, around 40 people more are situated in different European marketing units. Santen Oy operates as head of European operations, it produces pharmaceuticals both to European and American markets. Because of its modern facilities in Tampere it is one of the consolidated corporation's R&D centres. Around 20 percent of turnover is used for research and development. Research focuses on glaucoma and diseases of the anterior segment of the eye. Clinical research department is situated in Helsinki. The company holds marketing authorisation for 261 medicines in Europe at the moment. The three largest markets on the grounds of sales are Finland, Russia and Sweden. Santen Oy's product portfolio constitutes of around 40 ophthalmic medicines. Number of employees working in R&D has doubled after takeover being around 80 at the moment.

The ophthalmics industry is highly concentrated world-wide, number of global competitors is relatively low. The largest global competitors are Swiss Novartis, two American companies Allergan and Pfizer, which sells few ophthalmic medicines among other pharmaceuticals. Another European competitor can be found from France, called Alcon.

The parent company –Santen Pharmaceutical Co. Ltd in brief

Santen Pharmaceutical Co. Ltd (hereafter Santen Ltd) was established in 1890 in Osaka, Japan. Santen Ltd is among the three largest companies specialising in ophthalmic pharmaceuticals in the world. It operates in three main business segments: prescription pharmaceuticals, over-the-counter (OTC) pharmaceuticals and medical devices. Today the company is market leader in prescription ophthalmics in Japan. Their share is almost 80 percent of company's net sales. Net sales were ¥90 253 million (€672 million) and company's expenditure on R&D was ¥12 719 millions (€95 million) in 2003. (Annual Report 2003, Santen Ltd.)

Santen Ltd's first product was a cold medicine. Already in 1899 it launched its first eye drops. These drops became company's hit product for many years and allowed the company to specialise in ophthalmics in 1950s. It has further proved its innovative capabilities, for example through the introduction of Japan's first plastic eye drop container in 1962. This container was easy to carry and gained rapidly popularity among consumers. Company was listed on Tokyo stock exchange and Osaka securities exchange in 1977. (<http://www.santen.co.jp>)

The corporation's internationalisation started in 1993 when the first foreign subsidiary was established in Napa, California. The unit's focus is on marketing and sales but also to foster relations with top research centres and universities in the USA. Santen Inc employs around 250 people. The year after, in 1994, a subsidiary was established in Germany. Santen GmbH

serves as a link to European markets. A Taiwanese subsidiary was opened the same year as the corporation acquired its Finnish affiliate in 1997. An American medical device manufacturer Phacor Inc was acquired in 1998. Another American company Advanced Vision Science Inc, which manufactures ophthalmic medical devices was bought in 2001. This unit has also strong competences in research and development of intraocular lenses. A Korean affiliate was established in 2000. (<http://www.santen.co.jp>)

Nowadays Santen Ltd has three modern manufacturing plants in Japan and a modern R&D centre in Nara, also in Japan. The corporation headquarters is located in Osaka, Japan. Currently corporation employs approximately 2100 employees. (<http://www.santen.co.jp>.)

History of Santen Oy

Oy Star Ab was established in 1922. It was decoupled from Tampereen Rohdoskauppa Oy, which was established in 1895. The main motive for this split was to segregate manufacturing from wholesale operations. The former laboratory of Tampereen Rohdoskauppa Oy became a medicine factory – Oy Star Ab. The main products in the early years of the company were Lacro pastilles and Hota powder. The Lacro pastilles' reputation as medicine was disputable as they were regarded more as pastilles for cough. Hota powder, on the other hand, was a painkiller. These products kept company alive in many critical economical situations over the years. Oy Star Ab survived from economical depression in 1930s and 1940s World War II mainly because of good management skills and cutting down its unprofitable products. (Wilkman, 1972.)

In 1950s the company could finally concentrate on medicine manufacturing. Work in a modern medicine factory with new methods could begin. During this period international co-operation was strengthened and systematic R&D work started. The recruitment of the first research manager enhanced research work. Increased competition, rapid development of pharmaceutical technology and marketing forced the company to act quickly in the 1960s.

Heavy investments in international operations and R&D continued throughout whole decade. The first ophthalmic product was put into production in 1964. In the 1970s further changes were made in production. The share of eye care products, tablets and ointments increased. Concentration in pharmaceuticals started in 1970's, Oy Star Ab was exceptional in the Finnish pharmaceutical sector as it was able to concentrate on ophthalmic medicines as early as 1970's. This was possible mainly because of profitable exports to the Soviet Union. The Soviet Union markets were large and exports flourished. The money gained could be used for R&D. (Wilkman, 1972; <http://www.santen.fi>.)

Oy Star Ab became the only Finish medicine manufacturer concentrating in ophthalmics in the 1980s. Other Finnish pharmaceutical companies, such as Orion, left the ophthalmic business in favour of Oy Star Ab while Oy Star Ab gave up its antibiotics business. Oftan eye drops constituted 78 percent of company's export. Oy Star Ab was originally part of Tampereen

Rohdoskauppayhtiö, which changed its name into Tamro Oy in 1971 in the merger with one of its competitors Oy Aurum-Pharmakon Ab. Tamro Oy withdrew from pharmaceutical production in 1987 that led to selling of pharmaceutical plants, including Oy Star Ab, to Huhtamäki Oy. Oy Star Ab became an ophthalmic unit of Leiras Oy which was responsible of Huhtamäki corporation's pharmaceutical operations. (<http://www.santen.fi>; <http://www.tamro.fi>.)

Santen Oy was established in 1997 when leading Japanese ophthalmics company, Santen Ltd acquired ophthalmic unit of Leiras Oy. However, the conglomerate Huhtamäki Oy wanted to concentrate on packaging and confectionery and divested its other operations in 1996, among these were pharmaceuticals. Schering AG who concentrates on hormonal medicines bought Leiras Oy but was not interested in its ophthalmics unit, former Oy Star Ab. So the ophthalmic unit was kept separate from Schering AG deal. The acquisition of ophthalmic unit was completed in 1997, and Oy Star Ab had become Santen Oy.

Today Santen Oy manufactures products to European and American markets, and is leading ophthalmics manufacturer in the Nordic countries. Company's aim is to become leading company in ophthalmic pharmaceuticals in Europe. (<http://www.santen.fi>.)

Reasons for takeover

One of the main motives for Santen Ltd to acquire former Oy Star Ab was its desire to access European markets. The Russian markets seemed especially enticing to the Japanese parent company. Santen Ltd wished to expand to overseas markets at that time and sought partners from Europe. The ophthalmic unit of Leiras Oy exported to many European markets and offered ready-made channels for Santen Ltd.

The ophthalmic sector is quite small, as only a few companies operate in the field, and even smaller number of them was on sale at the time. The timing of the takeover was convenient for both sides. Huhtamäki's divestment of pharmaceuticals and leaving ophthalmic unit of Leiras outside the deal of Schering AG fit well with Santen Ltd's plans to acquire an European ophthalmic company.

Finland's EU membership in 1995 played a minor role in the acquisition. The societal issues coming among participation to EU such as predictable taxation had an influence on Santen Ltd's decision to seek partners from EU member countries (Tampereen Kauppakamarilehti, 2002).

As stated by vice president of R&D operations at Santen, the companies had had contacts in the form of collaborative projects in the early 1990s, before takeover. This meant that the two companies were not completely unfamiliar with each other. The Japanese colleagues were assured of Finnish counterparts' abilities and competencies. The former Oy Star Ab's competence and know-how in R&D combined with knowledge on exporting attracted the Japanese multinational. As vice president of R&D operations points it, "...at the time of acquisition Oy Star Ab already had some FDA

approved medicines which allowed their marketing on large US market". This naturally attracted the Japanese counterparts as they were at that time at the beginning of their internationalisation operations. The former Oy Star Ab's know-how was acknowledged also by other potential bidders, other non-European companies were interested in acquiring ophthalmic unit of Leiras as well.

Santen Ltd was seeking for pharmaceutical company that already operated in ophthalmics and additionally had facilities for production. The ophthalmic unit of Leiras fit well with Santen's requirements and future plans, and the two companies had synergy benefits which ensured that the acquisition was handled in good spirit. According to the emeritus professor of pharmacology at the University of Helsinki the acquisition was managed more appropriately than some previous mergers in the field.

Impacts of takeover within acquired firm

Santen Oy's current investments in R&D would not be possible without a solid parent company. The aim of the former Oy Star Ab was to become an international company when one of the largest ophthalmic manufacturers in the world offered internationalisation opportunities for the acquired Finnish company (Hildén, 2002: 8).

The multinational parent company has provided resources to conduct R&D, i.e. enlarged facilities in Tampere, capital and know-how. The resources Santen Ltd can offer for its Finnish affiliate are well appreciated, according to interviewed managers of Santen Oy. Santen Oy's resources have increased and made it possible conduct larger scale R&D projects than before.

Nowadays Santen Oy exports to over 30 countries and has operations in many countries. Even though former Oy Star Ab had wide export markets before the takeover Santen Ltd has offered opportunities to further enlarge the foreign operations. Such wide foreign operations could hardly be possible without the help of its Japanese parent company. The degree of internationalisation has increased significantly.

Regardless of how positive the acquisition is, difficulties are inevitable when two differing working cultures are to be unified. Santen Oy is trusted by its parent company and operates as an independent affiliate and head for European operations. Being part of a corporate group means that more significant decisions are approved by the headquarters in spite of the affiliate's independence. Decision-making after the takeover has become stickier because of the distance and cultural factors, as was stated by the project director of Santen Oy. Contacts between units in different continents are mainly conducted with the help of video-conferencing, electronic mail and telephone. "Meetings in person are more irregular. However, trips to Japan are now and then inevitable", states the project director from Santen Oy.

Santen Ltd established Global Project Teams to facilitate research and development between Santen's units in various locations. Project

management is constructed in a way that allows members from each continent to participate as well as differing regional requirements to be taken into consideration in the early stage of product development. The head of the global project team comes generally from Japan. Another benefit of this model is that it allows workers to get acquainted with the working habits of others and offers a platform for knowledge transfer. In the opinion of the project director of Santen Oy R&D becomes more effective when large project meetings are handled with only a few core project team members who operate as messengers between sub-teams and the global project management.

In spite of the organisation of global project teams the exchange of workers is still unusual. Only a few employees are working elsewhere than in their home units. Cultural factors, such as language barriers, hinder exchange between Japanese and Finnish units. “Lack of employee exchange is a problem as it would offer good way for learning for Santen’s employees. It would enhance spill-overs of know-how to universities as well”, says a professor from the University of Kuopio. Organising global project teams has been the most significant change in operational mode. Some change in external co-operation can also be seen. Co-operation with universities has slightly increased mainly because change in universities’ way of action, they are more eagerly marketing their know-how and services to companies. Interviewed university professors see this as a common trend in all Finnish universities.

Nowadays basic research is largely done in Japan where new research center provides excellent facilities. The role of research has changed at Santen Oy. Before the acquisition basic research was conducted in Tampere, now this unit concentrates more on product development as stated by project director of Santen Oy. However some basic research is still conducted in Finland and its volume has stayed somewhat unchanged compared to the period prior to acquisition. Currently Santen Oy employs around 10 people in basic research. Because of the change in basic research the patenting is mainly done in Japan where most of the basic research is conducted.

Compared to role of basic research large part of corporation’s clinical testing is carried out in Santen Oy. Professor from University of Kuopio believes this phenomenon is partly due to a overall trend of pharmaceutical companies’ concentrating on certain operations. Clinical testing must be maintained in companies whereas know-how for basic research can easily be found from external sources, such as from universities. Research has decreased in Santen Oy because of its Japanese parent company’s investments in new research center in Japan. On the other hand, Santen Oy concentrates more on product development and clinical testing. Nevertheless number of employees working in R&D has doubled at Santen Oy since takeover, currently employing around 80 people.

Santen Oy exported to various countries in Europe as well as outside Europe prior the takeover. Wide exporting channels allured Santen Ltd as it wished to expand European markets. Santen Oy manufactures products to European and American markets like it did before the acquisition. The takeover opened the way to Asian markets which are, however, taken care

of by parent company and affiliates located in Japan. As the vice president for R&D of Santen explains, an approval from local authorities is needed for marketing of pharmaceuticals. Therefore products developed for European and American markets may not be sold in Asian markets. Santen Oy's primary markets can be found in the Scandinavian countries. The company produces over 40 ophthalmic medicines, and has around 260 sales permits in Europe. At the time of acquisition Santen Ltd did not have any of its own products on the European markets which prevented conflicting interests as regards the product portfolio.

Being part of multinational company provides opportunities for smaller companies. Even though Santen as a name is less known in Finland than Oy Star Ab was, it has value in international markets. The ophthalmic industry is relatively concentrated in where Santen Ltd is among the largest operators. Representatives of Santen Oy see belonging to multinational organisation positive; it will bring visibility to affiliate rather than being small independent international company.

Impacts of the takeover in the surrounding innovation environment

Innovation relies more on intra-corporate resources than contacts with partners from the outside. Santen Oy evaluates projects more carefully now than prior to the acquisition – according to a professor from University of Kuopio. Not all projects are implemented, and both global and local projects have to be approved in Japan.

Project practices have changed as a project director of Santen explains, “projects are now approved on a basis of estimates of time, markets shares, sales, costs and other relevant issues. Evaluation is made more carefully”. Co-operation with universities has been strong in Santen Oy prior to the takeover. The level of co-operation with universities has not changed significantly after the acquisition. University projects are still considered important, but as basic research in Santen Oy is largely carried out by its parent company some change may be perceived. In addition Santen Oy increasingly utilises services of contract laboratories. Externalisation has become common in business because of tightened competition, and pharmaceutical industry does not provide an exception. Specialised know-how and expertise are commonly searched from external sources.

At Santen Oy the importance of co-operation with various operators in the innovation environment has been acknowledged. However, concerns regarding the need for more intensive co-operation have been raised.

The peculiarities of Finnish innovation system are not yet completely understood in the company headquarters. This hinders participation in co-projects with different institutions. The co-operation with contract laboratories has increased somewhat after the acquisition. According to project director of Santen Oy, the need of specified technology or know-how in certain projects drives the company to seek external resources but after first evaluating internal resources in different continents.

Conclusions

The overall impression of the acquisition is very positive. It seems that both companies have benefited from the acquisition. Santen Oy's resources have increased significantly as has its degree of internationalisation. Santen Ltd has, on the other hand, gained foothold in Europe.

Unifying two distinct cultures entails challenges that have to be overcome for the companies to build one common organisational culture. Finnish and Japanese cultures are very dissimilar. Still, at the same time similarities have helped these two companies to find a way to successfully work together. However, the unification process is long and demanding and many obstacles are still to be overcome.

Increased clinical testing in Finland will naturally require a workforce that can conduct clinical testing. However, recruiting competent employees has proved to be difficult at the moment.

Another challenge for the future is generic substitution which was introduced only one year ago. Even though the interviewees did not see this issue as a large problem it still does have an effect on every pharmaceutical company. Some concern has been raised on level of quality on medicines since the new law puts emphasis on price. It has been argued that level of R&D in pharmaceutical business is in danger to decrease if companies are forced to concentrate only on price issues in the development.

Taking a full advantage of multinational company's employees' know-how means that employee exchange should be more a tradition than an exception. Being part of multinational company has offered opportunities for Santen Oy, when cultural factors such as language problems has been overcome offered opportunities may be fulfilled even more successfully.

Co-operation modes could be even stronger between universities and Santen Oy as the firm has access to strong international network of know-how through its parent company. Contacts with different participants in the network of ophthalmics should be further enhanced. Santen Oy has already provided valuable knowledge for Finnish operators in ophthalmic sector. Ophthalmic industry is a small niche market with few multinational companies in where competence would be gained by building a strong network, which then would increase knowledge in ophthalmics among Finnish operators.

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Company cases Iceland

By Elva Brá Aðalsteinsdóttir

The main features of the Icelandic economy

The economic and political situation since 1990

Since Iceland became a republic in 1944 there have been both periods of economic growth and recession in the country, depending on the market value of the island's main export, namely fish-products (Jón Ingvar Kjarran, 2004). High inflation rates and the unstable currency have made the economic situation of Icelandic small and medium sized firms insecure and reduced their competitive advantage somewhat (Jón Ingvar Kjarran, 2004).

In the early 1990's the situation changed dramatically (Jón Ingvar Kjarran, 2004). The nation was hit by an economic recession which was mainly due to political and economic changes in Eastern Europe (Magnús S. Magnússon, 1993). Unemployment increased and many companies suffered financially. In order to cope with the situation, trade unions, employers and the government made a settlement. It was symbolically called the National-consensus agreement. It included collective agreements on wages, as well as agreements on general welfare issues such as the cost of food and housing (Árelía Eydís Guðmundsdóttir, 2003).

This agreement can to some extent be compared to the Swedish Saltsjöbads-agreement (Gylfi Dalmann Aðalsteinsson, personal communication, 13. February 2001). After the Saltsjöbads-agreement had been made in 1938, a period of stability in employment relations followed with a great reduction in conflict between the main actors. This was also the case in Iceland (Gylfi Dalmann Aðalsteinsson, personal communication, 13. February 2001). What is more, for the first time inflation lowered and became similar to the inflation rates in the other western countries (OECD, 1995). The National-consensus agreement provided the favourable economic conditions which were needed for growth and innovation to evolve; it also created opportunities for start-up companies.

Economic liberalisation

Today, Iceland is a member of the European Free Trade Area (EFTA), but not a member of the European Union (EU). But through membership in the European Economic Area (EEA), Iceland maintains close economic ties to the EU.

Iceland joined the EEA in the 1994. What followed was a more open economy, altered laws and regulations regarding the financial market, as

well as regulations regarding the labour and service market (Jón Ingvar Kjaran, 2004). In the 1990's accessibility to foreign capital and loans became easier, and limitations on ownership or transfer of foreign currency were abolished. In 1985, The Iceland Stock Exchange (ICEX) was established. Export and import restriction were also reduced and Icelandic companies could now establish themselves on foreign markets, both within the EEA and in other economic areas (Helgi Skúli Kjartansson, 2002).

Today, Iceland adheres to OECD codes dealing with the movement of capital, and is party to various bilateral, multilateral and international agreements relating to movement of capital and foreign direct investment (Jón Ingvar Kjaran, 2004). With very few exceptions, foreign direct investment in Iceland is not subject to limitation. The same applies to the movement of capital. Foreign investment in Iceland has shown a large upswing in the last few years, largely because foreign investors have been sought in IT, software and biotechnology to diversify the economy away from fishing (www.uktradeinvest.gov.uk).

The labour market

Iceland's labour force numbers about 160.000. This is a somewhat flexible labour market in comparison to other European countries. The relatively high employment mobility and lean employment regulations have in many ways been stimulated by rather low unemployment rates in Iceland; from 1980 to 2000 the rates were on average around 1 to 2,5% (Birgir Ísl. Gunnarsson, 2004).

As well as benefiting from a flexible labour market, companies that rely on export benefit from operating in a labour market that has a well-educated, English-speaking workforce. As a result, high-tech companies have had a large supply of educated workers and only during periods of an economic boom been forced to hire computer specialists from abroad.

Research and development work in Iceland

During the past decade, there has been a remarkable increase in expenditure on research and development work (Prime Minister's Office, 2004). Icelanders spent 3% (€250 million) of their gross domestic product on research and development undertakings in 2001, compared to 1.1% in 1990. Thus, in 2001 Iceland reached the goal which the European Union had set itself by 2010. Today, Iceland is ranked 4th among OECD countries for the R&D/GDP ratio. Commercial companies spend about €150 million on R&D. This constitutes about 60% of Iceland's total expenditure on R&D (Rannís, 2003).

Between 1999 and 2001 expenditure on R&D increased by about 40%, a unique figure among countries in the OECD. By far the largest increase, just under 80% was among commercial companies, especially new companies in emerging branches of industry with a heavy basis in R&D.

The ICT industry in Iceland

The Information and Communication Technology sector (ICT sector) has been a focal point for economic and social development in Iceland, as in most developed countries (Invest in Iceland Agency, 2004). This can be seen for instance in the growth in the number of jobs and turnover in the ICT sector and the entrepreneurship that are characteristic features of Iceland today.

Iceland has a large-scale infrastructure well suited to the new technological requirements of enterprises. This infrastructure has served as a major support for the fast growth in the ICT industry and the adoption of technical solutions throughout the society. Mobile phone penetration is among the highest in the world, as well as Internet penetration, over 85% of Iceland's population has access to the Internet.

Enormous development and investment have taken place in the telecommunications and telecom systems in recent years, partly as a result of deregulation and competition in the sector. The government has also undertaken initiatives to encourage market penetration by foreign players, passing legislation to ensure nationwide access to state-of-the-art telecommunication services.

The legal environment has been substantially deregulated, so that Icelandic legislation on telecommunications is now fully compatible with that in the EU and is based on current telecommunications directives in the European Economic Area.

Recent trends

The Icelandic ICT sector is undergoing rapid development (Invest in Iceland Agency, 2004). Innovative solutions have been developed and many have achieved success in international markets. Nevertheless, a downturn hit the Icelandic market in 2000, as elsewhere in the Western world, and this difficult situation has been challenging for the ICT sector. Mergers and acquisitions have been common, and some companies, not managing to survive the recession, have gone bankrupt. Investors and founders of companies have responded to the difficult market by merging companies in order to build stronger units that are better equipped to expand and serve foreign markets as well as the Icelandic market.

Employment

There has been a rapid growth of jobs in the ICT industry in Iceland (Invest in Iceland Agency, 2004). The number of people employed in the industry doubled from 1991 to 2001, with the highest number in 2000, when activity within the industry peaked.

The ICT industry is divided into four main sectors: Manufacturing, Wholesale, Telecommunications, and Software & Consulting. Software development and consulting is the most important field in the ICT sector,

with growth in employment being the highest there. There are round 140 ICT companies in Iceland and the number of jobs in the sector is just under 5000, 45% of which are employed in software development. In 2002, there were 2.176 jobs in the software industry. This means that the numbers of jobs in the sector has decreased, since in 2001 the jobs were 2.693 (www.si.is). There were 4.852 jobs in the information technology sector in 2002, which means that there are fewer jobs in this sector; in 2001 the IT sector comprised of 5.483 jobs.

People working in ICT-consultancy services are fairly young; nearly 60% are 35 or younger. Women account for 30% of the workforce in ICT services and 40% in telecommunications.

Education

Through the growth of the ICT sector in the last decade, the demand for quality staff has increased (Invest in Iceland Agency, 2004). In order to meet this growing demand, the education system and various institutions have opened up new fields that are of particular value to ICT. Between 180 and 220 students graduate annually from Icelandic universities with a degree or diploma in computer sciences or software engineering.

Turnover

Turnover in the ICT sector has grown in recent years (Invest in Iceland Agency, 2004). Turnover doubled from 1995 to 2001, increasing from USD 440 million in 1995 to USD 887 million in 2001, but went down slightly in 2002. In the software industry, turnover amounted to ISK 20 milliard in 2002 and in the information technology industry it was approximately ISK 64 milliard that same year.

Export

There has been a strong tendency in Iceland to seek out opportunities abroad (Invest in Iceland Agency, 2004). The value of exported Software & Consulting services has grown rapidly over the last decade. Software exports from Iceland amounted to ISK 3.732 million in 2003, an increase of ISK 324 million, or 9.5% from the previous year, measured at constant prices³². Software accounted for 1.3% of Iceland's total foreign currency earnings in 2003, which is marginally higher than the previous year's share of 1.2%.

The main market region for Icelandic software is Europe (Central Bank of Iceland, 2004). Europe's share has been growing at the expense of the US in recent years. Last year, Europe accounted for more than 69% of total Icelandic software products.

³² Calculated at fixed prices based on the average exchange rate.

Almost 74% of exports of software and computer services in 2003 were accounted for by sales of standard and custom software (Central Bank of Iceland, 2004). Sales were equally divided between standard and custom software. This is a considerable turnaround from the year before, when software accounted for almost 84% of exports by this sector, divided between 56% standard and 44% custom.

Iceland's exports of software and computer services were 0.09% of the OECD total, and equivalent to 0.13% of total EU exports.

Funding and investors

The number of venture capitalists focusing on ICT has decreased somewhat in the last two years following mergers in this field (Invest in Iceland Agency, 2004). Among internationally known companies owning Icelandic operations in ICT are Microsoft Corp. (in Navision) and Eastman Kodak (in Computer Knowledge).

The Icelandic software case: The Eastman Kodak takeover of Computer Knowledge Inc.

Multinationals have been researched considerably in recent years and the central topic in this research includes the difference between multinational corporations originating in different countries (Lovio, 2003), as well as relations between multinational corporations and local companies and business units. In Finnish studies, for example, the focus has either been on studying the acquired companies' success in terms of growth, profitability and the development of R&D investments. The other focus has been on studying the impact of foreign ownership on management, in terms of business strategy, corporate governance and the diversity of business areas (Lovio, 2003).

Very few Icelandic studies have been done on the effects of foreign acquisitions, whether the focus is on the acquired firms' success or on management. Moreover, almost none have been done on the effects of foreign acquisitions from the business unit perspective. This case will not only be analysed from this perspective but more specifically an attempt will be made to analyse the effects of the acquisition on the innovation capabilities of the acquired firm. As such, this study will add to the available literature on foreign takeovers in Iceland. The case is based on an interview with one of the former owners of Computer Knowledge Inc., as well as available material from annual reports and the media.

The paper is organised as follows: First, a basic description is given of the Computer Knowledge, Inc. (hereafter CKI) case by touching on the firm's history as well as by giving some insight into the operations of the parent company, Eastman Kodak Company (hereafter Kodak). Secondly, reasons for the takeover will be explained, both from the perspective of the parent company and that of the former owners. Thirdly, an attempt will be made to analyse the impact of the takeover within the acquired firm, as well as on

the surrounding environment. The section that follows will describe the takeover process. Also, the Icelandic innovation policy will be discussed from the perspective of one of the former CKI owners. In the final section, some conclusions will be drawn.

The Computer Knowledge Inc. case

Computer Knowledge Inc. is a medical software company which specialises in administrative systems for the high technology hospital departments. The system, which has been given the name RIS 2010, is more specifically a Radiology Information System which is used for information processing in radiology departments. It is a complete and modern information system that enables health-care facilities to electronically produce, route and maintain patient records, requests for procedures and other key documents.

The company was founded in 1983 by Professor Oddur Benediktsson, mainly as a result of a program created by the Nordic Council of Ministers. The objective was that the Nordic countries were at the forefront in cancer research and therapy. The Icelandic group was allocated the task of creating a registration system for various therapeutical procedures. One of the main objectives in the Council's program was that companies were to be founded based on the new products that research teams in the Nordic countries developed. Thus, Professor Benediktsson founded the company based on the new registration system he had developed with his team.

