Peter Gabrielsson

GLOBALISING INTERNATIONALS: PRODUCT STRATEGIES OF ICT COMPANIES

Peter Gabrielsson

GLOBALISING INTERNATIONALS: PRODUCT STRATEGIES OF ICT COMPANIES

ACKNOWLEDGEMENTS

allowing me leave to pursue my studies and for encouraging me to develop my competencies in this new and interesting area.

To Mr. David Miller I would like to express my gratitude for improving the English of my thesis. It is now not only more fluent, but also more correct and precise.

Finally, I would like to express my warm gratitude to my wife Hannele, my son Henrik, my parents Juha and Yvonne, who all were an important source of support during this research and enabled me to establish a balance between everyday life and research life. Especially, I want to thank Hannele for her patience and warm support during this interesting journey.

Helsinki, September 2003

Peter Gabrielsson

ABSTRACT

The study analyses how product strategies change when ICT equipment manufacturing companies move from the international to the global stage and what factors are expected to explain this development.

Product strategy evolution is described in three dimensions - product platforms, product lines, and individual products - and in terms of three product strategy alternatives developed on the basis of the standardisation degree. They are called the localised, modified, and standardised product strategies.

A theoretical framework and working propositions were constructed by analysing the existing theoretical approaches. The framework developed consists of four explaining blocks: first the macro and industry environment, second the corporate level strategies, third the business level strategies, and finally the internal strategic levers, resources/capabilities and decision-making variables.

In the empirical part, development of the product strategies of five Finnish ICT equipment manufacturers was analysed with the multiple case research method. It was found that the globalising internationals are developing towards more standardised product strategy alternatives, the product assortment is becoming wider and also more advanced product categories are increasingly used, not only goods, but also services, know-how and systems during globalisation. Moreover, global product platforms and horizontal co-operation are increasingly important for ICT companies.

This research will contribute theoretically in a number of areas. The globalisation of international companies has been studied very little and a better understanding of this process is valuable. Also, a detailed analysis of the evolution of the product strategies of globalising internationals in the ICT equipment manufacturing field during globalisation is an important contribution. The research contributes further by developing a theoretical framework and by putting forward a number of propositions explaining this evolution. These are expected to be useful for future research in this area. The managerial contributions stem from the understanding of the available product strategy alternatives and their expected development during the often critical transformation period from international towards global companies.

Finally, the study suggests that the generalizability of the framework and propositions developed herein could be tested in a large international survey in ICT or