In 1985 the focus was shifted towards software purposely designed for radiology departments. In 1992 the company was sold to the CKI employees. Three of them then owned 90% of the joint stock, while the other two owned 5% each. Lastly in 2000, Kodak proposed a takeover. The contract stated that Kodak would purchase all joint-stock but that CKI's management would be in charge of all operations within the company.

Today, CKI is a development centre within Kodak's Health Imaging Division. Other similar centres are situated in Canada, the US, and in Israel. The Health Imaging division formed a new business segment in order to expand its participation in the medical imaging-information field. The unit, dubbed "PaRis", combined CKI with Health Imaging's Picture Archiving and Communications System (PACS) business.

To be more precise, PaRis combines CKI and Health Imaging's wholly owned PACS subsidiary, Cemax-Icon in California, into a single unit within Health Imaging's framework of regional and functional organisations.

PaRis integrates imaging-information systems that incorporates CKI's RIS offerings (medical *information*-management systems) with Kodak Picture Archiving and Communication Systems (medical *imaging*-management systems) produced by Cemax-Icon.

Eastman Kodak Company

Early years

In 1879, London was the centre of the photographic and business world and George Eastman went there to obtain a patent on his plate-coating machine (www.kodak.com). An American patent was granted the following year.

In 1880, he began the commercial manufacture of dry plates. The success of this venture so impressed business man Henry A. Strong, that he consequently invested some money in the infant concern.

On January 1, 1881, Eastman and Strong formed a partnership called the Eastman Dry Plate Company. Late that year, Eastman resigned from his position at the Rochester Savings Bank to devote all his time to the new company and its business. While actively managing all phases of the firm's activities, he continued research in an effort to simplify photography.

In 1883, Eastman startled the trade with the announcement of film in rolls, with the roll holder adaptable to nearly every plate camera on the market. With the KODAK camera in 1888, he put down the foundation for making photography available to everyone.

In 1884, the Eastman-Strong partnership had given way to a new firm, the Eastman Dry Plate and Film Company, with 14 shareowners. A successive concern, the Eastman Company, was formed in 1889.

The company has been called Eastman Kodak Company since 1892, when Eastman Kodak Company of New York was organized. In 1901, the present firm, Eastman Kodak Company of New Jersey, was formed under the laws of that state.

Eastman built his business on four basic principles; mass production at low cost, international distribution, extensive advertising and a focus on the customer. He saw all four as being closely related. Mass production could not be justified without wide distribution. Distribution, in turn, needed the support of strong advertising. From the beginning, he imbued the company with the conviction that fulfilling customer needs and desires is the only road to corporate success.

To his basic principles of business, he added these policies; foster growth and development through continuing research, treat employees in a fair, self-respecting way, and reinvest profits to build and extend the business.

Kodak's history is one of progress in developing these basic principles and policies.

World distribution

By the time Eastman launched his dry plate business in 1880, European interest in photography was keen, but its practice was mostly limited to professionals (www.kodak.com).

Eastman recognized the potential of the world market for amateur photographers. Only five years after the Eastman Dry Plate and Film Company was established in the U.S., a sales office was opened in London. Within the next few years, particularly after the introduction of the KODAK camera and Eastman's simplified methods, picture-taking became popular with hundreds of thousands of amateurs.

In 1889, the Eastman Photographic Materials Company, Limited was incorporated in London, England, to handle distribution of Kodak products in countries outside the U.S. At first, all goods were manufactured in Rochester. Before long, the combined international and domestic demand outpaced plant resources.

Construction of a factory in Harrow, England, just outside London, was completed in 1891. By 1900, distribution outlets had been established in France, Germany, Italy, and other European countries. A Japanese outlet was under consideration, and construction of a factory in Canada was underway with the organization of Canadian Kodak Company, Limited.

Today, Kodak has manufacturing operations in Australia, Brazil, Canada, China, France, India, Mexico, Russia, the United Kingdom, and the U.S. and Kodak products are available in virtually every country across the globe.

Health Imaging at Kodak

Eastman Kodak Company's role in health imaging can be traced back to the birth of diagnostic imaging technology with the discovery of the x-ray in November of 1895 by Wilhelm C. Roentgen (www.kodak.com). Less than a year later in 1896, George Eastman's company introduced the first capture medium, a photographic paper, designed expressly for x-ray purposes.

In 1914, Kodak employed two radiography experts to solve customer's technical problems. By 1929, the technical staff had increased to 26. In 1996, the unit, that serves the health imaging customer, became the Health Imaging Division. In 2001, Health Imaging became one of three business groups formed by realignment within Eastman Kodak Company.

Today, Kodak's Health Imaging Group is a world leader in developing, manufacturing and marketing intelligent imaging products from analog to digital and providing innovative medical-imaging services, including those to assist customers with interoperability and other needs. Its product portfolio includes computed radiography (CR) and digital radiography (DR) systems, laser imagers, picture archiving and communications systems (PACS), radiology information systems (RIS), traditional mammography systems and various other products.

The group's 2003 revenues were USD 2.43 billion.

Reasons for takeover

From Eastman Kodak's perspective

CKI's acquisition cemented the relationship it had had with Health Imaging (HI) since 1993. HI had served as the exclusive distributor of CKI's RIS 2010 and had begun to integrate Kodak PACS offerings with the RIS 2010 to create image-information management systems for hospitals and other health-care facilities. While these efforts had been focused within Europe, PaRis was to be used for global expansion.

Hence, the decision to acquire CKI was a strategic one, in other words, CKI was strategically important to Kodak. RIS 2010 had become a critical component for their product line and acquiring the company meant that Kodak gained access to the radiology information market. It also provided them with an opportunity to closely observe opportunities in the broader health-care information arena.

In short, Kodak acquired CKI to acquire a new product that complimented its previous product range and by doing so it was able to access a new product market and improve its position in the international market.

Last but not least, it had become necessary for Kodak to gain control over the copyright of the product. CKI had developed a product that exceeded other similar products on the market and Kodak wanted to ensure that they were one step ahead of their competitors.

From the former owners' perspective

The reason behind the decision of the Icelandic owners to sell was twofold. First of all, 90% of CKI's revenue had been the direct result of collaborating with Kodak. That is, until then CKI had almost entirely been doing business with Kodak. Thus, when Kodak proposed that they would take over the firm, the owners felt some pressure. Kodak had the power to back out of agreements to collaborate and shift their focus to other comparable companies. Moreover, as will be explained later, the Icelandic market was not responding to the new product and for the company to be able to continue to operate if needed to shift its focus to markets overseas. Kodak was CKI's key to the international market.

However, the bargaining power was not entirely in the hands of Kodak. The Icelandic owners realised that they had created a product, based on years of R&D, which exceeded the products of their competitors. Furthermore, the employees, which at that point were only five, had developed skills and knowledge that had become very valuable. The former owners therefore felt confident that they had a strong bargaining position.

A contract was made that stated that Kodak would purchase all the shares, and by doing that, Kodak gained total control over the company. The contract stated that the former owners would receive payments gradually until 21. September 2004, at that point in time, they were to receive the final

payment. The contract also stated that the operations of the company would remain unchanged until 21. September 2004. This second part of the contract meant that the employees were prepared to stay with the company and remain its employees for the next four years.

This was seen as a win-win situation since the employees were ensured the same governance for the next four years and the company kept the key personnel, who were vital for the continued development of the product. After all, the capabilities of the company are inside the heads of its current employees.

In September 2004, the company and the employees had to decide if the arrangement was to be kept for another period. Before the contract ran out one of the former owners said that; *“the feeling is that Kodak will want to keep this arrangement and that the employees will want to stay with CKI for quite some time”* (our translation). As of yet, no drastic changes have been made at CKI and the company operates in a similar fashion.

Impacts of takeover within acquired firm

Human resources and turnover

The key personnel have stayed with the company in accordance with the requirements specified in the contract. CKI had five employees before the takeover and has hired two employees since. The three former owners are now employees at CKI.

The net profit in 2002 was ISK 5, 2 million (€59.565).

Corporate governance and management culture

As the contract went, CKI management and leadership stayed the same. As a result, the CKI organisational culture did not alter. In that sense the employees did not experience any major changes.

Nevertheless, the managers at CKI have experienced some differences between the Anglo-Saxon and Nordic business management culture. For example, demands for business performance and reporting requirements have grown. Also, investment and personnel plans need to be very well justified. In short, it has been important to prove the profitability and to ensure the availability of any other statistics required by headquarters.

The most noticeable difference in the management culture is in the method of communication. The Kodak company structure is hierarchic and the relations within the structure are formal. CKI has to communicate more frequently with Kodak and give more detailed information than it did before the takeover. It should however be pointed out that the different management styles have not led to conflicts and the managers at CKI have remained fairly autonomous. Their autonomy is very much facilitated by two factors; CKI is geographically far away from the corporate headquarters and the unit has been performing well as a business unit.

Access to resources

Access to resources, such as marketing channels, has improved considerably. With regard to financial resources, it is important to note that Kodak is a company that very much adheres to its strategic planning. Since CKI became Kodak's subsidiary, access to financial resources is ensured, but all CKI's actions (e.g. when hiring personnel) have to be justified and rationalised.

Knowledge interaction

As has been mentioned before, Kodak bought CKI solely because of its developmental capabilities. It was a strategic decision to buy the company and have it based in Iceland. What is more, Kodak did not have a choice when it came to the location, since the former owners were only willing to sell their shares if Kodak agreed to the location. Since the time of the takeover, Kodak has put various procedures in place to ensure that the knowledge that resides in Iceland spreads to other development centres. By doing this Kodak has ensured that the company will not be affected if anything negative happens with regard to the operations of one of its development centres, in this case CKI.

CKI now collaborates with a Canadian development centre which is developing the American version of RIS 2010. CKI is in charge of this process. This entails mutual visits between Reykjavik, Iceland and Canada as well as exchanges of documents that have to do with the project. In addition some CKI employees visit the Kodak headquarters regularly.

Impacts of takeover on innovation

The EU defines innovation as new products and processes or significant improvements in products and processes. A technological product and process innovation (TPP innovation) has been implemented if it has been introduced to the market (product innovation) or used within a production process (process innovation). TPP innovations involve a series of scientific, technological, organisational, financial and commercial activities (Eurostat, 2004).

It can be safely said that the takeover has not altered CKI's product innovation in a negative way. After the takeover, the RIS 2010 product was introduced to a new market which basically means that product innovation has occurred to a greater extent at CKI.

It is interesting to note that whilst the takeover has improved the product innovation within CKI, the process leading up to innovation has changed considerably. This will be explained in the next chapter.

Patenting

CKI has never used patenting to protect its system. The system itself has copy protection built in it which means that it cannot be manipulated. Also,

the company has protected itself, so to speak, by continuing to develop the system based on the foresight of its employees.

Impacts of takeover on surrounding innovation environment

The RIS 2010 product idea started out within an academic environment and in the Icelandic healthcare sector. CKI had therefore, right from the beginning, close ties to the surrounding innovation environment. When the collaboration with Kodak began in 1993, the national institutions lost all access to the system. Today, all ideas that have to do with the development of the system come from abroad, either from Kodak's customers or from their researchers.

What happened was that once the system had been developed sufficiently to be sold, the institutions that gave considerable input in the beginning did not have the budget to purchase the system. Also, other institutions which had some form of an information system were not given any financial resources to purchase this new system. Hence CKI had to search for prospective buyers abroad to be able to continue operating. This is when Kodak entered the scene.

It can not be argued that the takeover per se had negative effects on the surrounding innovation environment. One of the former owners maintains that the short-sightedness of the Icelandic government negatively affected the innovation environment. According to him, the various institutions that had worked on developing the system from the beginning and provided the company with all the resources it needed to be innovative were not able to access the system because the government was not prepared to purchase the system when it was still being developed. Thus, the institutions lost the access that they had had to the system. In other words, the researchers and developers who worked hard in the beginning to develop the system are not able to reap from what they sowed.

Some would argue that CKI also suffered after their ties to the surrounding environment were severed. CKI could now no longer rely on feedback from the researchers or the potential users of the system in Iceland. In other words, both CKI and the surrounding environment lost valuable contacts.

One of the former CKI owners points out that it could be argued that the takeover had some positive impacts on the innovation environment in Iceland. Some of the former CKI owners reinvested in small start-up companies in Iceland, following the Kodak takeover, and by doing so they reinforced the environment that these companies survive in. The ICT industry in Iceland needs more venture-capital and this takeover gave a financial boost to the industry to some extent. One of CKI's former owners maintains that those individuals who have profited from their ICT business are generally willing to handover some venture-capital to other new start-up companies. This is because they have gained considerable experience in turning these small companies into profitable entities.

The takeover process

The takeover process itself was a learning experience for the CKI owners. In hindsight they realise that they were somewhat unrealistic in their demands. This however turned out to be something that helped CKI; by putting a relatively high price-tag on the company, they were able to place the company in an international context.

One of the former owners points out that Icelanders often lack the necessary technique to negotiate with foreign companies. Besides not having the experience and technique, they often become impatient and lack the stamina to finish the whole negotiation process. The CKI owners on the other hand did finish the process, mainly because they had such a firm belief in their company and the product. CKI had been turning a profit for quite some time and the owners realised they had a special product to offer.

Experiences after the takeover

At this point in time, it can safely be said that the takeover has only lead to positive outcomes for the CKI employees and former owners. The CKI employees describe Kodak as a “reliable company”, since all obligations on Kodak’s behalf have been fulfilled. According to one of the former owners at CKI, the top-managers at Kodak have been very satisfied with both the financial situation at CKI, as well as with the developmental progress of the RIS 2010 system.

Kodak made the final payment to the former owners on September 21st 2004. The operation of CKI has not changed, and the company has not been relocated.

The Icelandic innovation policy

The government has to some extent created the conditions that are necessary for start-up companies to thrive. From CKI’s point of view, there remains much to be done. For the first part, companies such as CKI have had to face the fact that the governmental organisations, companies, various institutions and the general public seem to be more willing to buy foreign software, than Icelandic software. Some are even willing to pay three to eight times more for foreign products, when the Icelandic products are fully compatible, according to one of the CKI respondents. He gave the following example; *“One of the largest hospitals in Iceland, bought RIS 2010 from Kodak in Denmark at a price that was five times higher than the price we had initially offered. We tried to get them to buy the system when it was still at the development stage, and that’s when we really needed the financial resources* (our translation).

Small companies such as CKI have been focusing on developing specialised products, rather than the standardised products, in order to be noticed and ultimately survive. The former CKI owner points out that if Icelanders are not prepared to purchase local products that are fully compatible with the foreign products, there is no financial basis for this kind of industry in the

country. To put it simply, someone has to pay so that the developmental process can take place.

The former CKI owner points out that the ICT industry would be grateful for small-scale governmental initiatives, something like providing Icelanders with Internet access, free of charge, would create a basis for companies in the ICT industry. Companies such as CKI often compare themselves to similar companies in the Nordic countries, and have seen that some governmental programs have supported the industry considerably.

Conclusions

Both Kodak and CKI have expressed their satisfaction with the situation as it is today. One of the CKI respondents pointed out that Kodak's innovative culture and company values were a perfect match with CKI's culture, in other words, they two companies were culturally compatible. This finding underpins the importance of the companies (i.e. the parent company and the acquisition target) having compatible cultures and capabilities, as well as compatible business strategies.

The Kodak takeover of CKI was successful in many respects, mostly with regards to the product innovation that has been taking place at CKI. Product innovation has continued in the company, mainly because Kodak provided the resources that CKI needed.

Foreign ownership has primarily had a positive impact on the development of CKI, which is evidenced by the fact that the company has hired more people after the takeover. Kodak has also been successful in building commitment to the new entity and confidence in the future which meant that the key employees were willing to renew their contract with the company after their initial contract ran out (i.e. 21. September 2004). The employees have expressed that there is high morale at the workplace, and they have remained productive, both of which point to the success of the takeover.

There are some risks that CKI has had to face after the takeover. CKI now has a stronger link with the global economy than they did before, because they are now a part of a leading global company in their own line of business. This link can however be seen as potentially weak since the new owners have no historical or national commitment to CKI. The role of CKI is small in the context of their business as a whole, and Kodak does have similar developmental centres elsewhere in the world. This basically means that CKI has to compete for their position within the parent company. Thus, while the status of CKI has improved in terms of external market position, it has landed in competitive settings within the parent company. This could mean that although CKI is beautifully matched with Kodak (i.e. with regards to resources and marketing channels), it faces higher risks if the commitment by the owners decreases. Cost-cutting programs could seriously affect CKI.

Overall, a lesson has to be learned, firms like CKI have to be nurtured from the beginning and supported. Although the Icelandic environment has provided CKI with many of the necessary resources, such as well-educated

employees, more could be done to help small start-up firms like CKI to survive. The ICT industry faces problems because of tax issues. In some cases, public organisations have chosen to establish departments within the institutions to carry out tasks that the independent, ICT businesses are designed to perform. This is because value-added tax comes into play in these businesses. The government could easily simplify the business environment and help these businesses grow by, for example, doing business with companies such as CKI, instead of establishing its own departments.

It could be argued that in this case no “brain-drain” occurred since all the employees stayed in Iceland, but in another similar scenario the opposite could easily have happened, that is, the parent company could have relocated the business unit and the Icelandic ICT industry could have lost valuable talent. Of course, “brain-drain” could easily happen later in this case.

The Icelandic pharmaceutical case: deCODE genetics, Inc

The pharmaceutical and biotechnology industry in Iceland

Since the Icelandic government has promoted the development of the biotechnology industry, the sector has emerged as a second, significant high-tech industry, after IT/Software (www.iceland.org). Iceland makes an ideal home for biotechnology research as the population is, genetically speaking, relatively homogeneous. The country has a sophisticated, high-quality healthcare system and extensive genealogical records. Through these, resources can be generated to identify genes associated with a multitude of diseases. Research based on this population provides insights into the pathogenesis of these diseases, and the depth and comprehensiveness of the Icelandic genealogical database are unrivalled worldwide.

One of the country's most promising hi-tech projects is the charting of the nation's genetic material for the purpose of discovering the transmission by heredity of diseases and their related genetic material (www.decode.is). The project is based both on genealogy and the fact that Icelanders have for centuries remained a rather isolated nation due to the country's geographical position, causing rather limited mixing of the nation's blood with other gene pools.

It should also be mentioned that Iceland's advantage in the field of biotechnology is related to nature and the country's geographical position on the mid-Atlantic ridge, which is the reason for its wealth of hot springs and high-temperature areas, the habitat of thermophilic bacteria, which may be utilised for different industries, e.g. the pharmaceutical industry.

The pharmaceutical industry is opening new export markets, mainly in Europe, for a variety of products.

The history

The pharmaceutical industry in Iceland was initiated in the nineteen thirties by Stefan Thorarinsson, Ltd, the first drug wholesaler, making medicament-tablets for sale over the counter.

The local pharmaceutical industry developed gradually over the next years. The Institute for Experimental Pathology was established 1948. One of its tasks was production and distribution of sera and its own vaccine against diseases of animals, especially sheep. The Department of Immunology has participated in vaccine development in later phase testing of patients groups.

The Institute of Biology introduced biotechnology to the Icelandic society in the late seventies (Thorvald Finnbjörnsson, 2004). In the mid-nineties a programme was initiated by the University of Iceland, Ictech and the Icelandic Fisheries Laboratories on intracellular enzymes from thermophile and psychrophile organisms. This programme was financed by the Icelandic

Research Council. The effort later continued as a part of a Nordic umbrella program initiated and financed by the Nordic Industrial Fund. Considerable amounts of funding came into the country from this source, and other research funding was made available to the biotechnology sector. The success of entrepreneurs in the field encouraged others to go abroad to continue studying the subject.

The real breakthrough came with the founding of two genome companies, deCODE genetics in 1996 and the Iceland Genomics Corporation (ICS) in 1998, both basing their business ideas on the genealogical transparency of Icelanders (Thorvald Finnbjörnsson, 2004). The pioneers of both companies were Icelandic professors working in the US. The establishment of these companies created a need in Iceland for well educated staff in the field of biotechnology. Icelanders working in academia abroad were given a chance to come back home to participate in exciting projects.

Patenting

Iceland had a special position within OECD in patenting. The first patent law was introduced in 1923. Then it was not possible to patent medicaments, only their production methods. This and the smallness of the market resulted in that applications for foreign patents were seldom made.

A new patenting law took effect 1992 which means that it is now possible to patent medicaments.

Production

The government's health-budget is ca. 8 % of the GNP (gross national production). The wholesale cost of pharmaceuticals is one fifth of the total health-budget where the government pays 75% and the patient 25% for use outside hospital. The Ministry of Health has accordingly issued rules for doctors to prescribe less expensive generic drugs, when possible, rather than more expensive original ones. This and the size of the local market is part of the reason why the pharmaceutical industry is trying its luck on the international market.

Health-related R&D in Iceland

According to statistics from the OECD, Iceland had the fourth largest percentage of health-related R&D in government budgets in 2002, measured as a percentage of GDP (OECD, 2003). The average annual growth rate from 1995 to 2002 was 26.7%. Only the US and the UK had higher percentages than Iceland.

R&D in biotechnology from 2001 – 2003

In 2003, The Icelandic Centre for Research conducted a study on R&D in biotechnology in Iceland (Thorvald Finnbjörnsson, 2004). One of the findings in the study was that turnover in organisations working on R&D in

biotechnology peaked in 2002. Higher education institutions and public institutions, the University hospital included, had the most significant role in the development of R&D in this field (Thorvald Finnbjörnsson, 2004). Nevertheless, 95% of total R&D expenditure in biotechnology came from various companies.

R&D activities in biotechnology peaked in 2001 (Thorvald Finnbjörnsson, 2004). The total expenditure that year was €114 million. In the years after 2001, the expenditure decreased somewhat. One of the explanations for this is that some of the largest companies in this field laid-off some of their employees after having invested in automatic equipment that would facilitate the R&D activities. This indicates that R&D expenditures do not always reflect R&D activities.

It is clear that the new type of companies emerging in recent years and are actively participating in R&D activities in biotechnology, are not at all similar to other more traditional companies (Thorvald Finnbjörnsson, 2004). One of the differences is that the funding of R&D activities comes to a great extent from abroad. This could be a result of research contracts that these companies have gained. In some cases, companies have been getting considerable financing from foreign research funds, such as the European Commission's Framework programmes.

In 2001, almost 900 employees performed R&D in the companies in this study (Thorvald Finnbjörnsson, 2004). In 2002 the number had gone down to 850 and in 2003 the number had gone to 640. This development does give a good picture of the development during this period. This means that the decrease in headcount for personnel active in R&D is about one-third of the total workforce dedicated to this field of research.

The new emerging biotechnology industry has a different method of working than the more mature branches in Iceland (Thorvald Finnbjörnsson, 2004). The new companies rely more heavily on co-operation with other organisations domestic or foreign. The respondents in the study reported about 340 co-operation partners in the country and abroad. Of those 340 partner organisations, approximately 220 were foreign and 120 domestic.

The respondents reported 38 patents granted in the period from 2001 to 2003, as a result of their R&D activities (Thorvald Finnbjörnsson, 2004). The majority came from the business sector, only one came from a different sector. It should be mentioned that three companies were behind 26 of the 37 patents granted to companies in the field of biotechnology. When asked how many publications had resulted from the R&D work in biotechnology, some 230 publications were mentioned in all sectors. Companies were responsible for almost half of the publications.

The respondents were asked to give an idea of the obstacles they met during the R&D phase (Thorvald Finnbjörnsson, 2004). The primary obstacle was the lack of funding from public authorities, from the Venture Capital fund or other similar types of funding mechanisms. The R&D performers did not complain about the access to qualified personnel.

deCODE genetics, Inc.

The deCODE genetics, Inc. (hereafter deCODE) case is somewhat different to the other cases presented in this module. Whilst the other cases are about Nordic companies that have been taken over by foreign multinational firms, the deCODE case is about a multinational company, that is deCODE, its operations and some of its acquired companies. This case is therefore described more from the point of view of the multinational company, rather than the companies that it has taken over.

deCODE has had a great impact on the biotechnology and pharmaceutical industry in Iceland, not least when it comes to the concept of “brain-drain” and “brain-gain”. This case will describe the reason why deCODE has remained based in Iceland and an attempt will be made to explain what this has meant for the Icelandic labour market and ultimately the innovation environment in Iceland.

The following case will be organised as follows: First a general description of the company will be given followed by a short description of deCODE’s patenting activity. Thirdly, the human resources at deCODE will be described, as well as the knowledge interaction that takes place within the company. Some financial information will be given, as well as a description of the corporate governance style. The last sections touch on deCODE’s newest acquisitions. The final section discusses the Icelandic innovation environment from deCODE’s perspective. Lastly some concluding remarks will be given.

Introduction

Founded in 1996 by Dr. Kári Stefánsson, deCODE is a leading population-based genomics company (www.decode.is). When the company was founded, US investors provided venture capital that amounted to USD 10 million. This amount of money was necessary to ensure that the company would be able to operate for the next two years.

deCODE conducts research into the genetic causes of common diseases and operates one of the largest and most advanced high-throughput genotyping laboratories in the world. At this point in time, deCODE has mapped 25 disease genes and isolated 7. Through its in-house development program and together with strategic partners, deCODE is developing a range of products and services for diagnosing, treating, and preventing disease. The pharmaceutical industry is deCODE’s principal customer base for their gene-discovery and contract chemistry businesses.

The company leverages its expertise in human genetics to offer innovative products and services in bioinformatics, genotyping, pharmacogenomics and clinical trials. deCODE's US-based pharmaceuticals and structural biology groups conduct downstream development work on targets derived from the company's proprietary research as well as contract service work for pharmaceutical and biotechnology companies.

deCODE's key strengths are the growing portfolio of proprietary drug targets, its integrated drug development capabilities, its unrivalled genealogical resources, the cutting-edge proprietary bioinformatics, the world-leading, high-throughput genotyping operations (approximately 30 million genotypes per month), and its subsidiary Encode, which is performing integrated pharmacogenomic studies and clinical trials.

deCODE was awarded a 12 year license to build and run the aforementioned Centralised Health Sector Database (CHSD). The CHSD differs from similar projects elsewhere in an important respect, its nationwide scope. The database will collect information in a coded and anonymous form from patient records from Iceland's National Health Service institutions and store the data for the purpose of research and statistical analysis with the aim of increasing knowledge in order to improve health and health services. The CHSD is described in more detail in a later section.

Patents and proprietary rights

Patents and other proprietary rights protections are an essential element of deCODE's business (deCODE genetics, Inc., 2003). The company currently relies on patents, trade secret law and contractual non-disclosure and confidentiality agreements to protect their proprietary information.

deCODE actively seeks patent protection in the US and other jurisdictions to protect technology, inventions and improvements to inventions that are commercially important to the development of the business. These include, among other things, genes the scientists discover, mutations of genes and related processes and inventions, and other inventions based on these genes as well as methods developed in their biostructures and pharmaceutical groups for the discovery and development of drugs.

As of year end 2003, they had 24 issued US patents and eight issued patents in non-US jurisdictions. They had 65 pending patent applications in the US and 81 pending patent applications in non-US jurisdiction.

Employees

In 1996, deCODE started its research in Iceland with 20 employees. In 1998 the number of employees at deCODE had reached 100. The number reached 300 early in 2000 and 500 early in 2001. A large group of these employees were foreign specialist who came to Iceland solely to work for deCODE. Based on this fact, one could argue that deCODE's operations led to extensive "brain-gain" in the Icelandic biotechnology and pharmaceutical industry from 1996 to 2002. Many of the foreign employees have now left deCODE and only a small group of the key employees have stayed with the company.

The numbers mentioned above reflect a rapid growth period which ended in 2002. In October 2002, deCODE had to lay off a third of its employees (approximately 700 people) because the exchange rate of the deCODE stock fell considerably. This had a huge impact on the Icelandic labour market

since some of the employees subsequently had trouble finding new jobs in Iceland that suited their qualifications and experience. This action also had an affect on the amount of total R&D expenditure in biotechnology in Iceland, as has been mentioned, after 2001 this expenditure in general decreased somewhat (Thorvald Finnbjörnsson, 2004).

In 2003, deCODE and all of its subsidiaries employed 414 full-time employees (deCODE genetics, Inc., 2003). Approximately 109 were employed in the US and 305 in Iceland.

Today, more than 90 (22%) of the employees have PhD or M.D. degrees and around 250 (60%) have college degrees. 338 (82%) employees are engaged in, or directly support, research and development activities, of which 267 work within the laboratory facilities and 71 have positions associated with the development and support of informatics. Thirty-eight employees are engaged in various professional support functions such as Finance, Business Development, Legal Communications, Human Resources and Clinical Collaborations, and some 36 are employed in administrative support, facilities management, cleaning and security. In addition, deCODE utilises part-time employees and outside contractors and consultants as needed and they plan to continue do so.

Most of deCODE's employees work in laboratory settings and the largest group of employees comprises biologists, biochemists and doctors. As a point of interest, almost 50% of deCODE's employees are women and the average age has been around 33 years.

Knowledge interaction

Knowledge interaction at deCODE occurs at most levels in the company, but most evidently in the laboratory settings. All of deCODE's research is undertaken with a cross-sectional approach, that is, doctors, biologists and other specialist work in close collaboration. All research is done in a group setting and the group is responsible for the project right until the end. These groups include researchers based in Iceland and abroad. The interaction can range from exchanging document to mutual visits.

deCODE is defined as a "knowledge organisation". This means, for example, that employees are required to monitor what is taking place in their field of research, attend scientific conferences and some take an active part in writing peer-reviewed articles and various other articles.

Financial information

deCODE have financed their operations primarily through funding from research and development collaborative agreements, and the issuance of equity securities and long-term financing instruments (deCODE genetics, Inc., 2003).

Under all circumstances, deCODE will require significant additional capital in the future, which they may seek to raise through further public or private

equity offerings, additional debt financing or by other means. As deCODE has pointed out, no assurance can be given that additional financing or collaborations and licensing arrangements will be available when needed, or that if available, will be obtained on favourable terms. If adequate funds will not be available when needed, deCODE may have to curtail operations or attempt to raise funds on unattractive terms.

deCODE's revenue increased to USD 46 million in 2003, compared to USD 41.1 million in 2002. According to deCODE, this growth reflects continued expansion across their product development and other service businesses. From their revenues, deCODE were able to derive the funds necessary to sustain their investment in R&D.

In the second quarter of 2004, deCODE experienced losses of USD 13.3 million. This was a marked increase from the year before when deCODE lost USD 10 million. During the first six months in 2004, deCODE lost USD 25.3 million. According to deCODE, the main reasons for this loss were, among other things, lower levels of revenue and an increase in operational costs.

Research and development expenses

The research and development expenses in 2003 were USD 63.5 million (deCODE genetics, Inc., 2003). The expenses decreased from the year before when they were USD 89.6 million. Of these amounts, deCODE estimates that approximately USD 44 million was spent on customer-sponsored research and development activities in 2003. In 2002, USD 48 million was spent on these activities.

The 29% decrease in 2003 as compared to 2002 was principally attributable to the cost reduction measures they implemented in late 2002, taking advantage of investments in automation in their disease-gene research programs (deCODE genetics, Inc., 2003). This action had considerable impact on the amount of R&D expenditure in the biotechnology sector in Iceland. As has already been pointed out, the expenditure decreased somewhat after 2001, and that can be attributed to some extent to the developments at deCODE (Thorvald Finnbjörnsson, 2004). Nevertheless, these cutbacks meant that there was a marked increase in productivity which enabled deCODE to continue their discovery and downstream work with substantially lower costs.

Significant customers

Historically, a substantial portion of deCODE's revenue has been derived from contracts with a limited number of significant customers (deCODE genetics, Inc., 2003). deCODE's largest customer, Roche, accounted for approximately 43% of the company's consolidated revenue in 2003. That same year, Merck accounted for approximately 19% of the consolidated revenue.

Corporate governance and management

deCODE genetics, Inc. was listed on NASDAQ and EASDAQ in 2000. Today approximately 13.000 to 14.000 individuals own deCODE shares. It is interesting to note, that deCODE's market value soon after the company was founded, became much higher than the market value of all the companies in the fishing industry that had been listed on the Icelandic Stock Exchange.

The listing on NASDAQ meant that deCODE managers had to become more disciplined in their approach to running the company and follow the NASDAQ rules and regulations. In relation to the NASDAQ listing deCODE became a member of the Iceland Chamber of Commerce (www.verslunarrad.is). Early in 2004, the Chamber introduced new guidelines on good corporate governance working methods. The guidelines clarify the role and work of the board of directors and managers of Icelandic enterprises and thus make it easier for them to fulfil their duties. deCODE fully adheres to these guidelines.

The company has a hierarchic structure with clearly defined departments. The genetics research laboratory, for example, comprises of smaller departments that conduct research into various diseases. Within each department are little research groups which focus on specific types of diseases. Each group has a team leader who reports to a departmental manager. Every job has been defined; hence every employee has a clear idea of his or her responsibility, as well as the method of communication.

Acquisitions

As part of deCODE's business strategy, they continue to consider joint development programs and merger and acquisition opportunities that may provide them with products in late-stage development, intellectual property or financial resources, or with capabilities that will help accelerate their downstream drug discovery efforts (deCODE genetics, Inc., 2003). In this section, a short description is given of two of deCODE's acquired companies, that is, Encode, Ltd. (hereafter Encode), which is based in Iceland, and MediChem Life Sciences, Inc. (hereafter MediChem), which is located in the US.

Encode Ltd.

In 2000, deCODE acquired Encode, an Icelandic-based pharmacogenomics company. This acquisition meant that deCODE was able to add a key element to its business strategy which is to offer a wide range of products that can help the global pharmaceutical industry harness the potential of genomics (www.decode.is). Through Encode deCODE was able to pursue its plans to maximise downstream value-creation from its disease-gene research and take its in-house efforts further along the drug development process. In other words, Encode was an important link in deCODE's plans to improve its capabilities to service its collaborative partners.

With this alliance Encode was poised to become a leader in pharmacogenomic studies, combining clinical trials with advanced genetic research, making it possible to identify the genetic variations that cause people to respond differently to the same drugs. Encode was to operate as an autonomous entity and basically provide deCODE, and other collaborative partners, with necessary and valuable services. Based on this, it can be assumed that Encode benefited from being taken over by deCODE.

Encode was established in 1999 as a privately held company by Thor Sigthorsson, the former president of Icelandic Pharmaceuticals Ltd. Encode is a pioneer in its field of operations since it is the first CRO (Contract Research Organisation) founded in Iceland providing comprehensive clinical research and development services to the pharmaceutical industry, based on the highest ethical standards.

Since its founding in early 1999, Encode collaborated closely with the biotechnology company deCODE in conducting pharmacogenomic analyses and at the point of the takeover had acquired a group of partners that provided the company with a growing stream of revenue. In November 2000, as has already been mentioned, Encode became a subsidiary of deCODE.

Encode is located in the centre of Reykjavik, the capital of Iceland, and currently employs just under 20 Icelandic specialists (www.encode.is). The key employees all have long-term experience within clinical research, analytical fields, quality assurance, regulatory affairs and marketing. Encode furthermore cooperates with physicians and scientists in Iceland and abroad to bring expertise in various therapeutic areas to the company. Thus, Encode has close ties with the Icelandic innovation environment, which can only benefit those that also work in this field.

A key advantage of Encode's pharmacogenomic program is its access to deCODE's unique resources: the computerized genealogic database for the Icelandic population (i.e. the CHSD) which dates back 11 centuries. The database comprises detailed genotypic data of tens of thousands of participants of deCODE's genetic research in over 30 common diseases, and phenotypic data covering the same population. By combining these resources with clinical trials and expression profiling technology, Encode and its partners gained competitive advantage for identifying the genetic variations that cause people to respond differently to the same drugs. This enabled Encode's pharmaceutical partners to streamline their drug development process and create more effective, tailor-made treatments with faster, cost-effective R&D.

To sum up, deCODE became interested in Encode because of the intellectual properties and capabilities that resided within the company. The Encode acquisition was a part of deCODE's growth strategy and it helped deCODE secure its position in the international context. Encode, on the other hand, secured its access to the CHSD, as well as its position from a competitive standpoint. It continues to operate in Iceland, and there are no signs that this arrangement will change.

MediChem Life Sciences, Inc.

In March 2002, deCODE acquired the US clinical development company MediChem Life Sciences, Inc. MediChem was founded in 1987 and employs 100 to 200 people (www.business.com). The company provides drug discovery, research and development chemistry services to biotechnology and pharmaceutical companies. These services include proteomics,³³ the creation of customised compound libraries, medicinal chemistry, biocatalysis, computational chemistry, and chemical process development and chemistry project teams.

In a shareholder vote, all of MediChem's shareholders voted in favour of the merger of the two companies under which deCODE acquired MediChem in a stock-for-stock exchange (deCODE genetics, Inc., 2003). The acquisition of MediChem was a central element in deCODE's strategy to transform deCODE from a company focused on gene discovery into a biopharmaceutical company capable of creating and capturing the greatest possible value from its discovery capabilities.

The acquisition benefited the company in three ways: it enabled the company to advance its in-house programs in drug discovery. Secondly, it enabled them to negotiate much more favourable terms in their alliances with pharmaceutical companies, in which they take their discoveries much further down the drug development process and receive a more significant share of revenues from sales of products that are developed. Thirdly, the acquisition provided deCODE with a service business generating revenue in the short term and maintaining the infrastructure for conduction drug discovery work on several programs at once.

This acquisition is interesting from the "brain-drain and brain-gain" perspective. After MediChem was merged with deCODE a new department had to be established to connect the two companies and complete the merger. deCODE had to hire 250 new employees to man the new department.

Two factors affected the decision of whether to pick Iceland or the US as the location for the new department. deCODE argued that financing the new department could become more difficult if the department were to be in Iceland. This is because Iceland has not had a unique position when it comes to clinical development, compared to its position with regards to genetic research. Moreover, deCODE maintained that they would encounter difficulties in finding enough qualified people in Iceland to man the department. Thus, the department was established in the US where enough qualified people were available.

³³ A branch of biotechnology concerned with applying the techniques of molecular biology, biochemistry, and genetics to analyzing the structure, function, and interactions of the proteins produced by the genes of a particular cell, tissue, or organism, with organizing the information in databases, and with applications of the data (as in medicine or biology) (Dictionary.com)

The Icelandic innovation environment

One of the deCODE respondents emphasises that for deCODE to remain competitive it has to have qualified employees. deCODE has found that education in Iceland has to some extent been lacking in quality and their most valuable employees are the ones who have gained their PhD's abroad. These employees have also gained valuable insight into how companies in the biotechnology and pharmaceutical industries operate abroad.

deCODE has collaborated extensively with other companies, research institutions and universities in Iceland in the past and it will continue to do so. These have been formal collaborative agreements with Icelandic organisations, as well as informal ones. Researchers at deCODE have for example undertaken part-time teaching at the University of Iceland which has meant that deCODE has had close ties with the academic environment. In the past, students studying biology at the university have worked at deCODE during the summer holidays. This has often resulted in them gaining permanent positions with the company.

Conclusions

The company has had considerable positive effects on the economic, as well as the social environment in Iceland. It can safely be said that deCODE has led to so-called "brain-gain" in Iceland, at least for a period of time. The company hired a large group of highly qualified and educated Icelanders who had not been able to find suitable jobs in Iceland. Moreover, deCODE has hired numerous foreign specialists who have enriched the innovation environment by adding to the knowledge-base which existed in Iceland.

This study shows that the smallness of Iceland and the Icelandic labour market can be an inhibiting factor for a company such as deCODE. It is evident in the MediChem case, that deCODE's actions could have led to even more "brain-gain". The fact of the matter is that the Icelandic labour market simply did not have enough qualified people to man deCODE's new department and this influenced deCODE in their decision to establish the department in the US.

When it comes to the effect on the Icelandic biotechnology and pharmaceutical industry in general, some argue that the founding of deCODE stimulated Icelandic scientists and specialists who were, in one way or another, associated with these industries. Other biotechnology and pharmaceutical companies, although much smaller in scale, were founded shortly after deCODE started to operate.

Although deCODE has in many ways positively influenced these industries, these cases also indicate the extent to which deCODE can negatively effect the labour market and the innovation environment. A decision to relocate the company, as a whole, would have devastating effects on these sectors. But whilst deCODE has access to the CHSD it will have close ties with the Icelandic innovation environment.

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Company cases Norway

The Norwegian software case: The takeover of Zoomit by Kelkoo

By Siri Aanstad

Introduction: The Norwegian ICT industry

The ICT industry³⁴ is a dynamic part of the Norwegian economy, characterized by frequent product and market innovations as well as ongoing structural changes through mergers and acquisitions. In 2002, the industry employed 3,7 per cent of the country's total workforce and accounted for 6 per cent of total turnover.³⁵

The 1990s saw substantial growth within the ICT industry, which by 2001 had become Norway's third largest industry in terms of turnover. In the period 1995-2000, turnover as well as employment grew faster than in the economy as a whole. Data processing was the single most dynamic area, with an average annual growth rate in turnover and employment of 21 and 19 per cent respectively.³⁶

The ICT industry is among the most R&D intensive industries in Norway. In 1999, it accounted for 34,5 per cent of total industrial R&D investments. Of the industry's total investments of NOK 4590 million that year, as much as NOK 3800 million - that is, close to 83 per cent - were spent internally.³⁷ Recent studies have shown that the ICT industry has limited contact with external national research environments, and seem to be weakly embedded in the national innovation system in general.³⁸

While the effects of the dotcom crash are still evident, the Norwegian ICT industry has experienced growth over the recent period. This has, however, been so-called "jobless growth". The industry's unemployment rate is still high - in September 2004 it amounted to 3,7 per cent, which is only marginally lower than the unemployment rate in the Norwegian economy as

³⁴ denoting the production of ICT goods and services

³⁵ article entitled "Informasjonssektoren sysselsatte 127 701", published on the webpages of Statistics Norway 22.12.2003, URL: <http://www.ssb.no/emner/10/03/iktoms/>

³⁶ Statistic Norway's ICT barometer 2001, URL: <http://www.ssb.no/emner/10/03/sa51/>

³⁷ Statistic Norway's ICT barometer 2001, URL: <http://www.ssb.no/emner/10/03/sa51/>

³⁸ Narula, Rajneesh and Wibe, Mona Domaas, "Interactive learning in an innovation system: The case of Norwegian software companies", *International Journal of Entrepreneurship and Innovation Management*, 2002; Reve, Torger and Jakobsen, Erik W., *Et verdiskapende Norge*, Oslo: Universitetsforlaget, 2001

a whole.³⁹ There are nevertheless signs that the situation is picking up. Since April, unemployment has been lower than in the same period in 2003, and a recent survey shows that the ICT industry expects to increase its employment in 2004 and 2005. According to the survey, the industry is generally optimistic with regards to future developments.⁴⁰

Introduction to the case

In the autumn of 2000, the Norwegian firm Zoomit was taken over by the French shopping search engine company Kelkoo. The takeover meant that Zoomit, which at the time was a small Oslo-based start-up firm, became part of a French controlled multinational corporation (MNC) headquartered in Paris. Here, we investigate into how the change in ownership has affected the business operations in Norway, focusing on whether the foreign takeover has had any effects on local innovation capabilities.

It should be noted, that Kelkoo in turn was acquired by the US controlled multinational Yahoo! in the spring of 2004. Given that this event took place only recently, it will not be discussed in further detail here.

Zoomit

Zoomit grew out of Maskot Interactive, which was established by Per Siljobergsåsen in 1997. The underlying business idea was to offer news services to companies and organisations via e-mail and mobile phones. Through Siljobergsåsen's contact with a former colleague, William Klippgen, the business idea changed in the direction of launching a comparison shopping-portal on the Internet. Klippgen joined the firm, which was renamed first to Zoom, and subsequently - around the turn of 1999 - to Zoomit.

As a comparison shopping portal Zoomit provided an online search engine that let web surfers search for particular products and get a list of online shops that supplies this product. By comparing prices the service helps Internet users find the best bargain. The vendors normally pay the comparison shopping search engine for each click through or visitor, and provides the data the site needs to deliver search results.

From the beginning, Zoomit had close ties to the ICT milieu at the University of Oslo (UiO). Siljobergsåsen had previously studied at the Department of Informatics (IFI) and worked at the Department of Media and Communication (IMK). A former student at IMK, Gard Jenssen, was involved in the development of the business plan for Maskot and sat as a member of the company's advisory board. Jenssen later joined the company as Chief Editor in the spring of 2000.

³⁹ news article entitled "Fortsatt høy ledighet i IKT-sektoren", published on the web pages of Abelia 28.10.2004, URL: <http://www.abelia.no/>

⁴⁰ News article entitled "Størst optimisme i IKT- og kunnskapsbedrifter", published on the web pages of Abelia 30.06.2004, URL: <http://www.abelia.no/>

Zoomit was furthermore started up in close physical proximity to UiO. The company was established on the premises of Oslo Innovation Centre, a science park⁴¹ strategically located only a few minutes' walk from the main university area. Oslo Innovation Centre was also one of the company's investors. The establishment was facilitated by support from FORNY, a public policy scheme aimed at stimulating the commercialisation of research based business ideas. Through FORNY, Zoomit received support in the areas of business plan development, early-stage financing, incubator services and investor contacts.⁴²

At the turn of 1999, Zoomit experienced its first real breakthrough. In the course of that year, new capital had been brought into the company by the Norwegian investment company Kistefos Venture Capital. In the first months of 2000, another NOK 100 mill (app. €12,1 mill) were raised from more than 100 Norwegian investors.

Parallel to the inflow of new capital, the company worked intensely with developing its product, resulting i.a. in the introduction of a new web design. More people were recruited, many of whom had their background from IMK and IFI at UiO. A large number of the company's employees were non-Norwegian - at the most, more than ten different nationalities were represented in the workforce. This was only one aspect giving Zoomit a highly international profile. As early as in 1998-1999, the company launched its web based services in Denmark and Sweden, where students had been hired to translate the web pages into the local languages.

In the spring of 2000, the company was ready to expand beyond Scandinavia, and entered negotiations with players in Germany aimed at establishing an office there. Whereas these negotiations fell through, Zoomit launched its services over large parts of Europe early in the following autumn by adding seven new languages - English, German, French, Italian, Spanish, Dutch and Finnish - to its web site. At about the same time, the company acquired the Dutch start-up Koopwijzer, which at the time was one of the most popular interactive buyers' guides in the Netherlands. In connection with this acquisition, Johan Dolven - Zoomit's CEO at the time - stated that "Our aim is to become the most popular starting point for shopping on the net in Europe, and we are moving quickly in that direction."⁴³

The dotcom crash hit the international economy only few months after Zoomit's "take-off" at the beginning of 2000. Thus, the continued expansion of the company's operations that year took place despite of the generally depressed situation in the ICT industry. Nevertheless, Zoomit's

⁴¹ A science park is a property based initiative which has operational links with universities, research centres and/or other institutions of higher education; is designed to encourage the formation and growth of knowledge-based new industries and other organisations, normally resident close to universities and R&D institutions; and has a management team actively engaged in fostering the transfer of technology and business skills to tenant organisations

⁴² http://www.program.forskingsradet.no/forny/uploaded/nedlasting/FORNY_brosjyre.pdf

⁴³ <http://www.prnewswire.co.uk/cgi/news/release?id=34670>

investors - who at the time included Oslo Innovation Centre, Kistefos Venture Capital, the Norwegian insurance company Storebrand and the two founders Siljubejgsåsen and Klippgen - saw the need for scaling down the expenses, and encouraged the management to look for alternative expansion strategies. It was against this background Zoomit entered negotiations with Kelkoo in August 2000.

The takeover by Kelkoo in 2000

Zoomit's vision to become a leading pan-European comparison-shopping service was shared by the French company Kelkoo (meaning "Quelle Coup! or "What a find!"). Immediately after its establishment in October 1999, Kelkoo had embarked on a strategy for expanding internationally through mergers and acquisitions. After the acquisition of the French company Promodujour.com in January 2000, Kelkoo merged with Spanish Dondecomprar.com and British Shopgenie.com in the course of the following spring.

With Zoomit's offices in the Scandinavian countries and the Netherlands and Kelkoo's offices in France, Spain and the UK, there was a good match between the companies in terms of geographical presence. Negotiations began in August 2000. For Kelkoo, Zoomit was attractive due to the company's well-established position in the Scandinavian markets, its attractive product design and user-centric functionality, as well as its thorough knowledge of both the German and Dutch markets. And whereas Zoomit ideally wanted to stay independent, cooperation with Kelkoo appeared to be a good alternative when the general market conditions made it difficult to continue on one's own.

The chemistry between the two parties was good throughout the negotiations and the term merger, rather than acquisition, was consistently used. In formal terms however, the outcome was that Kelkoo acquired Zoomit. Zoomit's original investors were left with 35 per cent of the shares of the new company, which was priced at approximately NOK 800 mill (app. €95 mill).⁴⁴

Post takeover developments

Before the takeover, Zoomit and Kelkoo had been two fairly similar companies in distant competition with each other. The companies did however differ in terms of main focus and corporate strengths. Whereas Kelkoo was heavily oriented towards business development and highly efficient in this area, product development was the main strong point of Zoomit.

This "distribution" of corporate strengths appears to have been of importance to the role Zoomit was given in the Kelkoo organisation. The

⁴⁴ Aftenposten, *Norsk jubel over Yahoo!-kjøp*, 27.03.04, found on the WWW 01.07.2004, URL: <http://atekst.mediarkivet.no/form?action=visartikkelid=AFT2004/16467>

Kelkoo management clearly acknowledged Zoomit's product development expertise, and assigned the corporate responsibility for this area to the Norwegian unit from the very beginning. In practice this means, for instance, that the Oslo office focuses on the user interface, including Web design and how to present search results in the most efficient way, while the Grenoble unit develops the underlying software technology.

Thus, the unit got a position in Kelkoo resembling what has been termed a "Centre of Excellence" (CoE) in the strand of literature on MNCs focusing on subsidiary roles within these organisations. Although the definition remains somewhat unclear, the central attribute of a CoE is held to be that it plays an important role in the strategy and development of the whole MNC.⁴⁵

Shortly after the takeover of Zoomit, Kelkoo decided to launch a new, standardized web site for all its markets. The Norwegian unit was given a central role in the development of the new site. While this meant an immediate inflow of resources to the unit as well as a cementation of the product development function in Norway, the "boost" in activities proved to be short term. The depressed situation in the international ICT industry compelled Kelkoo to cut down on its operations and as soon as the new web site had been launched, the product development function was more or less put on ice. Over a period of three to four months in the spring of 2001, the product development team in Norway was reduced from fifteen to three employees. This was however part of a company wide rationalization process, in which Kelkoo's overall workforce was more than halved in the period from October 2000 to August 2001, from approximately 240 to 107 at the lowest level.

In the Norwegian unit, a downscaling of the workforce had in fact begun even earlier on. This was due to the gradual phasing out of the unit's platform technology function (i.e. the software and the algorithms that collect and compare products and prices and that generate the relevant search results) which had been initiated shortly after the takeover.

Following Kelkoo's takeover of Zoomit, a positioning fight broke out between the technology development managers in Norway and France. The Norwegian team, under the leadership of William Klippgen, was at the time in the process of developing a new agent technology which was believed to be superior to the technology in use in Kelkoo. The Kelkoo management nevertheless decided to centralise the platform technology development function in France, resulting in Klippgen leaving the company and his team being gradually built down.

The decision to centralise the platform technology development function in France can be seen in the context of how Kelkoo came into being. The

⁴⁵ see e.g. Benito; R.G., "Industrial clusters and foreign companies' centres of excellence in Norway", Reprint No.2/2000, Department of Strategy, Norwegian School of Management BI; and Forsgren, Mats and Pedersen, Torben, "Centres of Excellence in Multinational Companies: The Case of Denmark", in Birkinshaw, Julian and Hood, Neil (eds.), *Multinational Corporate Evolution and Subsidiary Development*, London: Macmillan, 1998

company in fact grew out of an EU project focusing on the development of new agent technology, including the development of algorithms that can generate relevant search results. Among the participants in this project was a group of senior researchers from the Grenoble based ICT company Bull, who decided to make use of the new technology by setting up a search engine company. As a result, Kelkoo was established in October 1999. Whereas the administrative headquarters were set up in Paris, the company's technology department was established in Grenoble which is a centre for the ICT industry in France.

During the period of workforce reductions, there was frequent use of freelancers in the Norwegian unit. But as Kelkoo's financial situation gradually improved and the central management showed renewed willingness to invest in product development, the number of permanent employees increased. Today, the staff at Kelkoo's Norwegian offices amounts to 36, out of which ten make up the product development team.

The product development team, which is led by Gard Jenssen, continues to hold the position of a CoE in Kelkoo. The team has substantial freedom in developing the product according to its own ideas and on the basis of its own expertise, and hence plays a central role in the shaping of Kelkoo's overall strategies and development paths.

In terms of how work is conducted on a day-to-day basis, the main changes following the takeover seem to be related to on the one hand, the split-up between the product development function and the platform technology function; and on the other hand, the fact that the Norwegian unit has become part of - and been given the position of a CoE within - a French controlled MNE with an extensive European network of country offices.⁴⁶

The decision of the Kelkoo management to centralise platform technology development in Grenoble has implied changes in the ways the product development team in Norway interacts with this functional area. In Zoomit, the product and platform technology development functions were physically integrated and characterised by close interaction on a day-to-day basis. With the split-up of the two functions in Kelkoo, interaction has been complicated by physical distance and language differences. While there is frequent contact between the staff in Oslo and Grenoble - by means of travelling as well as phone, e-mail and web conferences - our interviewees stress that the absence of regular face-to-face interaction does hamper efficient communication and cooperation.

Interaction between the Norwegian unit and other parts of the MNE is not limited to the platform technology development department in Grenoble. As CoE in the area of product development, the unit has close and frequent contact with the product teams at Kelkoo's various country offices. While major development activities are initiated and carried out in Oslo, modifications are constantly being made on the basis of feedback from the local product teams. According to our interviewees, this feedback is of great importance for product development activities in Kelkoo and - furthermore -

⁴⁶ Kelkoo has offices in a total of nine European countries.

contributes to a general strengthening of the Norwegian unit's competencies and innovation capabilities.

While there is a high degree of interaction between the Norwegian unit and other parts of Kelkoo, intra-firm cooperation and learning is by our interviewees believed to be hampered by hierarchical structures in the company organisation. Relationships between the central management and the various departments in Kelkoo are held to be more hierarchical than what was the case in Zoomit, and the flat structure characteristic of the latter is considered to have been more conducive to efficient communication and cooperation - and in the final respect, to innovation.

In line with arguments presented by Herstad and others,⁴⁷ the relatively stronger elements of hierarchy in Kelkoo may be seen as reflecting more general differences between corporate governance systems in Central Europe on the one hand and in the Nordic countries on the other. One of our interviewees, who is Italian and had worked in Italy before becoming a Zoomit employee, maintains that the hierarchical practices in Kelkoo are more familiar to him than the flat structure characteristic of Zoomit. It should be noted however - as our interviewee also points out - that the degree of hierarchy in an organisation may be expected to increase with size and geographical scope, and that compared to Kelkoo, Zoomit was a small start-up firm with relatively limited operations outside its home country.

When it comes to interaction with external actors, our interviewees state that there today exist no close links between Kelkoo Norway and national knowledge institutions. Thus, the strong ties that initially existed between Zoomit and the ICT milieu at the University in Oslo appear to have been broken. Physically, this happened already in the spring of 2000 when the company moved out of the premises of Oslo Innovation Centre. The latter nevertheless continued to be one of the company's investors up till the event of Yahoo! acquiring Kelkoo in the spring of 2004.

Nor does the incorporation into Kelkoo appear to have resulted in the establishment of new links between the Norwegian unit and external R&D environments abroad. According to our interviewees, Kelkoo's country offices do not function as "gateways" to knowledge providers in their respective countries, and generally, there are few links between Kelkoo departments and external R&D milieus. The exception is the platform technology development department which has close and regular contact with research environments in Grenoble.

Conclusion: Effects on local innovation capabilities

All in all, the takeover of Zoomit by Kelkoo does not appear to have had a detrimental effect on local innovation capabilities in Norway. On the contrary: The Norwegian unit today employs more than thirty people and forms a vital part of Europe's third largest online shopping service

⁴⁷ Herstad, Sverre, Forthcoming dr. polit (Ph.D.) thesis on foreign takeovers in Norwegian manufacturing industries, Centre for technology, innovation and culture, University of Oslo

company.⁴⁸ The unit is furthermore a Centre of Excellence for product development, meaning that it has the corporate responsibilities for R&D in this area. While the effects of Yahoo!'s recent acquisition of Kelkoo remain to be seen, becoming part of one of the world's leading consumer and business services companies may be expected to further strengthen Kelkoo's position.

In assessing the effects of foreign takeovers, we do however face the methodological problem of accounting for the counterfactual position: What would have happened if Zoomit had not been acquired by Kelkoo? In this case, the problem is reinforced by the fact that Zoomit at the time of the takeover was in a start-up phase, meaning that changes in the nature and scale of the company's operations must be expected to have occurred regardless of any change in ownership.

With these methodological problems in mind, it is possible to identify a set of areas where Kelkoo's takeover of Zoomit indeed has affected business activities - and innovation capabilities - in Norway. While the overall impression is that the takeover has been favourable, some negative effects can also be read out of our survey.

On the positive side, it can first of all be argued that the takeover was of major importance for the continued existence of the Norwegian operations, and thus the preservation and further development of Zoomit's firm-specific competencies. Taking into consideration the dotcom crash as well as Norway's competence level in the area of e-commerce, one of our interviewees states that "if Zoomit had not been taken over by Kelkoo, it is not at all likely that the company would have survived [author's translation]"⁴⁹.

The takeover has furthermore had a decisive impact on the type of activities that are carried out in the Norwegian unit. We have seen that the platform technology development function was phased out at an early point, and that operations subsequently became focused on product development. This can on the one hand be assumed to have had a negative impact on local innovation capabilities, in that the loss of the platform technology development function ruled out a further strengthening of local competencies in this area - at least within the context of Kelkoo. On the other hand, by specialising on product development the Norwegian unit has undoubtedly strengthened its competencies and ability to innovate within this area. This can in turn be assumed to have strengthened the unit's position as Kelkoo's Centre of Excellence for product development.

According to the literature on subsidiary roles in MNCs, subsidiaries that are assigned a central role in corporate R&D are more likely to form linkages to local knowledge providers than subsidiaries with limited R&D

48 Aftenposten, *Norsk jubel over Yahoo!-kjøp*, 27.03.04, found on the WWW 01.07.2004, URL: <http://atekst.mediarkivet.no/form?action=visartikkelid=AFT2004/16467>

49 Gard Jenssen, in e-mail correspondence November 2004. While stating that Norway in the late 1990s was among the European leaders in developing e-commerce services, Jenssen underlines that the country in general is no "leading nation" in this business area.

activity.⁵⁰ As a Centre of Excellence in the area of product development, Kelkoo Norway might thus be expected to have strong links to Norwegian R&D environments. However, the facts bear out the expectations. As we have seen, the close contacts Zoomit initially had with the ICT milieu at the University in Oslo no longer exist. There may be many reasons for this development, but the takeover by Kelkoo seems to have implied a stronger orientation towards and reliance on intra-firm learning and cooperation. While this can be argued to limit any positive spill-over effects on external actors, interaction with other Kelkoo departments has greatly contributed to a strengthening of competencies and innovation capabilities in the former Zoomit.

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⁵⁰ see e.g. Rusten, Grete, Jakobsen, Stig-Erik and Kvinge, Torunn, *Foreign direct investments and regional effects: the case of Norway*, Working Paper no. 60/00, SNF - Foundation for Research in Economics and Business Administration, Bergen, 2000

The Norwegian pharmaceutical case: The Axis Shield Plc takeover of Nycomed Diagnostics

By Sverre Herstad

The Norwegian pharmaceutical industry

The pharmaceutical industry in Norway is made up of a relatively small number of companies who are predominantly foreign owned. Main operating areas include medical research, clinical testing, marketing and distribution, and a total of six companies carry out pharmaceutical manufacturing in the country. In 2003, the industry employed 4600 people - a number which has been relatively stable over the recent period.⁵¹

Of the 4600 people employed in the pharmaceutical industry in 2003, approximately 600 were engaged in research and development activities. In 2002, the industry's total R&D investments amounted to NOK 827,5 million (app. €100 mill) which represented an increase of 9,5 per cent from the previous year. If R&D investments are seen as a percentage share of total sales, Norway's performance is well below the European average - whereas the Norwegian pharmaceutical industry in recent years has invested approximately 10 per cent of total sales in R&D, the average for the industry in Europe as a whole is 20 per cent. The main explanation for Norway's relatively poorer performance, is that other European countries host larger R&D facilities and thus generate larger R&D investments.⁵²

While the Norwegian pharmaceutical industry is dominated by foreign owned companies, one of the largest actors in the industry was for a long time under national ownership. Nycomed, which was established as early as in 1874, remained a Norwegian controlled company until the merger with British Amersham in 1997. At the time of the merger, Nycomed was made up of two business units - the contrast fluid unit Nycomed AS and the pharmaceutical unit Nycomed Pharma AS. While the contrast fluid unit remained part of the new company Nycomed Amersham plc., Nycomed Pharma was sold off to the private equity firm Nordic Capital in 1999. As we shall see, this forms the background for the Norwegian pharmaceutical case study: The takeover of Nycomed Pharma's in-vitro diagnostics division by the UK based company Axis-Shield.

⁵¹ *Facts and figures 2004*, Oslo: The Norwegian Association of Pharmaceutical Manufacturers, 2004, electronic version, URL: http://www.lmi.no/digimaker/documents/T-F_04_LR_yxgy2a1951LR.pdf

⁵² *Facts and figures 2004*, Oslo: The Norwegian Association of Pharmaceutical Manufacturers, 2004, electronic version, URL: http://www.lmi.no/digimaker/documents/T-F_04_LR_yxgy2a1951LR.pdf; *Increase in Norwegian R&D expenditures*, article published on the web pages of the Norwegian Association of Pharmaceutical Manufacturers, 06.05.04, URL: http://www.lmi.no/dt_main_allatonce.asp?gid=109&aid=&tgid=&amid=17267&g109=x&g91=x

Introduction to the case

Prior to its 1997 merger with UK based Amersham International Plc Norwegian medical corporation Nycomed had three main business areas. Nycomed Pharma AS contained its pharmaceuticals and in vitro diagnostics areas, while Nycomed AS contained its in vivo imaging area. The latter in vivo – in the body – area develop and produce contrast fluids, and was in 2003 absorbed by US-based General Electric Medical Systems through its takeover of the remaining Nycomed Amersham system.

Perhaps less known is the case in question. The former Nycomed in vitro – in-the-glass – diagnostics (IVD) unit is now owned by UK-based Axis Shield Plc. In vitro refer to biochemical diagnostics systems conducted either centralised in laboratories or decentralised at the point-of-care (e.g. in doctors offices).

During the years prior to the takeover IVD served mainly as a cash flow machine for the Nycomed/Nycomed Amersham system, this based mainly on incremental improvements and sale of mature diagnostics products. Linkages between IVD and the remaining corporate system were few, weak and highly person-based; and whereas ideas concerning the development of new product lines gained some initial support by corporate management, financial backing proved difficult to obtain and key personnel felt frustrated as they saw their point-of-care oriented product line aging.

A part of this picture is perhaps the late 1990s perceived debt problem of Nycomed Amersham, and a strong post-merger strategic focus on secondary market pricing and boosting price/earnings ratios. Hence, when Nycomed Amersham in 1999 announced the sale of a majority stake in Nycomed Pharma⁵³ to Swedish based private equity firm Nordic Capital Group, key personnel contacted the new owner and suggested a separate sale of the unit. Nordic Capital Group agreed that the strategic fit between Pharma and in vitro was bordering on non-existing, and hence agreed on splitting Diagnostics from Pharma and sell the former separately.

Subsequent takeover negotiations included a few Norwegian financial actors, but the choice fell on Axis Shield as previous contacts suggested a strong strategic fit. Axis Shield Plc was created in a 1999 merger in the wake of a patent right dispute between UK based Shield Diagnostics and Norwegian Axis Biochemicals, the latter which had previously attempted to acquire the IVD unit from Nycomed. Shield Diagnostics constituted the financially largest unit in the Axis Shield merger. As a result, headquarters of the merged company was located at the Shield premises in Dundee, Scotland. At the time of the takeover the Axis Shield product line was mainly oriented towards centralised laboratory diagnostics, and the company wanted to expand its minor point-of-care portfolio. Axis Shield bought a 100% share of what was then labelled Nycomed Diagnostics,

⁵³ Nycomed Amersham initially retained a 30% ownership. The stated reasons for the sale was downpayment of debt, and focus on the defined core area of in vivo diagnostics (known as “Imaging”). The author has not been able to confirm whether this ownership position was taken over by General Electric after its 2003 purchase of Amersham.

created what we in the following will refer to as Axis Shield PoC and consequently gained access to the existing point-of-care product line of the latter.

As of 2004 Axis Shield Plc employ a staff exceeding 400. At the time of the Nycomed Pharma-Diagnostics split the latter had some 100 employees, and this has now increased to 165 in the Axis Shield PoC development and production unit alone. In addition, explorative research initially conducted within Nycomed Diagnostics is now conducted at the Norwegian part of the Axis Shield Corporate Research Unit at Ulven in Oslo, and sales functions transferred to the sales company Medinor that was acquired in 1999. These numbers thus underestimate the underlying employment growth.

From value extraction to radical innovation

Key PoC actors involved in the takeover negotiations did not attempt to conceal the long-term value-extraction strategic behaviour of its former owners, nor the resulting maturity of their existing product line. Hence, the takeover was negotiated with openness as to the need for radical product line renewal, and an immediate effect was the establishment of a point-of-care technology development programme.

Subsequent market and technology feasibility analysis resulted in the launch of the Afinion platform programme, with the following targeted characteristics: a) automated point-of-care diagnostics processing in order to eliminate the human error risk inherent in both centralised and decentralised manual processing, b) a common platform for a diagnostics range extending into some 20 different markers, and not least c) all based on cost-effective hardware maintainable at the most decentralised points-of-care (i.e. doctors offices) and safely usable by non-professional personnel (e.g. nurses). With this Axis Shield PoC departed from previous plans of re-engineering and developing the existing product line. The platform development phase of the programme is scheduled to be finished within 2004, with the planned launch of the Afinion hardware and four basic tests.

The programme involves accelerating core competence biochemical marker development and production, and extended into radical hardware and software development. Both Shield Diagnostics and Axis Biochemicals had previously mainly developed markers for distribution through laboratory equipment brand names such as Abbot, and the departure from this strategy hence involved large-scale outsourcing of development activities to specialised produces, mainly in Sweden. One respondent thus maintain that “...we employ a large number of people externally” through the Afinion programme.

Afinion is financed by retained earnings from the existing Axis Shield product line. In addition 100 million NOK was raised by equity issuance in Britain, mainly through institutional agent investments, in sum bringing the total product development investment up to 350 million NOK. This is significant when compared to a present annual PoC turnover of 200 million NOK. In 2003, point-of-care and hence Afinion accounted for 64% of total

Axis Shield research and development costs, while only generating 35% of corporate revenues. Whereas only approximately 1/3 of this is internal RD (the remaining 2/3 being conducted externally by contract hardware and software developers) it indicates a financial commitment to the Norwegian PoC unit that is highlighted by the ongoing substantial technological upgrading of the Central Oslo production lines. It is stated Axis Shield policy that research and development should focus on generating *patentable* innovations.

Corporate governance

Ownership as linkage to UK equity market

We have previously argued the need to understand the economic systems that parent companies emerges out of and the subsidiaries become linked to. In the following we follow Doremus et al (1998) in conceptualising foreign takeovers as a process where the *different* investment and innovation systems of different national economies become linked and interface. We thus start by noting that the UK corporate governance system has a distinct outside financial capital character⁵⁴ (Goergen and Renneboog 2001, Owens 2001) where judicial primacy is given solely to shareholders⁵⁵.

Prior to the Axis Shield merger the ownership and strategic control of Axis Diagnostics was dominated by Norwegian venture capitalists Terje Mikalsen and Tharald Brøvig, in addition to insiders such as original founder Erling Sundrehagen and CEO Svein Lien. Similarly, Shield Diagnostics had London-based Norwegian investor Petter Smedvig as its largest shareholder and board member. After the merger the original Axis shareholders were left with 43 per cent of the shares in the merged Axis Shield (Dagens Næringsliv February 2nd 1999), creating a company with fairly concentrated and co-ordinated ownership and remaining strategic control by non-UK insiders. In this respect, Axis Shield as newly established UK firm did not reflect the structure of fragmented market co-ordinated outsider ownership normally associated with the main UK corporate governance system, and hence cannot at this point be seen as an agent for such a system. However, the twin CEO structure initially established did result in tensions between what was then interpreted as distinct British and Norwegian management styles, and consequent

⁵⁴ Industrial ownership is dominated by institutional agents holding smaller stakes in many companies and exerting control over these only by 'entry' and 'exit' in the stock, and bank loans are mainly given as short-term (Scott 1997) with variable interest rates; this in opposition to other European countries such as Germany or Sweden where larger holdings by single owners are the rule rather than the exception, the debt/equity ratio is higher and bank loans are more long-term (Ehrman et al 2001) and often involve board representation by bank representatives.

⁵⁵ E.g. as opposite to Norway, employees have no legislated right to be represented at company boards.

dismissal of the Shield Diagnostics CEO and restructuring of the Shield unit organisation towards ‘lesser emphasis on finance and marketing’⁵⁶.

The large risk capital requirements of the planned Afinion programme necessitated equity issuance that diluted the holdings of the original main owners. According to our respondents, the raising of 100 million NOK in a non-targeted London issuance “...*could possibly have been done in Norway, but we doubt it. It was anyway surprisingly easy in the UK*” (our translation). The same respondents further state that “...*presence in Britain, and thus proximity to its large capital markets, where undoubtedly vital when we raised the capital*”, and continue to be vital as a means of nurturing their relationship to increasingly impatient investors. The largest present shareholder of Axis Shield Plc, London-based institutional agent⁵⁷ Framlington Investment Management Ltd, holds a 15% stake as of December 31st 2003, and there is now no contact between main shareholders and company besides official market information (i.e. press releases, quarterly and annual reports).

Qualitative comparative research on national corporate governance systems as well as quantitative financial system analysis support both statements by the respondent. The former research agenda highlight how outsider corporate governance systems show a bias towards stand-alone investment programmes that carries a promise of generating patentable, radical products and thus quasi-monopoly rents (Porter 1992, Aglietta and Breton 2001).

Based on this line of reasoning it is tempting to argue that this is a case of outsider system financial capital supporting a new technology by its constitution of actors focusing distinctly on holding smaller stakes in the project. Moreover, there is a perceived potential for generating leaps in secondary market pricing.

Availability of risk-willing equity capital is of course also a question of mere size of primary equity issuance markets as well as liquidity of secondary markets. The London equity issuance market is comparable with similar US markets, and thus notably larger than the main European markets of Frankfurt and Paris combined (see Seifert et al 2000 for detailed comparative quantitative data on financial markets).

The Nordic primary issuance markets as well as secondary trading markets are minor in comparison. Norwegian venture capital markets are of average OECD size, primarily through the existence of the government established, managed and recently privatised SND invest equity fund (Baygan 2003) as well as the still state-controlled Argentum fund-in-fund set up to assist private venture capital funds. The same markets are however portrayed as overly oriented towards traditional sectors, and characterised by lacking risk

⁵⁶ To the surprise of our respondents, employment in the research department of Shield Diagnostics was considered low-status and hence poorly paid, whereas administrative work or marketing functions was considered high status and hence much better paid. This was, according to one of the respondents who acted as a temporary head of research at Shield, something “...*we definetly had to turn upside down*”.

⁵⁷ An institutional agent is an investment company that invest on behalf of customers rather than itself, and hence is subjected to competition from other institutional agents.

willingness (ibid) in the non-public sphere, and Axis Shield PoC respondents explicitly state that they have not gained any support whatsoever from Norwegian public industrial policy tools. Hence, when respondent statements are interpreted against these qualitative and quantitative findings combined, we strengthen our argument that the ability of Axis Shield PoC to finance Afinion thus must be seen as a more probable outcome given British ownership than e.g. Norwegian ownership.

Having said this, respondents explicitly state that Axis Shield must achieve a positive result by the end of 2005, or be severely punished by the secondary equity market and risk a hostile takeover⁵⁸. Thus, the flip side of the UK based ownership and equity issuance coin is direct exposure to what some observers (Goergen and Renneboog 2001:185) has label the only real market for corporate control in Europe, and by one of the respondents characterised as “...*complete irrational in how they value what we do, which is something we must always keep in mind*”’. The long-term implications of this remains to be seen, and we now turn to focusing on mediators between Axis Shield and this market.

Mediating the linkages to UK corporate control

We have previously argued the importance of *strategic integration* as enabler of innovation. The concept links up to the insider-outsider distinction, and serve to illuminate to what extent corporate structure and strategy is defined by insiders with the necessary technological knowledge, firm-specific competences and leeway from secondary market fluctuations (Morgan 2002) needed to understand how actual allocation decisions influence firm organisational learning and innovative capacity⁵⁹ - and act accordingly.

An important and perhaps more or less defining characteristic of the British corporate governance system is fragmentation of ownership and a resulting unwillingness of individual owners to be exposed as insiders to the firm, i.e. as board members⁶⁰ (Owen 2001). This has resulted in a common

⁵⁸ It is important to distinguish between primary (issuance) and secondary (trading) equity markets. In the former equity capital is raised, while the latter merely exchange the rights to control over and returns from capital raised elsewhere. It thus often referred to as the “market for corporate control”, in that it in outsider based corporate governance systems, through the possible threat of a hostile takeover, is supposed to serve as the main disciplinary mechanism in the relationship between management and owners. Given the technological exposure of Axis Shield to the Afinion programme, and the financial exposure to institutional agents, a takeover is a likely outcome given failure and/or further significant delays in the former. The 2002 announcement of an expected delay in the programme e.g. resultet in an immediate share prize dip from NOK 40 til NOK 10. Secondary market pricing initiated takeovers, hostile or not, are fairly common in US and UK.

⁵⁹ I.e. strategic decision makers who, as both insiders and owners, may easily bridge the so-called “information gap” inherent in the relationship between outside owners, inside management and inside knowledge actors.

⁶⁰ Inside positions inhibit anonymous entry-exit in the stock. Further, a main motive for exposure to such positions is a wish to directly influence management, the costs of which are carried by the individual agent while the possible benefits are spread out on all shareholders. Hence, avoiding this free rider problem would entail larger shareholding in individual companies, in turn severely limiting the exit option

occurrence of inefficient boards (ibid, Georgen and Renneboog 2001), and consequent management autonomy from owners. This in turn imply that the alignment of manager and owner preferences are thus necessarily done through the market for corporate control, i.e. based on remuneration through stock option plans (carrot) and the threat of hostile takeovers (stick).

Consequently, as often emphasised, the system contains distinct disincentives towards long-term planning beyond what can fairly rapidly be positively discounted in secondary markets⁶¹. Axis Shield respondents thus state explicitly state that a major problem of now being a Plc is this tendency of the market to punish allocation decisions that, while producing short-term outcomes perceived negatively by outsiders, are sensible in the longer run, hence highlighting the importance of firm specific mediators between the company and this tendency.

As a result of such mediators the present Axis Shield Plc internal governance system emerge as somewhat in opposition to the general picture of the external UK system. The history of the company itself (i.e. both Axis and Shield had large insider-owners) implies limited experience with being exposed to the shareholder value logic of corporate control (Lazonick and O’Sullivan 2000), and the existing *specialist* management and board composition temporarily mediate if not contradict the common collective action outcome of the system.

This is stressed by the respondent who state that the initial Axis founder, now chief scientific officer of Axis Shield as well as shareholder⁶² and board member, serve a major “...*driving and co-ordinating function that has enabled long-term systematic planning*” (our translation). Respondents further stress that both the composition of the board and top management team represent a – in their own words – unique combination of all expertise relevant for running the company. Again the same respondents explicitly and continuously highlight the *firm and person specificities* of these characteristics.

Corporate and subsidiary organisational principles

Post takeover organisational change

In the Axis Shield case we find few indications of immediate post takeover major organizational change in the PoC unit. The unit had already established co-operative relations with the old Axis part, and apart from a transfer of sales and distribution activities to the Axis Shield sales company Medinor our respondents highlight incremental “organic” unit integration and specialization through an increasing corporate focus on both harnessing synergies and on enabling the different parts to focus on core competencies.

and thus contradicting the internal logic of the system as a whole. See Porter (1992) for a brilliant analysis of this collective action game.

⁶¹ Either as measurable results, or, as in the Axis Shield case, expectations of future results.

⁶² Based on the 2003 annual report the author has estimated that Sundrehagen holds a stable 1% share

R&D for the centralized diagnostics product market is increasingly transferred to the Shield unit in Dundee, while the old Axis and PoC units have been given sole responsibility for decentralized point-of-care.

An umbrella function is found in the newly established Corporate Research and Development unit, established as a means of enabling synergies between the PoC and Lab divisions by serving *knowledge exploration* (Nooteboom) and diffusion functions for both. This is again fairly decentralized with activities both at Ulven and Bodø (point-of-care research) in Norway and in Dundee (lab diagnostics research). In sum our respondents stress the importance of the interplay between *decentralized lean corporate structures*, unit focus on core competencies, the pre takeover linkages established between Nycomed Diagnostics and Axis, the bridging function of corporate RD and not least the relatively small size of Axis Shield – in itself implying lesser scope for bureaucracy and hierarchy.

An essential part of this picture is the cross subsidizing of point-of-care research enabled. Axis Shield plc has gambled years of corporate earnings on a radical product development program based in Norway, and thus reveal a high level of financial commitment (Lazonick and O'Sullivan 1998) that must be highlighted as a main explanatory variable behind brain gain in Norway.

Corporate learning interfaces and structure of knowledge

There are of course strong product market similarities between lab and point-of-care diagnostics, extending into technological complementarities at least at the basic research level. An immediate effect of the takeover was availability of complementary knowledge and functions from the Norwegian Axis unit, and hence a strengthening of functions Axis Shield PoC had not been able to develop within the Nycomed Amersham system. It is however generally far too often assumed (Attewell 1996) that a formal or perceived existence of potential synergies is necessarily realised as such, or merely a question of establishing suitable formal organisational structures.

In particular, divergences in experiences, routines and frames of reference will influence on what interfaces that are formed. For instance, Nooteboom (2000) highlight how knowledge transfers between units rest on cognitive complementarity between their respective core competencies; this as brain gain “...requires on the one hand sufficient cognitive distance to yield novelty, and on the other hand sufficient proximity to enable understanding” (ibid: 290). Axis Shield respondents thus explicitly state that a major enabler in creating technological synergies is found in how people “...think alike strategically, but based on a somewhat different organisational and technological experience-based frame of reference” (our translation). This in particular applies to the linkages created between PoC and the former Axis activities in Norway. Further, a mediating function bridging cognitive distance at the applied knowledge exploitation level of the case is found in the above-mentioned Corporate RD division, which take care of pre-lab or pre-poc application basic research, as well as post-application generalisation of what is initially specialised unit knowledge.

Hence, whereas the increasing unit cognitive focus that follows from national specialisations in Lab or PoC respectively in itself can be expected to increase cognitive distance, the corporate R&D function contribute to bridging it.

Biochemical marker development overlaps with a limited range of established academic disciplines, implying that knowledge bases are characterised by analytical rather than synthetical knowledge⁶³ (Laestadius 1998). Knowledge actors in Axis Shield as a whole can be expected to share a fairly similar educational background, and thus a common professional language (i.e. not solely tied to Axis Shield itself nor sub-units within it) with limited scope for misinterpretation of codes and verbal communication.

Hence, complementary to the approach of Nooteboom (2000) we could, -- based on the work of Alice Lam (1998, 2002) on organisational knowledge architectures -- argue that such “professionalism” ease knowledge transfers and communication within the corporate structure. One of our respondents thus highlights how “...we document everything thoroughly. In principle, given the right educational background and hence ability to understand this documentation, it is not difficult to understand what we are doing. You may say that some of our core developers have knowledge “sitting in their fingers”, but this is not the general rule” (our translation).

Another neglected dimension concerning intra MNE learning interfaces is the *administrative, supervisory and financial context* within which they may form. The Axis Shied case highlights how lacking competition enables the formation of learning interfaces. This is not surprising given a) the strategic fit perceived initially and motivating the takeover, b) the reorganisation into Corporate RD as umbrella for Lab and Poc respectively, and again not least c) the emphasis put on harnessing synergies by insider strategic decision makers.

Linkages between PoC and Corporate RD emerge as tight and reflexive, of course not least because original PoC personnel have been transferred to the Norwegian Corporate RD unit as a result of the establishment of the latter. Similarly, personnel for the original Axis unit mainly working on Lab diagnostics have developed, according to one respondent, tight connections with the Dundee unit, and hence serve as a linkage between Dundee and PoC due to their knowledge of and contact with the latter. Whereas our three respondents diverge in their interpretations of what has so far come out of these linkages, they reveal optimism as to their future role. One respondent actually stated that “*we have now finally come home ownership vice*” (our translation).

External learning interfaces

In the Axis Shield case a main source of new ideas concerning improvements of existing PoC products and possible new ones are users in

⁶³ Synthetical knowledge bases evolve when knowledge from different scientific and professional communities constitute the professional foundations of organisational learning.

the medical communities. Our respondents explicitly state that medical professionals often contact them. This contact, while stressed as important, however seems somewhat non-systematic. Again the argument of cognitive complementarity and analytical knowledge applies; there is distance to ensure novelty and proximity to ensure comprehensibility, and a common language by which the actors can communicate. Apart from such contact with medical communities our there seem to be little contact between PoC on the one side, and professional communities in Norway such as research institutions on the other.

This picture however cannot be seen as resulting from the takeover. The old Nycomed system contained, according to our respondents, most of the professional expertise relevant for the PoC unit and represented “...*a university in itself, a unique scientific community which is now completely fragmented*”.

Further, Axis Biochemicals was established as a result of the lack of relevant domestic employment opportunities of the original founder and biochemical researcher, who then worked as a doctor. The latter respondent characterizes present Norwegian biochemical university research as fragmented, and while opening up for the possibility of Axis itself being partly to blame, he states that no significant knowledge has come out of such contacts.

An indirect and seemingly unintended outcome of Norwegian university biochemical research is however ‘...*the inability of universities to give professorships to good researchers, who we then can employ*’. Hence, initial isolation within the Nycomed system could have been compensated by establishing contacts with research institutions abroad.

A consequence of the takeover is however contact, indirectly through the Shield unit and the interfaces analyzed above, with the Scottish universities in particular. These were characterized by our technology respondent as of a “very high quality”. The same respondent reveals that important development projects have sprung out of these linkages, and that some of these contain the prospect of producing tests for the Afinion platform.

External learning interfaces related to specialized suppliers are continuously stressed as important in the literature on innovation systems. However, inputs to the core processes of both Axis Shield and its PoC unit are mainly generic chemicals bought of-the-shelf, and hence such linkages are few and bordering on non-existing, apart from one important exception: As the Afinion development program include software and hardware development, linkages to specialized suppliers have been established and one respondent maintain that “...*we have a large number of people working for us*” through external contract development. Evidence on how this works as learning interface is limited; but we do however have some indications that these relationships are fairly linear and characterized by modularity based on PoC pre-specified requirement. Hence we expect that externalities from these are limited mainly to brain gain seen from the part of the suppliers in Sweden.

Assessing the brain drain versus brain gain question

The Axis Shield takeover of Nycomed Diagnostics undoubtedly represents a case of major technological upgrading in the wake of a foreign takeover. This can be argued both based on the lacking strategic fit with and financial commitment by the old Nycomed/Nycomed Amersham system, as well as the resulting strong strategic fit with Axis Shield.

First, by using comparative evidence from corporate governance and financial system analyses we can, as argued above, strengthen the respondent's statement that financing of the Afinion programme was enabled by contact with and proximity to financial markets of a certain size and with certain characteristics. Such markets are positively found in the UK; and positively not (both size of issuance markets, as well as the distinct financial capital characteristics) in Norway.

Furthermore, given the transparency of this rather specialised product market, both internationally but in particular domestically, we feel that it is safe to conclude that neither the level of strategic fit produced by the Axis Shield takeover nor in-house financing by a domestic actor can be considered a likely counterfactual outcome.

Second; the launch of Afinion undoubtedly represented both a major technological upgrading of the PoC unit, and will possibly open vast new markets and hence generate returns that can be fed back to the Axis Shield system. Whereas the latter remains to be seen, the share increase in RD activities as well as number of employees (even when excluding those transferred to Corporate RD) leaves no doubt that brain gain has occurred on a significant scale.

Third, the Axis Shield structure itself is fairly immature. Still, our respondents highlight foreign ownership induced linkages to professional communities outside Norway (i.e. mainly Universities in Scotland), and that these linkages already has led to new Afinion platform products being in the development pipeline.

To this can be added the restructuring towards unit product market focus, and the following personal linkages between the Axis and Shield units. These are a result of their focus on decentralised and centralised diagnostics respectively. Hence, also in this respect we are forced to conclude that brain gain is resulting from a *foreign* takeover, and that initial positive experiences with such linkages, within an administrative, supervisory and financial context promoting such linkages, is likely to result in them deepening.

Forth, quantitatively speaking synergies within the Axis Shield structure remain fairly national, initially related to Axis – PoC linkages and now related to PoC – Corporate RD linkages (i.e. the Norwegian part of the latter). Hence the role of foreign ownership as enabler of linkages abroad should not be exaggerated.

Last but not least we conclude by agreeing that the case in question can be criticised as empirically being non-representative of a foreign takeover in

general, and a British plc takeover in particular. Both our respondents explicitly state this point throughout the interviews, and the case thus serve to illustrate the potential variety of foreign owner firms and again the difficulties inherent in attempting to make empirical generalisations as to the brain drain versus brain gain question. We hence stress the *temporary* – or transitive (Bhaskar 1978, 1979) - character of present outcome of the Axis Shield takeover of Nycomed Diagnostics; and have above raised questions of both increasing brain gain as a result of increasing cross-unit integration, as well as the possible future post-Afinion launch role of British corporate governance in defining the prospects and limits to future growth and domestic brain-gain.

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Company cases Sweden

The Swedish software case: Internet AB

By Hans De Geer, Tommy Borglund and Magnus Frostenson

Introduction and methodology

The question about innovation and knowledge in multinational firms can be highlighted in different ways. This case study focuses on the consequences of the cross-border acquisition of the Swedish firm Internet AB by Deutschnet GmbH, a German competitor. The purpose is to illustrate the problem of innovation and knowledge development, accumulation and maintenance in a cross-border acquisition. The empirical material has been collected mainly through semi-structured interviews, but also through documents and observations on a longitudinal basis. The research is qualitative rather than quantitative. In particular, cultural aspects have been of interest since these are likely to have consequences for the milieu of innovation and learning. The internationalized context is also highlighted since it provides a key to understanding the fate of Internet AB.

Background

German acquisitions in Sweden

Out of the many foreign acquisitions of Swedish companies in recent years, German buyers are among the most common ones. Hence, German companies play an increasingly important role as owners of Swedish companies. In 2002 15 percent of the foreign investments in Sweden were made by German companies, making German firms the second largest investors in Sweden after American companies. About 39 800 Swedes worked in 770 German owned companies in Sweden 2002, compared to 1990 when 11 900 Swedes worked in 220 German owned companies.

When it comes to foreign owned IT companies, the pattern is somewhat different. Foreign owned IT companies have played a less important role in Sweden the latest years. Between 2002 and 2003 about 10 000 jobs were lost in foreign owned IT companies. About 2000 of those jobs were lost in German owned IT companies in Sweden. However, the percentage of employees in foreign owned IT companies in the IT industry has been pretty stable, close to 30 percent. Hence, the jobs lost are probably due to the problems in the industry, not so much that foreign investors have lost their interest in Swedish IT-companies.

Nature of the firm

Internet AB was founded in Stockholm in 1994 by two private entrepreneurs. The firm's main focus was on Internet consulting, a direction that the firm took in the mid-1990ies after starting its business as a developer of various multimedia products. As times passed, its business was expanded to include technical engineering and IT-solutions and more general consultancy services within management and strategy. As many other Internet consultants, the firm had special competence within general web design. But new market demands forced the firm to acquire new skill in order to satisfy customers' needs. Offering back-office solutions, middleware, web showrooms and interfaces became necessary. The customer base was a mix between well-known, mainly Swedish, multinationals and newly established e-trade firms.

Internet AB was acquired by a Deutschnet GmbH in late 1999. At the time, Deutschnet GmbH had about three times as many employees as Internet AB and was highly valued on the German stock market. The purchase was followed up a few months later when Deutschnet GmbH bought another Swedish IT consultancy firm, Tech AB, which had a more explicit technical focus, and integrated it into the local organisation.

Development since takeover

Internet AB was small seen in a wider perspective. Around 70 people worked within the organisation at the time of the takeover. Sales had been surging for a few years and the firm had experienced a substantial increase in its turnover, which was now approaching a level of around 50 million SEK a year.

After the acquisition took place, there was a substantial focus on growth and expansion. A new business unit was established in a town in the western part of Sweden, and the number of Swedish employees rose by around 50% when Tech AB was purchased a few months after the takeover. Great plans were made for expansion via new business units around Scandinavia. More people were hired and the number of Swedish employees approached 150 in the middle of 2000.

But after the burst of the Internet bubble in 2000, business conditions got worse. Cut-downs and rationalizations became a reality in late 2000 and early 2001. The office in western Sweden was shut down without having attracted any customers at all, and the number of staff was reduced by almost 40% through different measures during these months. Things got even worse in 2001 when both Deutschnet GmbH and Internet AB suffered heavy losses.

Of course, one reason for this was the general downturn in the industry. For the Internet consultants, one major cause of the worsened business conditions was the demise of the e-trade firms, which constituted a very important group of customers that no longer were able to place orders or pay their bills. To a certain extent this was a reality for Internet AB too. But

since many customers were established and sound multinationals, this wasn't decisive. Other factors contributed. Costs were high, as was price competition in order to attract customers. Another reason was that customers developed their own competence and were able to carry out tasks using their own staff rather than assigning them to consultants. In sum, Internet AB faced a severe crisis. Especially its liquidity was bad, and Deutschnet GmbH had to support it financially until the bitter end.

The sound part of the Swedish business was Tech AB, the firm that was acquired in the second phase. In the summer of 2001, the mother-company Deutschnet GmbH went bankrupt, followed by the financial collapse of Internet AB a few days afterwards. As the Swedish business was reconstructed after the bankruptcy, the technicians and IT specialists of Tech AB, who were organized as an own unit within the Swedish group, continued their business by establishing a new firm. A few of the old Internet consultants in the collapsed Internet AB also started up anew, handpicking old colleagues to go on in a new setting, although with less emphasis on the Internet. They also retook the old name of the firm, removing the prefix "Deutsch", which had been imposed on all firms that were integrated into the German group.

Overlap and reasons for the takeover

In 1999 there was a distinct trend among Internet companies to take part in the structural changes in the Internet industry. There were several mergers and acquisitions between different actors in the industry, both national and international. It was almost a race among many Internet companies to reach a substantial size since that was considered to be a competitive advantage and something that was rewarded by the stock market.

Internet AB also had an interest in growth and the company wanted to become a big player in the European Internet industry. This was reflected in the Swedish founder's eagerness to be a part of something bigger. "We could have bought several smaller companies but it would have taken too long time. We would like to grow in one step since it is a hurry to build a network", he said in an interview in a newspaper.

However, since Internet AB lacked financial resources enough to buy other companies, its owners chose to be acquired by Deutschnet GmbH. The shareholders of Internet AB, mainly the founder and an investment company, decided to merge with Deutschnet GmbH by switching shares, thereby becoming minority owners in the new company. In the short run this was very successful for the shareholders since the share price of the new company rose sharply shortly after the acquisition.

Less than a year before the acquisition another competing Swedish Internet Company was negotiating to buy Deutschnet GmbH. That deal broke down since the parties could not agree on the terms. The Swedish competitor started to look for other companies to buy instead. Deutschnet GmbH was listed on the stock market, which gave the company a high market value and a higher potential to acquire companies by switching shares. Deutschnet

GmbH wanted to grow by buying other firms. Since the company had made an IPO over the stock market they had financial resources and a high market value to make acquisitions. They wanted to buy medium sized companies with good product quality on new markets. Internet AB complemented them geographically and since its shareholders were willing to trade their shares for shares in Deutschnet GmbH the two parties reached an agreement.

Internet AB and Deutschnet GmbH were essentially in the same line of business, with core competence within communication and web design. The basic rationale of the deal was to unite a firm from one of Europe's most developed markets with one from the biggest market of the continent, the German one. Deutschnet GmbH communicated a long-term engagement and an interest in product and service quality, management competence and in entering new markets.

The target firm was not allowed to be too big to handle. As the protagonists of the two firms asserted, they had a common interest in expanding their businesses both geographically and substantially, through developing or going into areas such as management consulting, customer relationship management and technical assistance. This meant that a wholesale concept was introduced, replacing the old focus on communication and design. Structurally, this would be achieved through acquisitions and organic growth, the latter of which was emphasised. Within the group, separate firms should be established, specializing in their distinct competence areas.

Impacts of takeover within the acquired firm

Initial changes

Initially there were some smaller changes for Internet AB stemming from the acquisition. Primarily, new systems were introduced for control and planning. There was a change of business system to SAP which was used by Deutschnet GmbH. SAP is a business system made for use in big companies and integrates several functions such as accounting and planning of projects.

Internet AB now had to work with that kind of big system which included new ways of measuring the number of orders received, as well as new systems for documenting the time used for different projects. It was a way of measuring productivity which had not been done before. Through these systems there was a higher focus on planning and what was to happen in the nearest future. The planning had to be realistic since it was used to make prognoses that were to be communicated to the stock market.

This resulted in a bigger workload of administration for project leaders and others who were to gather and send information through these new systems. People felt that things took a little longer time to do because of to this extra administration. There was also a change in the branding of the company. The name of Internet AB was not to be used anymore and the Deutschnet GmbH brand was introduced in the Swedish organisation. The new logotype was printed on for example business cards, pencils and brochures.

Internet AB had a fairly weak position within the new company. The founder of Internet AB had a place in the board of directors. He was made a senior executive with responsibility of a big geographical market where Sweden was one part. Internet AB did not have much influence on the general international operations. It represented about 10-15 percent of the overall size of the Deutschnet GmbH. The new owners were almost invisible for Swedish employees. There were some formal contacts with headquarters through the sending of information and reports in the new IT-systems but there was not much informal contact. The CEO of Deutschnet GmbH visited Sweden a couple of times to meet the employees, but the general impression was that he was on a big distance from them, communicating visions of small concern to them.

In the beginning Deutschnet GmbH invested resources in Internet AB, especially in new IT systems and in the new corporate brand. Efforts to increase quality and stability were made, resulting in higher costs for administrative routines. New offices were opened, one in a better and more expensive address in Stockholm and one in the western part of Sweden. But over time there were smaller and smaller resources available for the Swedish part of Deutschnet GmbH. That was mostly due to the worsening business conditions with lower demand for Internet consultancy services and the falling share prices on Internet stocks. Big cutbacks in budgets and personnel were enforced on the organisation by the new owners.

Knowledge transfer and role of own R&D

Being a small firm with a very strong focus on growth, research and development activities were not undertaken in isolation from customer related projects. Rather, these relationships were tightly linked to innovation and creativity, which was spurred by working actively in close co-operation with customers in order to find solutions to their problems. This means that innovation in general could be seen as strongly linked to what the firm perceived to be the needs of its customers.

Just like many other Internet firms, Internet AB benefited from the knowledge advantage they had in comparison to many of its customers, a competitive advantage that seems to have diminished as time went by. Being an edge player, ahead of the customers' own learning processes and increased possibilities to resolve their own problems, required ongoing knowledge accumulation, which was difficult to attain within the prevailing structures of the firm. In practice, transfer of knowledge from Internet AB to its customers took place and little was received in return.

Work was organised loosely in projects, and this also had a bearing on how and in what way development of the firm's products and services took place. Much was done on an ad hoc basis. Knowledge development was essentially tied to individual participation in different projects, and this participation was not evenly distributed. Some persons were engaged in more projects than others, often due to good relations to the management of the firm. Being active and taking initiatives were prerequisites for working in prestige projects.

The steady growth in the number of employees, which lasted until the summer of 2000, caused problems. Assertedly, lots of people joined the firm without having the requisite competencies for doing high-quality work. The growth focus fuelled an aggressive hiring policy. Certain people were employed without their references being checked at all. Lots of people were in their early twenties, and most of the management just under thirty years of age. All this meant that the firm was filled with enthusiastic employees, but also that it lacked experienced staff.

After the purchase the need for more advanced technology made itself known. This was in line with a broader business concept including more all-embracing solutions to customers in order to qualify as a full-service provider. However, Internet AB's competence within this area was rather low, and Deutschnet GmbH did not add much to it. To many Swedes, it seemed evident that Deutschnet did not possess these technical skills at all. And even if they did, knowledge transfer was so scarce that Internet AB couldn't benefit from it anyway.

Because of the need for technical knowledge, and in line with a growth strategy and an idea about local presence, Tech AB was bought in early 2000. Integration was tough, however, and some of the newly purchased firm's senior consultants left immediately. When the business conditions worsened, the technicians were to a great extent spared when rationalizations were made. As Deutschnet GmbH went bankrupt, the founders of Tech AB started up a new business, handpicking a few of the old colleagues to join them.

From the Swedish perspective, there were strong hopes about knowledge interaction and transfer when the purchase was made official. However, much of this came to nought. Deutschnet GmbH was seen as passive and the Swedes' business went on more or less as before. No new business model emanating from Deutschnet GmbH was introduced, contrary to what Internet AB had hoped for. Knowledge transfer didn't occur in any direction, at least not in a formalized way. Top management interaction was scarce. And although middle management took part in meetings in Sweden, relatively little came out of it. Knowledge exchange was more up to individual initiatives rather than a strategical choice.

One senior manager of Internet AB typically remarked that the knowledge transfer from the mature Swedish market to the big German market did not consist of more than passing on a few logotypes of Swedish customers to Deutschnet GmbH. Some Swedes were engaged in projects initiated by the Germans, but this was mostly in order to make use of Swedish competence in international projects.

Co-operation model of acquired firm prior to and after takeover

A basic feature of the business that Internet AB ran was ad hoc projects combined with a customer oriented organisational structure. When Deutschnet GmbH entered the scene, project groups tended to become much larger, and each member got a more specialized function than before. A new

divisional organisation was also introduced, and competence groups were initiated, consisting of people with the same type of knowledge and tasks. Within the Swedish organisation, designers, sales people, key account managers and technical developers formed such groups that were meant to contribute to knowledge diffusion based on experiences. Art directors, copywriters and others welcomed this change, since they had a special need for working together to achieve a creative climate. These groups, however, were established at a rather late stage when things were already getting worse financially, meaning that they never were able to make much difference from a business point of view.

In the nature of Internet consultancy lays a rather close relationship to the customer. But this, however, was not necessarily a characteristic that was explicitly appreciated by employees of the firm. Having fun, working late nights and making use of creative potential were in many eyes the lodestars of the business rather than adhering strictly to customer specifications and needs. A characteristic that can be seen as an expression of this was the fact that the work that Internet AB performed was undertaken in its own Stockholm offices. That is, physical presence at customers' premises was not deemed necessary.

To some extent this changed as the financial realities made themselves known after the takeover. Work processes were shaped up and became subject to control and harder scrutiny. The new profitability focus reduced the room for creativity. Going from being a small firm to an internationalized and bigger one affected the work climate. Not only Deutschnet GmbH had to tackle integration issues when they bought the Swedish firm. Internet AB too had to deal with a local situation of growth and integration of the newly bought Tech AB. More space was needed. A physical separation of the units became reality, with one office that constituted the public showroom and where the management sat, and another one on a somewhat less fancy address, where much of the production took place.

In the beginning many people in Internet AB had a feeling of being left alone, a fact that many employees didn't regret. The CEO of Deutschnet GmbH came to Sweden two or three times but never spent more than a couple of hours here each time. The short visits mainly consisted of discussions with the Swedish senior management and press conferences. German middle management came over more often, but co-operation in its real essence only took place in certain project groups that were put together across borders.

Factors hampering innovation activity in the acquired firm

In an Internet consultancy firm at the turn of the Millennium, innovation was strongly linked to creativity rather than profitability. The atmosphere was marked by entrepreneurial enthusiasm and the common go-ahead-spirit that characterized the so called "new economy". Basically, this cultural phenomenon was borne by the in-group of the firm, consisting of people who had been involved in founding it or that enjoyed status for some other

reason. Due to the rapid expansion of the number of employees, other categories came into the firm without immediate access to the cultural bearers' inner circle.

As the firm grew, the division between these groups became more evident. The "playground" atmosphere that prevailed before the takeover was to a great extent the product of the preferences and attitudes of the cultural bearers. This resulted in innovative, although not necessarily profitable, solutions. However, the "playground" epoch came to an end when Deutschnet GmbH entered the scene. This was mainly due to a stronger profitability focus and the need for control, which the new SAP system facilitated. The aim was to steer processes and to pave the way for growth. The introduction of the system was, however, a severe blow to creativity, according to the interviewed co-workers, since a control focus replaced the relative creative freedom that once used to be the hallmark of the business.

There were visible signs indicating that the creative and innovative era had come to an end. In a sector marked by entrepreneurs and creative solutions, competitions like "the Web Campaign of the Month" played an important role. Internet AB had won several awards for their innovative solutions, but after the purchase this was no longer the case. Even though it wasn't intended, idea generation seems to have been curtailed within the new structure. Deutschnet GmbH was not directly blamed for this. Increased size and more routines were mentioned as the problem, but more in a general sense than as something that Deutschnet GmbH could be accused of. Whatever the cause, efficiency and fervour faded, with lower quality as a consequence.

There was a new rigour in the business, which was ambiguously perceived. To some, it was equated with stability and safety while others saw it as the cause of lost of creativity, entrepreneurial spirit and family feeling. Financial facts also spoke for themselves. The profit-and-loss-account suggested that there were no possibilities to keep employees that were not pulling their weight. A strong business focus took over due to the economic realities, which was to some extent detrimental to the "hype factor".

Key personnel's commitment to acquired firm after the takeover

Commitment was to some extent structurally assumed in the financial arrangements following the purchase. The protagonist among the founders of the firm received shares in Deutschnet GmbH as the main compensation for selling his part of the firm. Others, belonging to the same circle as the remaining founder, were tied up by a stock option plan, which contained a lock-in paragraph hindering key personnel from capitalizing their options before a certain date. This program, however, existed before Deutschnet GmbH came in and caused irritation, since the new owners did not make use of this kind of motivational instruments.

In general, the old management team of Internet AB pulled out, not immediately, but in the process following the purchase. The entrepreneurs that personified the firm, both internally and externally, left or lowered their

ambitions. A sense of lost identity took over, removing the earlier enthusiasm of the in-group of the firm. A new management came in, replacing the old one. But there were clouds in the sky. Many old managers left, reportedly in protest against the new direction that the business took. Out of those who stayed, many went back to positions related to sales and project managing, which signified a confusion of roles. These people were still bearers of culture, but with less formal power than before. A vacuum could be felt.

Connections to local innovation environment and resource base

There was only a small significance of the local and national resource base for Internet AB. It did not receive any direct incentives or support from the local community. Regarding the approach to national R&D and innovation policy measures, there was little such interest from the company. The development of the company was very much driven by the market for Internet services. On the other hand, it had the advantage of being in an Internet cluster in Stockholm together with other Internet companies. It also had the advantage of good infrastructure when it comes to IT- and telecom systems, which is crucial for the Internet industry.

The magazine Newsweek wrote about the emergence of an IT and Internet cluster in Stockholm and mentioned several factors which can be said to have contributed to a good innovation environment. In Stockholm there was the technical campus in Kista with many smaller high tech IT companies and the presence of Ericsson and their development of wireless Internet services. Other factors were the availability of telecommunications at a low cost and that the universities had made early investments in Internet connections. IT consultancy firms had a tradition of being in the Stockholm area since the 1980-ies and many Swedes had personal computers in their homes since purchases of computers to employees were tax deductible for companies (Fölster 2000). This made Stockholm to an important test market for products and services relating to the Internet and a good environment for start up businesses.

The takeover resulted in negative consequences for Internet AB and for the surrounding innovation environment, at least in the sense that the company went out of business in the end. The weak finances of Deutschnet GmbH brought down also Internet AB, which, however, would probably have gone bankrupt anyway, even if it had not been acquired. Internet AB was affected of the general slowdown in the industry in Stockholm, Sweden and Europe. This was a slowdown that eventually turned out to be much more than a slowdown. It was more or less a downright collapse of the entire Internet industry, where values of the companies fell sharply on the stock market and where many of the stars in the industry went out of business. The corollary of this was a general distrust of the whole sector.

The failure described in this case study was a consequence of the collapse of the industry. In a way it contributed to a development that made Stockholm lose its leading position as a cluster for Internet companies. By

understanding this case you can also understand the failure of the whole industry and its effects on the innovation environment. Even though in the beginning there was no big importance of national R&D and innovation policy measures, the question is if such measures could have had a role to play when things got out of hand in the company and in the industry. Was there anything that could have been done in form of innovation policy and support to keep the competence and the innovations to survive? This is a topic for discussion, in particular as we bear in mind that other Internet related companies like Yahoo and Google survived the crisis and became international giants.

However, the innovations and knowledge coming from this venture were not totally destroyed by the collapse. They survived in areas such as web design, technical platforms, strategy concepts and business models. One start-up under the name Internet AB emerged after the bankruptcy using personnel from the former Internet AB and their knowledge about web design. In addition, Tech AB started up again using the knowledge about the technical platforms.

In general, many of the customers in the industry started to do their own in-house web design, building on the basis of knowledge they had obtained from working together with Internet consultancy firms. Some former customers hired people from Internet consultancy firms. Traditional IT-companies integrated Internet solutions in their management consultancy services, as did management consultancy firms. Hence, innovations from Internet AB to some extent survived and were transferred to customers, competitors and to new start ups.

In connection to the Internet industry and to the concept of the “New Economy” innovations in the form of new ways of organising emerged. Speed, individualism, risk, change and the search for new possibilities became new norms in organisations (Holmberg & Strannegård 2002). People were described as being flexible, working in networks where the individual had made a business of himself, the Me Inc. Organisations were supposed to be connected in alliances and networks in a market of self-organising individuals. There was a discussion of the revival of the entrepreneur and a higher status for people starting to build their own company (Fölster 2000). This way of looking at the world belongs to the discourse of the “New Economy” which Internet AB also was a part of. It is a way of thinking which in one interpretation can be seen as innovative and as something which probably to some extent have survived the crash of the Internet industry. Signs of that are that entrepreneurs from crashed Internet companies have been reported in media to work in other start-ups building on network organising.

Conclusions

The takeover initially introduced new planning systems and new administrative routines in an attempt to boost quality and professionalism. Some perceived this as causing stability and safety while others saw it as damaging to the creativity, entrepreneurial spirit and family feeling of the

firm. There was a change of power when insiders and early employees over time left the company without the emergence of any new bearers of culture and identity. The takeover did not bring very much of technical or design innovations to the Internet AB and the new owners were on a distance from the Swedish organisation due to a lack of integration processes. As times got worse not much was done to live up to initial visions of expanding the markets and developing new products. Soon the survival of the firm became the number one priority when demand fell and stock markets crashed. Big cutbacks were made in budgets and personnel.

The weaknesses in the firm were the lack of order and routines, the dependence on the founder and the inner circle around him, later resulting in a leadership vacuum together with a too rapid expansion and too much optimism about the own capacities and the market potential. What is striking is the fragile nature of Internet AB. It lacked any systems of building and accumulating knowledge inside the company, systems that would have made the company stronger in difficult times. This case study shows the importance of having an internal organisation for fostering knowledge and learning which can build quality over time.

The merger between the organisations became very hard to handle for the inexperienced organisation, especially without these systems of keeping knowledge in the organisation. There was a lack of integration processes and efforts to make the organisations work together. Instead many of the most experienced left the company complaining over a lack of creativity. Those were the people that would have been needed to transform the company in difficult times.

In addition, the “hype” of the “New Economy” seems to have made it difficult for management and others to have a realistic view of the future. There were collective misjudgements made in the name of the “New Economy”. The rationalities constructed within this discourse might be seen as a knowledge bubble with unrealistic expectations building on false theories. The “hype” in itself blindfolded the entrepreneurs.

The strength was the local network of customers that the firm worked with and the creativity and innovation that the company developed in co-operation with the customers. Unfortunately the difficulties in the market became too much to handle. The company was too small and weak to cope with the difficulties itself. It needed strong support from a mother company that wasn't able to uphold it for a longer time.

The “hype factor” was a major characteristic of the work climate for a long time. But when the advantage of newness disappeared and the march from small and personal to big and impersonal was on its way, the glamour of the firm faded away. But in the end some of its achievements lived on, since some of its innovations were transferred to the surrounding environment in the form of new start-ups and knowledge transfer to customers and others.

In general, innovations in the industry as for example new ways of organising lived on as a part of a mindset of a new generation of co-workers and entrepreneurs. Although emanating from a financial failure, seeds of

innovation coming from Internet AB can be said to have lived on in the surrounding business environment. The seeds of innovation were spread to customers, competitors and to new start-ups.

Policy perspectives

When it comes to policy recommendations from this case study, you can ask if anything could have been done to prevent Internet AB from going bankrupt as a part of the bankruptcy of Deutschnet. You can also ask what anyone should do if an important cluster is on the way of going under due to bad business conditions.

Should governmental or any other bodies try to interfere to keep the cluster alive or help to save innovations from the cluster to survive in other forms?

Maybe this can be done together with venture capitalists, where companies in a threatened cluster are restructured, building a new business on their technical innovation? Many would answer no to these questions, referring to a history of failed industrial policy of supporting, for example, industries like shipbuilding. However, this should be a topic for discussion.

The Swedish pharmaceutical case: The merger between Astra and Zeneca. Impacts on R&D activities in Sweden

By Katarina Arbin

The Swedish Pharmaceutical Industry

According to Swedish statistics, enterprises have increased their global presence in the 1990's and early 2000's. The value of takeovers in Sweden reached a unique high level in 1999, which can mainly be explained by two big mergers and acquisitions (AstraZeneca and Volvo Cars).⁶⁴ The year 2003 about 235 000 were employed in the manufacturing industry, predominately in the manufacturing of vehicles and chemicals, for foreign controlled enterprises in Sweden.⁶⁵ In the pharmaceutical industry, 88 per cent were employed in foreign controlled enterprises.⁶⁶

The market size for pharmaceuticals has increased continuously over the years. Comparing pharmaceutical sales in 1980, 1998 and 2003, there has been an increase in sales. The total pharmaceutical sales for Sweden in 1980 was 2 445 MSEK, compared with, 16 572 MSEK in 1998, and 23 689 MSEK in 2003. In 2004 the total pharmaceutical sales in Sweden amount to 23 761 MSEK^{67 68}.

Sweden's export of pharmaceuticals in 2003 was 49 382 MSEK, total export to EU was 25 013 MSEK. Sweden's import of pharmaceuticals 2003 was 11 550 MSEK. The majority of this import came from the following countries; Denmark (16,6%), Germany (11,3%), Belgium (10,4%), Switzerland (10,3%) and Great Britain (9,5%).

Even though sales are increasing, the pharmaceutical sector is experiencing increased pricing pressure and a more competitive business environment. In order to come up with new pharmaceuticals, large investments over time in research and development are needed, resulting in, compared to before, very large investment costs in order to develop and improve pharmaceuticals.⁶⁹ The research and development cost for a new medicine has increased from 1677 MSEK⁷⁰ 1991 to 5825 MSEK⁷¹ 2001.⁷²

⁶⁴ UNCTAD, World Investment Report based on data from Financial Corporation and compiled by ITPS.

⁶⁵ ITPS, International Business.

⁶⁶ ITPS, International Business.

⁶⁷ The figure for 2004 is moving annual total (July-June).

⁶⁸ The Swedish Association of the Pharmaceutical Industry, the trade association for the pharmaceutical industry in Sweden.

⁶⁹ Interview with project manager at AstraZeneca Södertälje, December 2003.

⁷⁰ The figures are converted from USD into SEK. 1 USD = 7,26 SEK.

⁷¹ The figures are converted from USD into SEK. 1 USD = 7,26 SEK.

Looking at figures regarding current costs and capital investments for R&D in certain Swedish industries of manufacturing, pharmaceuticals can be compared to other industries. For pharmaceuticals, current costs are estimated to 11 932 MSEK and investment expenditures to 662 MSEK, summing up to a total of 12 594 MSEK. For telecommunication equipment current costs are estimated to 15 628 MSEK and investment expenditures to 844 MSEK, reaching a total of 16 472 MSEK. Pulp and paper products have current costs at 949 MSEK, and investment expenditures at 55 MSEK.⁷³

When comparing research and development intensity in certain Swedish industries of manufacturing for 2001, R&D expenditures in % of total turnover was 26,7% for pharmaceuticals, which is much higher than, compared to telecommunication equipment (10,8 %), paper products (1,0%) and food products (0,3%).⁷⁴

In order to give insights into the significance of the pharmaceutical industry, from a national point of view a presentation of figures regarding health care costs are given. Health care costs in Sweden as percentage of GDP, is 8,2% (199 Billions SEK). Pharmaceutical sales accounts for 14% of those 8,2%, as percentage of health care costs.⁷⁵

Sales in Sweden by the 10 largest pharmaceutical companies in 2004 can be seen in figure 1 below. The figures in figure 1, are moving annual total (MAT), September (2003) to August (2004).

Table 9 Sales in Sweden by the 10 largest pharmaceutical groups of companies 2004.⁷⁶

Pharmaceutical group	MAT ⁷⁷ , MSEK, 2004	% of total MAT, 2004
PFIZER	3 344	14,0
ASTRAZENECA	2 106	8,8
GLAXOSMITHKLINE	1 303	4,4
NOVARTIS	1 018	4,3
ORIFARM	990	4,1
WYETH LEDERLE	912	3,8
MSD	861	3,6
AVENTIS PHARMA	842	3,5
ROCHE	760	3,2
SCHERING-PLOUGH	672	2,8

⁷² EFPIA (The European Federation of Pharmaceutical Industries and Associations) (represents the research-based pharmaceutical industry operating in Europe).

⁷³ The Swedish Association of the Pharmaceutical Industry and Statistics Sweden.

⁷⁴ The Swedish Association of the Pharmaceutical Industry and Statistics Sweden.

⁷⁵ Statistics Sweden and the Swedish pharmacy chain Apoteket AB.

⁷⁶ The Swedish Association of the Pharmaceutical Industry, the trade association for the pharmaceutical industry in Sweden.

⁷⁷ Moving Annual Total, From September 2003 to August 2004.

As can be seen in the figure above Pfizer is the pharmaceutical group that has the largest sales on the Swedish market, second is AstraZeneca with sales on 2 106 MSEK.

Below in figure 2, large mergers and acquisitions within the international pharmaceutical industry are presented.

Table 10 Large mergers and acquisitions within the pharmaceutical industry since 1990.⁷⁸

Year	Companies	New name
2004	Sanofi-Synthélabo + Aventis	Sanofi-Aventis
2003	Pfizer + Pharmacia	Pfizer
2001	BASF Pharma/Knoll + Abbott	Abbott
2001	Glaxo Wellcome + SmithKline Beecham	GlaxoSmithKline
2000	Pfizer + Warner Lambert	Pfizer
2000	Pharmacia & Upjohn + Searle	Pharmacia
1999	Hoechst Marion Roussel + Rhone-Poulenc	Rorer Aventis
1999	Astra + Zeneca	AstraZeneca
1997	Nycomed + Amersham	Nycomed Amersham
1996	Ciba Geigy + Sandoz	Novartis
1995	Glaxo Borroughs + Wellcome	Glaxo Wellcome
1995	Hoechst Roussel + Marion Merrell Dow	Hoechst Marion Roussel
1995	Pharmacia + Upjohn	Pharmacia & Upjohn
1994	Janssen + Cilag	Janssen-Cilag
1991	SmithKline + Beecham	SmithKline Beechman
1990	Rhone-Poulenc + Rorer	Rhone-Poulenc Rorer

One of the motives to mergers and merger talk between major pharmaceutical companies, is the rapidly rising costs and risks associated with researching and developing new drugs. Due to the complexity of biomedical research, costs are rising in inverse proportion to the number of novel medicines to emerge from this research. Some companies will win and others will lose.⁷⁹

When looking at the Swedish market, there has been consolidation among the large companies and the large players are continuing to grow. This has created space on the market for so called specialty farmer companies, for example the company Meda, which is taking over products on a license basis that are too small for the large organisations. These specialty farmer companies have no research and development of their own.

A couple of years ago these kind of companies (specialty farmer companies) were popular and viewed as important (for Sweden and for the industry) and they were offering high wages and interesting compensations to their

⁷⁸ EFPIA (The European Federation of Pharmaceutical Industries and Associations) (represents the research-based pharmaceutical industry operating in Europe).

⁷⁹ Astra Annual Report, 1997.

employees. Researchers at AstraZeneca were also interested in these biotech companies and several of AstraZenecas employees left the company for a smaller biotech companies that offered better employment terms. Besides competitive salaries, these companies could also offer options. But today (October, 2004) the situation has changed, the biotech companies are down on their knees and the researchers are coming back to AstraZeneca and other large companies. The small companies have an insecure existence and are struggling. Large companies are also having a hard time. It is difficult for all players at the pharmaceutical market right now.⁸⁰

AstraZeneca

In December 1998, Astra's board of directors approved an agreement to merge with the British company Zeneca. Together the companies would form one of the world's largest pharmaceutical companies – AstraZeneca.⁸¹

In April 1999, Astra AB and Zeneca Group PLC merged to form AstraZeneca, one of the world's leading pharmaceutical and agrochemical companies. Its healthcare business was strategically focused on seven major therapeutic areas: gastrointestinal, oncology, pain control and anaesthesia, cardiovascular, central nervous system, respiratory and infection.⁸²

In order to give a picture of business and product groups before and after the merger, products by Astra 1998 and by AstraZeneca 2003 are presented below.

Main product groups at Astra 1998 were: Gastrointestinal, Cardiovascular, Respiratory and Pain control.

- Main product within Gastrointestinal (acid-related disorders): Losec.
- Main products within Cardiovascular (high blood pressure, atherosclerosis, angina pectoris, myocardial infarction, congestive heart failure and cardiac arrhythmias): Seloken, Plendil, Imadur, Ramace, Canef and Atacand.
- Main products within Respiratory: Pulmicort, Bricanyl, Rhinocort and Oxis.
- Main products within Pain Control: Xylocaine, Marcaine, EMLA, Naropin, Carbocaine and Citanest.

When looking at main product groups at AstraZeneca 2003, we find the product groups similar but stronger: Cardiovascular, Gastrointestinal, Oncology, Respiratory and Inflammation, Neuroscience and Infection.

⁸⁰ Interview with global manager for information and PR, October 2004.

⁸¹ Astra Annual Report, 1998.

⁸² AstraZeneca Annual Report, 1999.

- Main products within Cardiovascular: Atacand, Crestor, Exanta, Plendil, Seloken and Zestril.
- Main products within Gastrointestinal: Losec/Prilosec (proton pump inhibitor for acid related diseases), Losec MUPS (in tablet form) and Nexium.
- Main products within Oncology: Arimides (breast cancer), Casodex (prostate cancer), Faslodex, Iressa, Nolvadex and Zoladex. Main products within Respiratory and Inflammation: Accolate (for control of asthma), Oxis, Pulmicort, Rhinocort och Symbicort.
- Main products within Neuroscience: Doprivan, Naropin, Seroquel (atypical anti-psychotic for schizophrenia and other psychotic disorders), Xylocaine (local anaesthetic for use in surgery and dentistry) and Zomig (migraine).
- Main product within Infection: Merrem (ultra broad spectrum injectable antibiotic for serious bacterial).

In 1998, before the merger, Astra's turnover increased by 25% from the year before (1997) to 57,187 MSEK. Sales outside Sweden accounted for 96 percent of total group sales.⁸³ The number of R&D employees had risen from approximately 3500 in 1994 to 6 400 in 1998. Most of the research and development work was conducted at five major research units: four in Sweden and one in the UK. In addition, exploratory research was conducted at a number of smaller units in the US, Canada, India and Australia.

Astra also collaborated with academic research centers and research companies in the biomedical field. The number of employees in the Astra Group was 24 958 and number of employees in Sweden were 8 060. Approximately 6 400 people worked within research and development. Research expenditures were 10,600 MSEK and capital expenditures were 16,668 MSEK.⁸⁴

Like Astra, Zeneca was a research-driven organisation. The company's ability to develop novel, advanced drugs was the core of its business. Above all, in cancer treatment Zeneca had built up a very strong position. Astra's firmly rooted management philosophy and view of the pharmaceutical business also had a counterpart in Zeneca.⁸⁵

Regarding the ownership structure prior to and after the merger, Astra's largest shareholders 1998 were: Investor (176,572,497 number of shares), Swedish National Pension Insurance Fund (77,471,466 number of shares), Robur mutual funds (49,525,266 number of shares) and SPP (47,134,260 number of shares).⁸⁶ AstraZeneca's largest shareholders 2003 were: The Capital Group Companies Inc (254,143,676 number of shares), Investor AB

⁸³ Astra Annual Report, 1998.

⁸⁴ Astra Annual Report, 1998.

⁸⁵ Astra Annual Report, 1998.

⁸⁶ Number of A-shares, from Astra Annual Report 1998.

(91,545,308 number of shares), Putnam Investment Management LLC and the Putnam Advisory Company LLC (52,643,484 number of shares) and Legal & General Investment Management Limited (52,518,020 number of shares).⁸⁷

Before the merger the Swedish ownership of Astra amounted to 61%, when merging with Zeneca these 61%, corresponded to 30,5%. In 2003, the Swedish ownership of AstraZeneca amount to 22%.⁸⁸ The Swedish ownership has decreased after the merger (compare 30,5% to 22%), the Swedish ownership is still relatively high considering that AstraZeneca is an international company.

Today (October, 2004) AstraZeneca is one of the world's leading pharmaceutical companies, providing medicines designed to fight disease in areas of medical need: oncology, cardiovascular, gastrointestinal, infection, neuroscience and respiratory. They are active worldwide with sales in over 100 countries, manufacturing in 20 and major research centres in seven countries. The company has 60 000 employees worldwide, including approximately 13 000 in Sweden. Corporate HQ is located in London UK and R&D HQ in Södertälje, Sweden. Sales in 2003 totalled \$18.8 billion and total R&D spend in 2003 was \$3.5 billion.⁸⁹

As mentioned above R&D HQ is situated in Sweden, with divisions in Lund, Mölndal and Södertälje. R&D Södertälje runs a research and development centre mainly within the fields of therapy for the central nervous system and pain control. There are 1 500 employees working with R&D in Södertälje and approximately 1 200 co workers in Lund, working with research and development of new medicines and medical aids used in the battle against respiratory disorders. One of AstraZeneca's larger research units is located in Mölndal. Some 2 500 people are working in Mölndal, with research and development of medicines within the cardiovascular and gastrointestinal areas.⁹⁰

Below reasons for the merger are presented.

Reasons for merger

Why Astra decided to merge with Zeneca

Since the late 1980's to about 1997, several pharmaceutical companies had been acquired or had merged with others in the pharmaceutical industry. Astra had observed that the industry was consolidating and that merged or acquired companies were successful. The larger companies were performing well in the pharmaceutical market.

⁸⁷ AstraZeneca Annual Report, 2003.

⁸⁸ Interview with global manager information and PR, AstraZeneca, October 2004.

⁸⁹ AstraZeneca webpage.

⁹⁰ AstraZeneca webpage.

Astra wanted to increase its turnover and grow and needed to investigate possible solutions. It was difficult to be a medium-sized company in the pharmaceutical market and there was a threat of other larger companies buying Astra and this would have resulted in a loss of their independence.

The size was important for two main reasons.

First, was that to be able to market new products on the global market, large marketing investments (costs) were needed. In the US market for example, there was a need for a large sales force and investment in consumer advertising in order to sell pharmaceuticals.

Second, when it came to research and development, large investments were needed in a new technology base. There was a new technology base on the market, enabling technologies that was crucial to have when conducting research and development for new pharmaceuticals. This enabling technology was much cost demanding and Astra realized that in order to be successful they had to be large, the small- and midsize companies would not be able to afford the investments needed.

Perfect product- and research fit according to AstraZeneca

The overlap between businesses at the time of merger is presented below.

At the time of the merger, both Astra and Zeneca had one product group each, where they were number one in the world. For Astra it was Gastrointestinal with Losec and for Zeneca it was Oncology with products for breast- and prostate cancer.

In the area of Cardiovascular, the largest research area for Astra and for Zeneca (and still is for AstraZeneca) there was a perfect fit. Both companies were strong in this area, but there was only one product group that directly overlapped. Otherwise the products within Cardiovascular fit perfectly.

Astra had certain gaps that were filled with the products by Zeneca and vice versa. There was however, one product category where they both had a product (beta-blocker). They had to choose one of the products according to the European competition authority and Astra's product was chosen.

When it came to Respiratory the situation regarding product fit was similar to the product fit of Cardiovascular. Astra was among the world leading companies on steroids with Pulmicort, but was missing product categories that Zeneca had.

Regarding the area Pain Control, Astra was number one in the world on local anaesthesia with Xylocain, and Zeneca was number one in the world on anaesthetics. This was also a perfect fit, with product categories and products complementing each other.

Finally, when it came to Neuroscience, Astra had research in this field, but few products, while Zeneca had one successful product already out in the market. Both regarding products and research this was a good fit.

Concluding regarding research- and product fit; both companies were research driven organizations and it can be seen from above that the overlap between the companies businesses at the time of the merger was very good, complementing each other well. Both companies had one area in which they were number one (for Astra it was Gastrointestinal and for Zeneca it was Oncology). Regarding Cardiovascular, Respiratory, Pain Control and Neuroscience both companies were strong, but on different products, which complemented each other.

Astra looked for an equal (same size) partner for a merger and Zeneca was a medium-sized company, facing the same challenges as Astra. In addition to a complementary product group (oncology) and complementary products in other areas, there was also a strategic and cultural fit between the companies and no restructuring was needed. Zeneca also added a strong position in the US and a complementary position in Europe (Zeneca was strong in the southern parts of Europe).

Zeneca's reason to merge with Astra

The reasons for Zeneca to merge with Astra were similar to the reasons for Astra (as can be seen above). In order to sell pharmaceuticals globally, a large investment in marketing was needed. Large investments in enabling technology were also needed, in order to conduct competitive research and development. Zeneca was also (more than Astra) under acquisition threats and there was at a large risk of being acquired, which would mean losing their independence.

Strengths within Astra influencing the merger process

Astra had large possibilities in influencing the merger process due to that this was a merger of equal. Astra took the initiative to discuss a merger with Zeneca, resulting in among other things that headquarter for research and development was situated in Sweden. Astra was a successful company that had been increasing its turnover and profit continuously. Zeneca was facing acquisition threats and risking losing its independence.

Impacts of merger within the Swedish firm

Corporate culture

As mentioned before (above) this was a merger of equals and regarding culture Astra and Zeneca had a common belief about competence and individuals. The corporate cultures did however have their differences and the Swedish (Astra) decentralized culture is now seen within the research and development organization, while the more British centralized Zeneca culture is found in the administrative organization. The two highest global research managers are originally from Astra (Swedish) and highest global managers for marketing and finance, origin from Zeneca (British).

Another difference between the Astra and Zeneca culture that is viewed as a problem by the external consultant⁹¹ is the different view on career paths within AstraZeneca.

In Astra, people stayed at the same department for many years. If they were successful in their work, they were promoted through an expansion of their area. At Zeneca, people who wanted to conduct a career within Zeneca changed jobs (and department) every second year, moving up the hierarchical ladder. A problem for people from Astra (as perceived by highest global management) is that they have problems to maintain their position because they are not used to climbing the hierarchical ladder.

However, when it comes to AstraZeneca subsidiaries around the world, most managers origin from Astra not Zeneca. An explanation is that the Zeneca people that are changing positions and geographical sites more often, lack the skills needed to run a subsidiary successfully. Interesting to note, is that all key personnel, except two (one from Astra and one from Zeneca -- Zeneca's research director) stayed on, and are still working at AstraZeneca.

Major impact of merger

In large, AstraZeneca kept the research direction that both Astra and Zeneca had previous to the merger, but became much stronger in the different product groups, having more complete product group portfolios.

Headquarter for research and development was to be situated in Södertälje, Sweden and the investment in research and development continued focusing on the same product groups as before the merger. Impacts of the merger for Astra are mainly positive, investments in enabled technologies in order to gain competitive research and development and a strengthening in the field of sales and marketing. Through Zeneca, market share and access to the US market have increased.

There has been a vitalization of the research after the merger. AstraZeneca has afforded to invest in research and there has been a large inflow of new ideas and projects in Södertälje (Sweden). The same effects can also be seen at the division for research and development in Mölndal (close to Gothenburgh, Sweden).

Role of R&D before and after merger

AstraZeneca continues to invest in research and development. And because of the nature of its business, a large global pharmaceutical company, its core business is to conduct research and development, in order to improve and find pharmaceuticals. R&D was important both in Astra and Zeneca before the merger, and is now of large importance in AstraZeneca.

⁹¹ Interview with global manager information and PR, October 2004. AstraZeneca has had and are still having a cultural expert consultant describing and analysing their culture (AstraZeneca) and cultures (Astra and Zeneca).

As said above AstraZeneca continues to invest in research and development. Total R&D spend 2003 was \$3.5 billion compared to total R&D spend 1999, \$2.4 billion.

AstraZeneca has since the merger invested large amounts in research and development. It can be viewed as in a transitional phase according to persons interviewed. Both Astra and Zeneca had patents expiring at approximately the same time (for Astra it was the patents for Losec and Plendil and for Zeneca the patents for Nolvadex and Zestril). Therefore it has been and still is important for AstraZeneca to invest in research and development, in order to improve current pharmaceuticals and to find new ones.

The largest product group in Astra, cardiovascular, is now after the merger the largest product group within AstraZeneca. The division responsible for cardiovascular is situated in Mölndal (Sweden).

Knowledge interaction, transfer within AstraZeneca

AstraZeneca has a global research organisation, with research and development in Sweden, Britain, Japan and the US. There is continuously collaboration and co-operation between research teams from different divisions at AstraZeneca.

Research teams are often situated geographical at the same site, but there are almost always international experts connected to the team. Researchers in AstraZeneca are working in small teams, where the researchers are working independently but are sharing their knowledge with other researchers within AstraZeneca on international- and global meetings and through documentation. This sharing of knowledge contributes to more ideas. It is also common with projects over the national borders, where researchers from example Britain and Sweden work together.

Impacts of merger in local/national environment

Impacts of merger in local/national innovation environment have been positive. After the merger investments in research and development have been made by AstraZeneca in Sweden. As presented above the Swedish organization has increased with approximately 4 000 employees since the merger and several billion SEK have been invested into laboratories.

Investments have been made mostly in Mölndal (within the Cardiovascular product group) and in Södertälje (within the Neuroscience product group). Approximately 1 000 new researchers have been employed in Mölndal since the merger and 300 new researchers in Södertälje.

Impacts of merger in surrounding innovation environment

Both prior and after the merger the company is working together with academic institutions and biotechnology companies.

After the merger, AstraZeneca (former Astra) had problems with their academic relations. According to one person interviewed, the academic institutions thought that Astra (like Pharmacia when acquired by UpJohn) would move their research from Sweden, not investing in research and development in Sweden.

AstraZeneca (Astra) has been trying to build up the relations with academia again, traveling around Sweden talking about collaboration between the industry and academia, resulting in improved relations and collaborations. The dependence on the Swedish academia though, becomes continuously less important. According to AstraZeneca the research frontier is global today and they are collaborating with universities around the world. Today (October 2004) they have approximately 1 700 research collaborations running globally, of which approximately 500 in Sweden (both small and large projects).

Today (October, 2004) there is a more two-way flow of people between AstraZeneca and the academia than prior the merger, AstraZeneca both employ people from academia and employees at AstraZeneca goes back to academia to become associated researchers. Prior the merger AstraZeneca did not see this two-way flow to the same extent.

Use of national technology- and innovation policy programmes and measures

After the merger, integration projects started up, with the purpose to look over the business and with the purpose to coordinate the business in the best way.

On the research side the systems for processes, documentation and so on previously used by Astra, continued to being used by AstraZeneca. In finance and administration it was the British (Zeneca) systems that took over, which were frustrating for the Swedes because they had more advanced systems than Zeneca prior the merger.

Astra had for example come further than Zeneca with electronic invoices, but the view was that it was easier for Astra, that had more advanced systems, to take a step back, than for Zeneca that had less sophisticated systems to take immediately steps forward.⁹²

Current and emerging challenges for AstraZeneca

- AstraZeneca is worried over the providing of researchers from academia in the long run. They claim that it is important to support basic research and improve conditions for Swedish doctoral candidates. Today there are many foreign doctoral candidates in Sweden, who leave Sweden after receiving their doctoral (At KS for example there are many doctoral candidates from China and when they have received their doctoral they

⁹² Interview with global manager for information and PR, October 2004.

go back to China). AstraZeneca also thinks that it is important to support post docs abroad for Swedish doctoral candidates.

- It is important with continued intellectual property protection. There is a tendency today not to respect patents.
- There is also a tendency that we no longer can afford new pharmaceuticals. The county council has to cut costs and is cutting costs for medicine, focusing more on price than quality. Generic substitution and therapeutic substitution do not lead to innovative projects, on the contrary. If Europe does not want to pay for the added value that comes with new and improved medicine, it will result in reduced research activities in Europe.
- Pharmaceutical research in Europe is looking at the US and towards the dynamic that is surrounding universities and companies there. AstraZeneca is also drawn to the entrepreneur spirit in the US.

Pharmaceuticals, AstraZeneca and the Swedish debate

The merger between Astra and Zeneca raised a great amount of public discussion in Sweden. In a number of articles the issue was argued as if Astra's shareholders had lost out in the merger, due to the fact that Astra was a better performing company than Zeneca and that Astra's share price was at a low point at the time of the merger (Hellgren et al., 2002). Hellgren et al (2002) argue, though, that a more rigorous analysis by the media would have worked in favour of the Swedish Astra.

In the Swedish press, the decision to locate the headquarters in London was perceived as a visible sign of losing in the merger. There was at the time a Swedish concern for losing as a nation. There was a wider debate in Sweden at the time of the AstraZeneca merger, a debate triggered by the relocation of a number of large Swedish firms' headquarters (Hellgren et al., 2002).

As described above, the headquarters of the main research and development operations of AstraZeneca was decided to be located in Södertälje, Sweden. The Swedish press reported it as a rational choice to locate research and development there (Hellgren et al., 2002).

For a couple of years the merger was viewed as relatively successful in the media. Recently (2004) however there has been an increased attention on the merger and the issues that the company is facing today.

In a radio program from July 2004, the Swedish pharmaceutical industry and AstraZeneca are discussed by different actors.⁹³ The discussion originated from a statement made by AstraZeneca, saying that they might reduce their activities in Sweden and move research and development abroad, this due to the fact that the county councils are choosing cheaper medicine copies instead of the more expensive originals, and that the rules regarding contact between doctors and the industry are becoming more

⁹³ Radio program called Studio Ett, 20th of July, 2004.

strict. Another issue that recently (September, 2004) has been raised in the media is shareholder value origin from the merger. The Swedish Shareholders' Association conducted a report in September 2004, in which they criticized the merger from a shareholder perspective, this leading to a short debate in the media.

Conclusion & Remarks

All in all, the merger between Astra and Zeneca 1999 can be viewed as a successful merger, leading to cost reductions due to synergies and resulting in increased investments in R&D in Sweden. It is difficult if not impossible, to claim what would have happen if Astra had not merged with Zeneca. The market for pharmaceuticals and its conditions have changed since 1998, resulting in larger investments in order to conduct research and development and larger costs for marketing and sales activities.

References

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Appendix 1 FOTON Module 2: Interview guideline

Case-studies - impacts of foreign takeovers on local innovation capabilities

Background information (based on public material available + interviews)

- nature of markets in which the firm is active (number of various size of players/few large global players)? Acquiring firm's market position and success on this field?
- ownership structure prior to and after the takeover
- were there overlap between business activities of the acquired and the acquiring companies at the moment of takeover?
- new owner's strategic commitment to the area of business of the acquired company?
- is the acquired firm foot loose or very much connected to a local resource base or local labour market?

Reasons for takeover

- why the firm was sold-off by former owners?
- why the firm was acquired by foreign corporation?
- in which country the headquarters of the MNC locates?
- is the acquired firm first of all acquired because of competences in production, market contacts or development capabilities?
- how about the firm's innovativeness — whether it had effect for the takeover decision?

Impacts of takeover within acquired firm

- changes in corporate governance and management culture? (compatibility of 'old' and 'new' cultures)
- position vis-à-vis to the parent company's headquarters and within the new corporate structure? (including position in the in-house competition)
- changes in resources available (financial/human resources/competences/marketing channels...)?
- does "transfer pricing" play a role in intra-corporate interaction? (this needs to be defined more clearly...)
- role of own R&D functions before and after takeover?
- are there some "knowledge interaction/transfer" between subsidiaries within the MNC, and between subsidiary in question and central corporate R&D facilities?

If yes, how this interaction takes place? (i.e. on a scale from superficial exchanges of documents/patents to the establishment of large-scale project groups/mutual visits between the communities that are to interface)

- possible effects of takeover on the way innovation is made in the company? (for instance, no longer outsourcing locally but relying more on intra-corporate resources)
- did your enterprise have any co-operation arrangements on innovation activities with other enterprises or institutions prior to the takeover? Has co-operation models or partners changed since the takeover? OR has the firm changed its network and collaboration habits?
- has there had changes in the main sources of information needed for suggesting new innovation projects or contributing to the implementation of existing projects?
- have there been any factors hampering innovation activity (economic factors, internal factors, external factors etc)? Has there been changes in distribution and weight of factors after the takeover?
- did the acquired company make use of any methods to protect inventions or innovations developed in the firm? Has there been changes in use of different protection methods after the takeover?
- market orientation before and after takeover? (domestic, international...)
- does the foreign ownership help the firm to enter global markets?
- does the firm has own product(s) and how the markets are divided within the corporate?
- did the key personnel stay in the acquired company after the takeover?

Impacts of takeover in surrounding innovation environment

- nationally within the relevant industrial cluster?
- locally in the immediate (geographical) surroundings of the acquired firm?
- Use of national technology- and innovation policy programmes and measures before and after of the takeover?
- how does the parent company view participation in national programmes?
- (Did available national technology and innovation policy support schemes increase attractiveness to takeover a firm in a specific country?)

Other

- how the acquiring company has operated during and after the takeover from local perspective?
- local /national strengths and weaknesses which may have had effect on takeover process and utilisation of new opportunities?
- How does the acquired company/the MNC see/value government functions in development of national innovation systems (including education, promotion of R&D, competence development etc.

Appendix 2: Theoretical perspectives on MNE organisation, strategy and subsidiary implications

By Sverre J. Herstad

Introduction

Attempting to identify implications of foreign takeovers, be it as the brain drain versus gain question posed here, as productivity impacts or as e.g. employment changes, one inevitably ends up with some puzzling dilemmas. The main problem arises out of the question itself – one is by definition looking for impacts that are *specific* to foreign takeovers, and hence changes in performance indicators must be both validated against a supposed counterfactual state (e.g. no takeover) and distinguished from effects arising out of other aspects of the overtaking firm (e.g. takeover by a large firm, mature firm, domestic multinational firm, etc.).

The latter point emphasise the need to focus on effects arising out of the ‘as such’ element of foreign takeovers. It can be argued (Herstad, *fortc*) that existing research on FDI implications is characterised by a lacking ability to make these distinctions, and consequently a lacking ability to make general conclusions concerning FDI impacts.

To a certain extent this is explainable with reference to a strange and enduring (Kogut 1993:136, Herstad, *fortc*) separation of FDI research, conducted mainly by “traditional” economist, from theories of the MNE as an organizational entity.

The former focus exclusively on the “national vs. foreign” distinction in both intensive and extensive analysis. It is to some extent based on arguments that are solely macro economic, such as national capital stock increases following from FDI. Alternatively it is bordering on organisational and strategic issues in seeking to identify implications of consequent substitution effects within the national system of industrial ownership. This perspective is this based on the notion that foreign takeovers are ‘freeing’ national owners, enabling the latter to focus on early-stage investment projects where country specific knowledge is more critical.

Furthermore, these approaches investigate knowledge diffusion effects resulting from the perspective of *technology gaps* (Kvinge 2004) between the host economy and, implicitly in the distinction between national and foreign owners as groups, the world economic system as such. The problem, however, emerges when these approaches are trying to identify *firm level implications of intra-developed world FDI*; implications that are inherently organisational and strategic and thus neither reducible to the disaggregate of

macro-economic implications nor plausibly seen as resulting from technology gaps as such.

Against this 'traditional' approach we may contrast theories of and empirical evidence on the MNE; that from the influential work of Ruigrok and van Tulder (1995) and through the impressive Doremus et al (1998) has established itself as a research agenda focusing on how the organisational specificities of MNEs must be understood as developed within the context set by their respective national business (Fukao 1995, Whitley 1999, Morgan et al 2001) and innovation (Doremus et al 1998) systems.

From this perspective, '*...home-based institutions provide the basis for the development of MNEs transnational social spaces, and thus their strategic behaviour and organisational forms will continue to diverge*' (Lam 2003) accordingly.

Given that the objective of FOTON is to identify implications that are directly strategic and organizational and only by implication macro-economic, it inevitably follows that the general theoretical framework applied in interpreting both quantitative and qualitative evidence should be informed by theories of the organizational and strategic specificities of different MNEs.

The problem with these approaches, however, is a lacking willingness to explicitly focus on those innovation and competitiveness implications that may follow from the different behavioural tendencies identified. Hence, the following will draw on existing theoretical and empirical work on MNE distinctiveness, as well as empirical evidence from Norway (Herstad, fortc), synthesise this and sketch a theoretical framework enabling brain gain/drain implications of foreign takeovers to be drawn.

The MNE can be defined as an organisational entity with operations in more than one country, and hence an organisational entity interacting with and potentially linking different systems of economic organization, research and development. MNEs has to '*...organise its operations across institutional divides*' (Morgan et al. 2001), and preferably link operations in such a manner that subsidiary and context specific knowledges can be harnessed as 'synergies' appropriated by the MNE.

The latter both *represent* (home base) and *interact with* (host economy) different national or regional business systems⁹⁴ (Whitley 1999), and hence different logics of collective action, economic organisation and industrial specialisation that raise questions as to parent-subsidiary strategic and organisational fit. Further, by having operations located in different business systems the MNE may function as an organisational innovation system in its own right, and through their subsidiaries contribute to linking different national or regional innovation systems. Based on this line of reasoning we

⁹⁴ The concepts of 'business systems' (Whitley 1999), 'social systems of innovation and production' (Amable 2000) or 'production regimes' (Soskice 1999) all refer to how the societal institutions of in particular labour, finance, education and the role of the state represent distinct incentives and constraints concerning collective action, and hence are reflected in economic organisation and industrial specialisation both at national and firms levels.

can identify the two main sources of firm level – organisational and strategic – foreign takeover implications:

- a) *The business system effect*: The ‘strategic fit’ between parent corporate governance characteristics and human resource management practices, and subsidiary institutional embeddedness, organisational set-up and product market.
- b) *The innovation system effect*: Ownership initiated linkages, established and maintained within the incentives and constraints set by a), between subsidiaries and i) research and development units contained within the MNE, and b) their respective external business system linkages

This is a specification of the reasoning originally presented in Doremus et al (1998:144), who, based on their large scale MNE study, conclude that MNE activity

“...describe a process through which still-national corporations, and the innovation and investment systems in which they remain embedded, are inserted into one another’s home markets. Those corporations then adapt themselves at the edges. But at their cores, our research underlies the durability of such factors as German systems of corporate control, the historical drive behind Japanese technology and investment strategies as well as corporate organizational forms, and the persistence of institutional disincentives to long-term planning inside American corporations”.

Having this as our starting point for answering the brain gain or drain question, we will further need to account for factors such as subsidiary and parent company maturity and size, subsidiary product market specificities, the nature of knowledge involved as well as the, revealed by our case studies, non-generalisable importance of key *persons* in generating a certain brain gain or drain outcome.

International industrial variety, national specialisation and strategic fit

It is an established notion that national industrial development is a path-dependent evolutionary process. Moreover, the Nordic countries are small, open economies. Based on this we may as a general argument highlight the fact that the business and innovation system *specialisation* of these economies in themselves imply that a high degree of foreign ownership may be a general prerequisite for strategic fit between parent and subsidiary companies, and in particular a prerequisite for sustaining a certain degree of industrial variety and renewal.

The national systems of finance and ownership in the Nordic countries are by necessity both qualitatively specialised and quantitatively limited, and when accounting for revealed national specialisations such as the natural resource focus of the Norwegian economy it is hardly controversial to argue that firms such as our Norwegian cases may have to look abroad in order for

competent and financially strong enough owner firms to be identified (cf. the Axis Shield case).

Hence, a possible effect of foreign ownership per se may be linked to the international availability of certain owner specific advantages (Dunning 1980, Narula 1996) resulting both from the mere amount of owners available abroad as compared to domestically, hence implying that it makes some sense to distinguish between domestic and foreign owners as groups, but more specifically from the variety of business and innovation systems that constitute the international economic system.

The latter point again highlight that the concept of ‘foreign ownership’ *must* be specified beyond itself; we need to grasp *what* economic systems ‘foreign’ owner firms emerge out of in order for structure, strategy and hence subsidiary brain gain or drain implications to be drawn.

The business system effect: Corporate governance and the multinational corporation

The first step in such a specification will be to follow Doremus et al (1998) in seeing the investing firm as an agent for certain corporate governance systems. These systems of creditor, owner, management and employee relationships constitute “...*the locus of social evaluation of economic activity*” (Aglietta and Breton 2001:436), and thus both define what is considered success for a capitalist organisation and how management of that same organisation should go about achieving it.

There is a vast and growing literature that explains differences in firm structure and strategic behaviour with reference to differences between such systems (Porter 1992, Fukao 1995, Doremus et al 1998, Dore, Lazonick and O’Sullivan 1999, Lazonick and O’Sullivan 2000, Hall and Soskice 2001), as well as empirical evidence continuing to highlight their enduring national character (Gugler et al 2001, Seifert et al 2000).

Hence such national differences can be found in the availability of capital with certain characteristics, notably risk-willing but generic *financial capital* versus industry-specific, knowledge-intensive and often conservative *industrial capital* (Perez 2001). These differences also influence the resulting firm organisation, innovation and economic performance (Aglietta and Breton 2001). An understanding of this variation is necessary in order for systematic differences in MNE structure, strategy and thus different takeover implications to be grasped and understood (Herstad 2004, Herstad and Asheim 2004, Doremus et al 1998).

The perhaps most analytically clear-cut model of “national systems of corporate governance” is found in Porter (red) (1992). Porter argues that characteristics of the external capital market in which a firm is embedded exert strong influence on the internal capital allocation and monitoring system of that same firm, including its strategic objectives and organizational principles. In Porters framework a main emphasis is put on the different logics of communication and co-ordination, both internally and

towards owners and creditors, following from differences in external ownership structure (see table below).

This highlights a fundamental aspect of the MNE, as the definitional characteristic of business system variety contained within a common ownership structure indicate a vast potential for *information gaps* (Tylecote 1994) to be created within it.

A fundamental difference in this respect is between what has later been labelled insider or outsider systems of ownership and corporate control (Ali-Yrkkö and Ylä-Anttila 2001), and the different degrees of strategic integration⁹⁵ (Lazonick and O'Sullivan 1998) that follows.

In the first case ownership is concentrated and strategy contingent on the knowledge and preferences of large owners in *inside positions* within the firm, where they have first-hand information about what is going on, in turn enabling the industry and firm specific knowledge accumulation that characterises industrial capital. According to Porter (1992), a main point in this is that short-term market valuation of the firm does not affect buy-sell choices of main owners, and consequently not management behaviour.

Such “tight” insider systems are found in Continental Europe and Japan, with the German system often portrayed as the archetypical one and the Swedish case a nice example by its dominance of business groups centred on the “Wallenberg sphere” and Handelsbanken AB (Collin 1998)⁹⁶. Co-ordination of information, knowledge and technology within the MNE here tend to be based on investments in *socialisation* (Bartlett and Ghoshal 1998) of key personnel and thus a technology and knowledge transfer policy backed by ‘...*coherence in vision, goals and strategies*’ (Granstrand and Sjölander 1994).

⁹⁵ I.e. to what extent strategic decision makers are integrated into, and hence have first-hand knowledge of, the learning and innovation processes their allocation decisions are influencing.

⁹⁶ In 1995 these two directly or indirectly represented some 52% of the stock value of all the corporations listed on the Stockholm Stock Exchange (Collin 1998:726). The ‘Wallenberg Sphere’ alone controlled some 39%.

Table 1
Concentration of voting power⁹⁷

Source: Ekeland (2002)/Bøhren and Ødegaard (2000)

	Percentage of voting power		
	Largest owner	Second largest	Third largest
<i>Anglo-Saxon</i>			
US (average 1992-1997)	3	1	1
UK (1996)	14	7	6
<i>European</i>			
Belgium (1995)	56	7	5
France (1996)	52	10	4
Italy (1996)	48	10	4
Germany (1996)	50	3	1
Austria (1996)	54	8	3
<i>Nordic</i>			
Norway (1997)	29	11	7
Sweden (1998)	38	11	6

As an opposite we find the *outsider systems* of the Anglo-Saxon economies (Lazonick and O'Sullivan 2000). These are first and foremost characterised by a highly fragmented and stock-exchange driven system of corporate control, where primacy is given to the interests of minor non-committed investors and their short-term desire for company reporting initiated value appreciation on their holdings (see table 1).

Important in this is the lacking willingness and ability of these same fragmented owners to exert direct strategic control through insider positions, which consequently limit the role of company and industry specific in-depth knowledge in strategic decision making⁹⁸ and is complemented by a structure of inefficient company boards representing mainly judicial and generic competencies (Porter 1992, Fukao 1992, Owens 2001, Goergen and Renneboog 2001).

This in turn create a strong focus on generic financial indicators as measures of success (company) and consequent stock market pricing of the firm, as a basis for buy/sell decisions (owners/investors) and thus as the main strategic driver (management, normally with stock option plans as important incentives).

⁹⁷ Average share of quoted stock held, controlled for preference shares.

⁹⁸ Inside positions inhibit anonymous entry-exit in the stock. Further, a main motive for exposure to such positions is a wish to directly influence management, the costs of which are carried by the individual agent while the possible benefits are spread out on all shareholders. Hence, avoiding this free rider problem would entail larger shareholding in individual companies, in turn severely limiting the exit option and thus contradicting the internal logic of the system as a whole. See Porter (1992) for a brilliant analysis of this collective action game.

Furthermore, those same outside owners are often merely representatives ('institutional agents') of other owners (private investors)⁹⁹, hence creating a stratified ownership structure where ownership itself is 'dissolved', highly anonymous and highly driven by buy-sell decisions based on 'valuation by proxies'.

From our point of view it is particularly important to note that these systems, through their internal capital monitoring and evaluation system reflections, reinforce the mentioned information gap inherent in the relationship owners/MNE/subsidiary, thus, by co-ordinating mainly through centralisation or formalisation (Ghoshal and Bartlett 1998) possibly creating a distinct logic of internal communication by generic performance (results) or expectancy (R&D, rate of patenting etc) indicators.

Table 2
Equity market activity

Source: Megginson and Boutchkova (2000)

	Market capitalisation 1998 Percentage of GDP	Trade volume 1998 Percentage of GDP
<i>Anglo-Saxon</i>		
US	142	166
UK	158	92
<i>Continental European</i>		
France	46	39
Germany	39	65
Italy	30	41
Sweden	120	89

Hence these systems, and MNEs acting as agent for them, contain certain distinct incentives and constraints that translate into different investment behaviour and organisational set-ups, and thus competitive strengths and weaknesses.

According to both Porter (1992) and Soskice (1998) the insider model has a distinct strength in its ability to support those complex sets of complementary investments in machinery, skills and R&D that support continuous incremental process and product innovations in industries such as e.g. car production or machine tool production¹⁰⁰.

The outsider model, on the other hand, tend to be biased against such investments while favouring "...stand, alone investment strategies" that represent a "...clear technological discontinuity" and thus generates leaps in

⁹⁹ An institutional agent is an investment company that invest on behalf of customers rather than itself, and hence is subjected to competition from other institutional agents.

¹⁰⁰ Those activities that are referred to by Streeck 1992 as "diversified quality production", or by many simply as post-fordism, where competitive strength is build and maintained by continous incremental product and process innovations.

position vis a vis competitors (e.g. the so-called ‘new economy’) (Porter 1992) (cf. the Axis Shield case).

Table 3

Sources of debt capital

Source: (Ehrman et al 2001)

	EURO Countries	France	Germany	US
Bank loans to industry Percentage of GDP	45	37	40	13
Bond issuances Percentage of GDP	4	8	1	26

The bias against such investment has to do with the lacking transparency of those complex investment, skill-building and R&D programmes needed to continuously build capabilities in these industries, while the bias in favour of such investments has to do with the highly transparent prospect of large leaps in stock market pricing and dividend payments that follow from radical research aimed at patentable product innovations.

It is also possible to argue that outsider system, by way of the investor portfolio diversification that characterise these systems, is superior in dealing with the fundamental *uncertainty*¹⁰¹ that is inherent in radical technological change.

In this the relative importance of banks as sources of debt capital is important (table 3); both as these may have access to inside private information on clients (Aglietta and Breton 2001) and as these operate under incentive structures that diverge from those of outside investors.

A known characteristic of the German system of corporate control is the long-term and stable banking relations of corporate enterprises (see table), supported by bank representation at company boards and reinforced by the system of ‘proxy voting’ that enable banks to vote on behalf of customers who deposit stock. Tight long-term relationships between banks and industry are also found in Japan and the Nordic countries (Tranøy 2001) and has e.g. constituted a defining characteristic of the mentioned ‘business groups’ in Sweden (see Ehrman et al 2000, Collin 1998).

According to Collin (1998), strategic influence over industry by long-term banking partners generates conservatism and long-termism in investment strategies. This is as bank earnings from corporate credit is set a priori as interest rates, total earnings thus becoming linked to duration of the relationship, and not determined as *residuals* ex post. Thus, whereas banks

¹⁰¹ Uncertainty here distinguished from risk, which is calculatable given sufficient information.

will be exposed to the risk of customer bankruptcy following from high-risk or high-uncertainty corporate strategies, they will not directly – apart from potential risk premiums set a priori on debt capital – receive those high residual earnings that invite equity investors to engage in high risk or uncertain ventures. Rather, given strategic influence over the corporation, the bank will seek to ensure its long-term survival through medium-risk investment programmes.

Hence the main strategic driver within outsider systems is *secondary stock market evaluation of reported information*- as reactions to confirmed financial results or generated expectations, a logic supported by debt capital sourcing through bond issuance and short-term bank loans (Scott 1997). Consequently corporate managers are shown to focus on strategies enabling quarter-to-quarter and year-to-year positive reports, sensitive those indicators defined by outside investors as signs of “health”, as well nurturing investor such expectations by e.g. a strong emphasis on R&D aimed at radical, patentable innovations.

From Norway (Herstad, fortc) there is clear evidence that this translates into a distinct bias towards such activities in subsidiaries of Anglo-Saxon MNEs, and a bias against innovative activities involving distributed knowledge bases that hence cannot be easily distinguished from production costs. There is also evidence (ibid) that this desire to build secondary market expectations by reporting R&D may influence on organisational and accounting principles, hence raising the question of whether R&D investments, as proxies for investments in innovation, are comparable across countries.

This leads us to the larger picture of human resource management principles. A main finding of Wever (1995) and later Lam (2000) was divergence in the degree of individualism vs. collectivism supported by management principles through in particular applied reward schemes and responsibility structures. This corresponds perfectly to the findings in Herstad (fortc), where respondents in US and UK MNE subsidiaries in Norway all highlight both the individualism revealed in the HRM practice preferences of the owner and a preferred ‘variable cost’ approach to labour through ‘hire and fire’ according to short-term qualitative or quantitative needs.

This must be understood in light of how the different national industrial relations systems that foreign owner firms have emerged out of influence the general role of labour (Wever 1995) and thus who is expected to contribute to firm specific learning (Blair 1997).

The unionised countries of Continental Europe, with strong institutional/judicial barriers to numeric flexibility in the labour force and co-determination rights by employee representation at local boards, represent a clear opposition to the Anglo-Saxon systems of flexible labour and minimal institutional protection of workers that distinctively reflect in both expectations and preferences of owner firms emerging out of these respective systems, and – importantly – what learning and knowledge

accumulation processes that are either indirectly nurtured or directly considered 'legitimate' (von Krogh and Grand 2000).

This, in turn, leads us to follow the business system literature in concluding that *organisational and strategic diversity* characterise the international economic system, and hence both parent MNEs and their subsidiaries. In particular we again highlight how the definitional character of the MNE in and by itself reinforce the information gap inherent in the relationship. This applies to outside investors and bankers, through corporate management and into the professional communities of subsidiaries in which complex technologies are developed – and their contact with respective product markets – translating into a need for the corporate administrative hierarchy to *deal with organisational variety, based on accumulated experiences and routines* while *necessarily lacking* first-hand knowledge of all the different organisational logics contained within its umbrella.

The resulting “how” question of governance is in turn a question of internal characteristics of the MNE and those incentives and constraints that emerge out of the corporate governance system. The information gap problem can simply be neglected by the application of generic corporate best practices and routines, normally preferred by Anglo-Saxon MNEs as strong reflections of parent company home base business system ('formalisation', Bartlett and Ghoshal 1998).

Alternatively it may be avoided in two complementary ways. First the MNE may seek to integrate top-level strategic decision makers into the actual learning and innovation processes contained within its ownership structure. This, of course, presupposes a certain composition of both management teams and company boards, a limited range of technologies contained within this structure, and a limited size of the structure itself. In the Axis Shield case, we find that both apply.

Secondly, strategic decision making authority may be decentralised to actors functionally and hierarchically already integrated into actual learning and innovation processes (Nooteboom 2000b: 286). This, in turn, presupposes a corporate governance structure allowing for such organisational principles in general to be applied, and in particular for such formal lack of financial control to be acceptable within the incentive structure that arise out of the top management-owner relationship. The latter is enabled by insider systems of corporate control, but contradict the logic of monitoring, evaluation and financial control shown to emerge out of outsider systems (Porter 1992, Geppert, Williams and Matten 2003, Herstad fortc)

Table 4

Business system effects and the MNE

	US MNEs	German MNEs	Japanese MNEs
Home-base corporate governance and internationalisation of finance	Short-term shareholder value, highly constrained by capital markets, financially centred strategies. Only group displaying genuine 'global' sourcing of finance	Managerial autonomy except during crises, little takeover risk, conservative and long-term strategies. Tightly linked to domestic owners and key creditors	Stable shareholders, network-constrained management, and aggressive long-term market share oriented strategies. Tightly linked to domestic owners and key creditors
Defined legitimate stakeholders	Judicial primacy to shareholders, thorough minority protection. No employee representation rights at company boards	Inside owners, creditors, suppliers and employees.	Inside owners, creditors, suppliers and employees.
Principle for subsidiary control and co-ordination	Formalisation or centralisation. Tight individual subsidiary <i>financial</i> control. Threat of sell-out.	Socialisation. Fairly decentralised administrative control, technology and market share oriented.	Centralisation and socialisation. Tight subsidiary <i>administrative</i> control.
Competence structures expected by corporate routines	Individual experts at higher hierarchical levels, professional communities (Lam 2003) enabling strong linkages to external research	Distributed throughout distinct hierarchical levels	Distributed and collective. Internally integrated organisational communities with few, selective external linkages.
Home-base industrial relations	'Variable cost approach' to labour. Harsh industrial relations, limited overall role of labour in organisational learning.	'Semi-fixed cost approach' to labour. Thorough employment protection, significant role of labour in organisational learning.	'Fixed cost approach' to labour. Long-term, bordering on lifetime, commitment of company to employees given full employee commitment to company
MNE internationalisation and acquisition strategy	Rapid entry and exit based on perceived <i>individual</i> company potential, high turnover of subsidiaries, aggressive	Entry and exit based on long-term implications for company or division activity portfolio	Selective and reluctant internationalisation strategies, based on long-term implications for company activity

internationalisation
strategy enabled by
weak linkages to
home-base

portfolio. Preference
for greenfield
investments to build
new organisations in
“own image”.

The innovation system effect: MNE organisational principles and knowledge diffusion

Whereas the business system effect of MNE takeovers highlight how subsidiaries are governed individually as learning organisations, the innovation system effect of such takeovers highlight brain gain resulting from *linkages* between the variety of organisations and learning processes that potentially co-exist within the MNE – including their respective linkages to national or regional innovation systems.

This effect is in turn highly flavoured by the ‘communicative skills’ and organisational set-up of the owner firm (Forsgren 1997:72), and hence again the business system effect, and contain an inherent paradox (Forsgren 1997): The more technological variety contained within the MNE ownership structure, the higher the potential for technological novelty resulting from synergies.

Hence, more subsidiaries located in diverse business systems, and a higher turnover of subsidiaries (in particular if initiated by an aggressive acquisition and divestment strategy aiming at internalising new technologies and disposing of mature ones) increases corporate technological variety and hence the scope for novelty.

But, on the other hand, realisation of such synergies may require deep and long-term co-operative arrangements, or ‘learning interfaces’ between subsidiaries which as we will see are not easily formed within a corporate structure characterised by individual subsidiary monitoring and evaluation, high subsidiary turnover and low inter-subsidiary trust.

MNE organisational principles

Morgan (2001) argue, with reference to the increasing presence of foreign institutional investors in the Finish economy, that the current preference of Anglo-Saxon investors and owner firms are so-called focused corporate structures that can easily be subjected to outside estimation of value. This in contrast to the risk-diversifying conglomerates identified by Porter (1992) that grew out of a wish to secure a predictable flow of earnings and reduce dependence on individual product markets.

Recent evidence from Norway (Herstad, fortc) support both Morgan’s claims for an institutional investor driven drive towards leaner Anglo-Saxon MNE structures (i.e. revealed by de-mergers of British and US owner firms), while still identifying a remaining tendency towards both unrelated

diversification but most importantly segmented subsidiaries in those same US and UK MNEs (as argued by e.g. Fukao (1995) and Doremus et al (1998) and a high turnover in the latter.

This view is supported by Morgan (2001:17), who continues by arguing that the drive towards leaner and seemingly more integrated British and US MNEs is still “...*less likely to be based on a limited set of technological competencies*”, and is “*driven by the search for shareholder value and the opportunities that exist for both divestment and acquisition*”.

Against this may be contrasted e.g. Japanese MNEs, who tend to be less diversified and better integrated into a structure where “...*the individual subsidiary is judged not based on its own merits (as individual profit-making entities) but in terms of its contribution to the industrial system of the company as a whole*” (ibid). German MNEs are also found to focus more on a limited range of skills and competencies (ibid: 18), while more diverse than their Japanese counterparts as to internationalisation strategies.

More important than seeming relatedness is to what extent the MNE focus on, and *invest in*, building internal learning interfaces and hence on establishing a ‘corporate industrial system’ where the knowledge may be shared and technological synergies harnessed.

Understanding the existence or non-existence of such interfaces, as well as their actual workings, requires an understanding of the financial cost and commitment aspects of these (i.e. the costs, investments and asset/relation specificities involved), as well as their social aspects.

The latter ranges from arms-length exchanges of documents and patents, hence transferring only knowledge codified in fairly universal codes, to large-scale project groups able to both exchange and develop tacit, collective knowledge (see below). The former overlaps with the latter.

The costs, investments and asset/relation specificity of document exchanges are all low. Large-scale project groups, on the other hand, both bind up personnel and require an often long-term process of building mutual trust and understanding (Wenger 1998, Lam 1998, Granstrand and Sjölander 1994) both on the individual level and on the subsidiary level. This requires commitment to creating the interface on the part of the subsidiaries and the MNE, and commitment over time in order for the initial investment to generate returns as ‘knowledge transfers’ and ‘interactive learning’.

The latter point is important. The cost/investment aspect of learning interfaces concerns investments in relation specific assets and subsidiary co-specific skills (Blair 1997), that as such commit resources not only to individual subsidiaries, but to the relationship between individual subsidiaries – hence committing the parent company to two or more subsidiaries simultaneously.

Experience from MNEs present in Norway (Herstad, *fortc.*) clearly indicate how e.g. German, Swedish or Finnish insider system governed MNEs have no problem exposing themselves to such commitments, of course given that the technological rationale is defined as sufficient, British and US MNEs

consciously avoid these in order to reduce commitments vis a vis subsidiaries and hence secure their freedom to sell out *and renew corporate capabilities through acquisitions* rather than in-house synergies.

Hence, in the latter group, the MNE ownership may serve as an innovation system by the mere variety of technologies, and hence ‘cognitive diversity’ (Nooteboom 2000), that result from an aggressive high subsidiary turnover acquisition and divestment strategy. On the other hand weak inter-subsidary linkages and parent company commitment limit knowledge transfer processes to that of documents and access to patents. Here variety is achieved at the expense of depth.

Similarly, the lesser variety of technologies within e.g. German or Swedish MNEs, combined with a lower subsidiary turnover, imply that these to a more limited extent may serve as an innovation system by supplying subsidiaries with radical new technologies continuously internalised elsewhere in the corporate structure – but to a much higher degree develop those ‘communicative skills’ that enable them to function as vehicle for long-term co-operative inter-subsidary integration. This of course illustrates both “the strength of weak ties” (Granovetter 1973) and the “weakness of strong ties” (Grabher 1993).

Yet another aspect concerning internal learning interfaces has to do with competition – direct or indirect – within the MNE and the extent to which subsidiaries are monitored and evaluated as individual profit-making entities rather than in terms of their contribution to the industrial system of the company as a whole’ (Morgan 2001, Herstad fortc.). Extending the work by von Krogh, Ichijo and Nonaka (2000), and building on Lundvalls emphasis on trustful relations (Lundvall and Johnson 1994), we can introduce a simple distinction between degree of subunit competition versus co-operation, and between degrees of individual unit versus systematic corporate monitoring and evaluation of performance.

Subunit competition can exist either directly, when units compete on the same product markets, as expected by some MNEs to enhance individual unit performance. Competition can further exist indirectly and thus linked to the second dimension; when units are evaluated as individual profit making entities this may induce a perceived competitive relation towards other units. This particularly applies when this monitoring and evaluation is based on standardised value proxies and combine with pre-determined corporate requirements as to e.g. returns on invested capital and lacking financial commitment on the part of the owner (Herstad fortc.).

The point in this context is that competition – perceived or real – between subunits may effectively hamper the formation of learning interfaces and hence realisation of technological synergies (Granstrand and Sjölander 1994). The mere cost and benefit uncertainty – as well as uncertainty concerning consequent distribution of actual costs and benefits – inherent in cumulative and collective learning must be resolved within a context where individual units share a common understanding of the de facto corporate incentives *towards* opportunism that their transactions must occur within.

Evidence from Norway suggest that while direct competition eliminate subsidiary initiated internal learning interfaces altogether by creating distrust and protectionist attitudes between them, indirect competition has an almost equally disabling function in reducing learning interfaces to mere buy-and-sell transactions where the scope for opportunistic behaviour can be eliminated a priori through contractual arrangements (i.e. uncertainty and complexity has to be low) (Herstad, 2004). When potential complexity and uncertainty rise, the learning interface is not established.

Readers familiar with transaction cost theory should now see how ownership integration may produce the opposite outcome of what is predicted – i.e. ownership integration increases opportunism and hence transaction costs, leading here not to integration but isolation. Further, as what must first be constructed cooperatively cannot be controlled hierarchically, *centralisation* is not sufficient to overcome this problem.

Brain gain and the nature of knowledge

The nature of knowledge itself, as defined by past organisational learning and product market interplay, not only the organisational and administrative context around it, will to a significant degree influence on what learning interfaces that may form (Lam 1998, 2000). It is generally far too often assumed (Attewell 1996) that a formal or perceived existence of potential synergies is necessarily realised as such, or merely a question of establishing suitable formal organisational structures or having a formal ‘technology transfer policy’ (Granstrand and Sjölander 1994). The mere variety of knowledge, learning processes and organisational forms, resulting in part from business system variety, are neglected, and hence their influence on inter-organisational co-operation (see in particular Lam (1998), Campagnac and Winch 1998) and knowledge transfers.

Building on contemporary work on the sociology of knowledge we can make important distinctions between

- a) signals that relevant knowledge exist within the corporate network, and the absorption and interpretation of these signals;
- b) diffusion of a given piece of knowledge from unit x to unit y, and again the absorption and interpretation of this knowledge, and last but not least
- c) the establishment of an interactive learning relationship between the units – directly or in through mediating functions – where, as opposite from the cases a) and b) - what is communicated from unit x is based on a thorough understanding of technology contained within unit y, and vice versa.

The Anglo-Saxon style MNE innovation systems portrayed above are strongly biased against a) or b), while c) both requires an ‘integrative’ approach to corporate organisation and rests on the ‘communicativeness’ and ‘absorptiveness’ of knowledge itself.

In particular, divergences in experiences, routines and frames of reference will influence on what interfaces that are formed. For instance, Nooteboom

(2000) highlight how brain-gain resulting from a relationship between units rest on cognitive complementarity between their respective core competencies; this as brain gain “...requires on the one hand sufficient cognitive distance to yield novelty, and on the other hand sufficient proximity to enable understanding” (ibid: 290). It follows that given a cognitive distance beyond a certain point actors may find themselves either unable to communicate efficiently, or generating unsustainable costs in trial-and-error attempts to bridge this distance (Herstad 2003). The definition of sustainable and unsustainable costs is of course in turn a question of corporate governance in general and corporate financial commitment to the respective interfaces, and thus often two or more subsidiaries, in particular.

Complementary to this approach Laestadius (1998) introduces a distinction between analytical and synthetical knowledge – or the degree to which organisational learning processes follow development paths pre-determined externally by academic professions, based on language and subject matter borders defined by the latter, or are synthetical in the sense of being interdisciplinary and defining its own language and subject matter borders as a result of the interplay between idiosyncratic organisational learning and product market requirements.

Similarly, Lam (1998, 2000) distinguishes between degree of ‘tacitness’ and ‘explicitness’ as well as ‘individualism’ versus ‘collectivism’ in organisational knowledge bases and organisational learning.

Both approaches converge towards the insights of Wenger (1998), who argue that knowledge transfer processes between professional communities generally rest on a common, experience-based ‘interpretative’ framework, a common language and mutual access to the often fairly tacit ‘routines’ of the organisations involved. Given analytical knowledge, this language is generic, the experience-based frame of reference easily accessible and knowledge easily exchanges as patents or other documents; and given individualism in organisational knowledge bases knowledge can easily be moved by moving individuals. Hence, knowledge transfer processes are easy and cost-effective to achieve.

Given the other opposite of collective knowledge bases characterised by a high degree of tacitness and synthetic knowledge, the latter is not easily transmitted and the scope for misinterpretations, failing co-operative ventures and escalating costs is high¹⁰². In answering the brain gain question it is thus important to note that the focus on absorptive capacity initiated by Cohen and Levinthal (1990) should incorporate perspectives on the ‘communicativeness’ as well as ‘absorptiveness’ of *different* forms of knowledge. The Axis Shield case illustrates this point well.

Embeddedness in innovation systems

A major point in the “business system literature” is that different corporations/MNEs, originating in different institutional systems, differ in

¹⁰² See Lam 1998 for an in-depth case study of a UK-Japanese strategic alliance illustrating this point

their ability and willingness to collaborate with business partners (Whitley 2001:41), and what kind of partners they preferably collaborate with

According to the transaction cost school line of reasoning this could be interpreted as differences in the willingness to expose the corporate structure to knowledge intensive/uncertain external transactions - i.e. high asset specificity, transaction frequency and uncertainty will, according to this school, given a low-trust environment, create high transaction costs and hence lead to vertical integration of these functions, and leave remaining external linkages governed by arms-length contractual arrangements.

The key in this argument is 'low trust', either actual or merely expected by the MNE, and hence differences in the preferences towards internalising such risks and hence controlling the transactions administratively. Anglo-Saxon economies in general, and US in particular, are shown to contain 'harsh' transaction environments that favour vertical integration (Storper 1997, Soskice 1998), while the Continental European economies as well as Japan are shown to display significantly more competitive intercompany relations (ibid, Fukao 1995, Ruigrok and van Tulder 1995). This, reinforced by the corporate governance system, is of course reflected in corporate routines, expectations and strategies towards partners abroad.

Consequently the literature emphasise the unwillingness of US and UK MNEs to establish long-term co-operative relations with parties outside the innovation system narrowly defined (see below). This in particular applies to their relationship towards suppliers. Experience from Norway clearly indicate that US MNEs tend to favour a transaction-cost informed vertical integration of, by them defined, key functions, while putting out the remaining up-stream activities of the value chain for open cut-throat bidding. Contracts are then offered based on prize and for a very limited period of time.

Against this the literature (Fukao 1995, Soskice 1999, Whitley 1999) usually contrast the stable user-producer relationships initiated within the institutional systems of e.g. Germany, Sweden or Japan – and consequently the experiences with such relationships carried by MNEs when they go abroad. All this has of course important implications as to the role of MNEs in national clusters and national value chains, in that the scope for technological externalities to emerge is reduced dramatically when functions are either conducted internally by the MNE, or exposed to cut-throat and short-term price competition that inevitably hamper the ability of suppliers to innovate and upgrade, and sooner or later result in contracts being given to suppliers in low-cost countries - the defined knowledge intensive parts of the value chain being internalised somewhere in the MNE anyway.

Again, evidence from Norway (Herstad, fortc) include several examples of local knowledge-intensive sourcing within regional clusters becoming substituted with international (in one case internet-based) bids, all with explicit reference to the need for meeting US or UK MNE quarter-to-quarter cost cut requirements – but also of (German, Finnish or Swedish) MNEs

stating that local or national supplier linkages are vital learning interfaces that should be governed as such.

Another important difference in the outsider-insider governed firm dimension argued in Herstad (forthc) is the fact that the latter group of subsidiaries (i.e. again German, Finnish or Swedish) have both the formal/administrative freedom to themselves chose the mode of governance of supplier relations that they find suitable – given their first-hand knowledge about how things work – as well as the financial leverage needed to expose themselves towards seemingly uncertain user-producer relationships.

Recent evidence (Lam 2000, 2003) however highlights the superiority of US-style organisations and thus MNEs when it comes to establishing and utilising contacts with research institutions, both domestically but also abroad. Similar observations are made by Doremus et al (1998) and explained with reference to the national innovation and education systems from which they have evolved (i.e. the strong research/education/industry linkages found in the US, cf. table), as opposite to e.g. Japanese MNEs with far less experience with such linkages from home.

Lam (2003) however poses a complementary explanation in highlighting business system initiated differences in organisational set-ups and thus logics of learning: US style firms focus heavily on the role of the individual expert, hence managing to create ‘external, internal labour markets’ (Lam 2000) where the labour market for individual experts in the corporate organisation overlap with research institutions and hence contribute to a strong linkage between the two – thus enabling knowledge exchange through either co-evolution of synthetic knowledge or a strong mutual emphasis on analytical knowledge.

Similarly, the ‘pure’, and far broader in the sense of incorporating a larger part of the employee base, internal labour markets for experts found in German or Japanese style organisations imply a higher degree of ‘collectiveness’ and firm-specific synthetic knowledge – which in turn imply both that linkages to outside R&D are more limited – and that those linkages that are formed will be characterised by problems of communication as a result of the nature of knowledge itself.

Table 5**The innovation system effect and the MNE**

	US MNEs	German MNEs	Japanese MNEs
Home-base national innovation system	Originating in mission-oriented policy environment, strong linkages to higher education, focus on science-intensive high-tech industries	Diffusion-oriented, strong inter-industry linkages, national focus on specialized suppliers and scale-intensive medium tech industries ('diversified quality production')	Strong inter-industry linkages, weak linkages between industry and 'outside industry' R&D
MNE organisational set-up	From financial system driven unfocused risk diversification to financial system driven focus on 'lean structures'. Low degrees of inter-subsidiary integration	Varying degrees of focus, but divisionalised according to technology/product market considerations, integrated within divisions	Focused and integrated.
MNE preferred supplier relations	Arms-length, contractual and short-term.	Stable, selective and long-term	Stable, extremely selective and long-term

Implications for subsidiaries

Now, given the theoretical arguments and empirical findings presented above we could portray the 'archetypical', *mature* MNE from the distinct business systems of the US, Germany and Japan as in table 6 below. For the purpose here these can be seen as, admittedly crude, proxies for the broader Anglo-American group (US MNEs) or Continental European and Nordic group (German and Japanese MNEs).

Table 6
MNE organisation and strategy

	US MNEs	German MNEs	Japanese MNEs
Revealed strengths	Generating or seeking out and internalising radical new technologies, forcing commercialisation of science based knowledge, product innovations and patenting.	Enabling complex problem solving and incremental innovations, firm specific knowledge accumulation. Knowledge transfers and in-house synergies.	Enabling complex problem solving and incremental innovations, firm specific knowledge accumulation. Knowledge transfers and in-house synergies.
Revealed weaknesses	In enabling incremental innovations and (long-term) programmes of complementary (R&D and non-R&D) investments that depresses present returns without promising radical new technology. Knowledge transfers and in-house synergies.	In enabling commercialisation of science-based knowledge and radical product innovations. Conservative, uncertainty-averse.	In shifting technological development paths. Conservative and path-dependent through emphasis on firm specific learning and inability to feed on external research.
Parent commitment and subsidiary role	Commitment to subsidiaries contingent on prospects of emerging product or technology, ability of subsidiary to defend/increase earning by <i>continuous</i> cost cuts and/or market for sell-out.	Commitment to subsidiary contingent on defined role in long-term company technology and market strategy.	Commitment to subsidiary contingent on defined role in long-term company technology and market strategy.
Linkages to host innovation systems	Revealed ability to and focus on linking up with host system research institutions. Weaker linkages to other business partners	Mixed picture. Weaker linkages to host research than US counterparts, but stronger linkages to other business partners.	Very weak linkages to host contexts, known to even move suppliers with them when establishing activities abroad.

Note that this mainly applies to mature firms of a certain size; i.e. firms which through institutionalisation processes (Scott 1997) have become rule and routine governed, and thus reflecting the rules of the societies in which they have developed and to which they remain linked through ownership. These are the firms that constitute the main bulk of the existing MNE population.

Before proceeding to draw general brain gain or drain implications we also stress that *actual firms* may vary quite a lot from the picture portrayed above. First, this an inevitable result of not all MNEs investing in the Nordic countries being 'typical' in the sense of large and mature – rather, our case studies contain at least one example of how age, size and the concrete history of the firm have produced a UK MNE contradicting the Anglo-Saxon governance styles and organisational set-ups associated with these as a group (i.e. the Axis Shield case).

Hence, actual owner firms may – and will, of course - display characteristics that are solely theirs as firms, and not reflections of their home bases. Examples in Herstad (fortc) include family controlled and union-friendly US MNEs, as well as extremely shareholder value oriented European ones. No structural determinism should thus be read into the following, as it focuses on *incentives, constraints, experiences and resulting tendencies* in themselves rather than presupposing these to always emerge as their seemingly logic outcome (Bhaskar 1978).

Having said this, contemporary in-depth MNE research (Lam 2003, Geppert, Williams and Matten 2003, Morgan et al 2002, Herstad, fortc) as well as the broader agenda of research on national business systems show no evidence of the structural revolution in either the world economy or in MNE behaviour that would force us to reject the conclusion by Doremus et al (1998) and Whitley (2002): That

a) the internationalisation strategy of MNEs reflect incentives and constraints in their respective home business and innovation systems (Ruigrok and van Tulder 1995), and

b) that these same systems causes them to govern subsidiaries in accordance to experiences and routines developed within them – i.e. as they would domestically.

According to Whitley (2002), the perceived uncertainty stemming from operating in different business environments would actually cause this tendency to be reinforced – this as uncertainty strengthen routines – rather than eliminated.

Table 7

Subsidiary implications

	US MNEs	German MNEs	Japanese MNEs
Subsidiary internal brain gain	Strong corporate focus on reportable R&D and (patentable) product innovation may boost subsidiary formal research.	Patient capital and industry specific ownership advantages may enable long-term investment programmes and incremental innovations that do not necessarily result in radical new technologies	Patient capital and industry specific ownership advantages may enable long-term incremental investment programmes that do not necessarily result in radical new technologies
Subsidiary internal brain 'paralysis'	Short-term non-R&D investment strategies and governance approach inhibit long-term organisational learning. Bias towards nurturing defined experts may alienate other groups, and bias towards nurturing individual performance may inhibit broader organisational learning.	Parent companies shown to be hierarchical and conservative, and while 'thorough' in decision making processes radical subsidiary technology renewal processes may be negatively discriminated (uncertainty-averse).	Tight administrative control and focus on 'Japanese practices' may inhibit level of local leverage necessary to <i>renew</i> organisational learning processes. Strong path dependencies.
Implications of parent commitment	Commitment contingent on prospects of radical innovations may boost R&D, while creating strong bias against long-term non-R&D investments focused on incremental innovations.	Commitment to subsidiary contingent on defined role in long-term company technology and market strategy; enable long-term development strategies in subsidiaries but may reinforce negative path dependencies	Commitment to subsidiary contingent on defined role in long-term company technology and market strategy.
Subsidiary post-takeover innovation system linkages	Strong/increasing linkages to R&D institutions through parent company focus on such. Weak linkages to other	Stronger emphasis on enabling and nurturing selective linkages to specialised suppliers, less emphasis on	Strong emphasis on internal organisational learning and extremely selective supplier linkages.

subsidiaries in corporation, and non-R&D business partners (e.g. suppliers)	linkages to external research nurture path-dependent incremental innovations	
High turnover of subsidiaries imply availability of technological capabilities at the expense of deeper, selective linkages (cf. Granovetter and 'the strength of weak ties')	Lower turnover of better integrated subsidiaries imply lesser technological variety but deeper linkages (cf. 'the strength and weakness of strong ties')	Extremely reluctant and selective internationalisation imply less internalised technological variety, low turnover of subsidiaries imply strong path-dependency in renewal of this variety.

It is traditionally argued (Narula 1996) that a main reason to internationalise is the prospect of utilising owner specific advantages, developed domestically as a result of national industrial specialisation, on a larger scale. In the case of Anglo-Saxon MNEs in general and US MNEs in particular we may argue that such ownership advantages to a large extent lie in the ability of these companies to achieve technological renewal through a combination of aggressive acquisition and divestment strategies, strong linkages to external research institutions abroad and domestically – and a high level of internal R&D – all *driven* by the necessity of continuously creating shareholder value by reporting improving results and creating increasing expectations, and enabled by their domestic experiences and organisational set-ups focused on the same.

Seen from the viewpoint of the subsidiary, the flip side of the coin is lacking parent commitment and what some subsidiaries report as perverted requirements as to non-R&D operational predictability and short-term operational efficiency improvements that inhibits the incremental innovations enabling the latter to be sustainable in the long run (Herstad, fortc). Hence, US and UK MNEs are distinct agents of *financial capital*, with those distinct logics of R&D, organisational learning and innovation that follow.

Similarly we may argue that the ownership advantages of e.g. German, Swede or Japanese MNEs these seek to exploit abroad carry all the hallmarks of conservative and patient *industrial capital*; and hence both corporate organisational principles and investments in research and development more broadly defined flavoured less by a need to build expectations externally, and allow for external estimation of corporate value, than the monitoring and evaluation of organisational learning and product market prospects continuously carried out by those *insiders* that define corporate structure and strategy (and who, as highly exposed to

individual firms, are more risk and not least uncertainty averse than their portfolio diversifier counterparts in the UK and US).

These *general* subsidiary implications should however in turn be interpreted against the known specificities of the Nordic business and innovation systems as well as revealed industrial specialisations in order for the positive or negative contributions to subsidiaries as well as regional or national innovation systems to be identified.

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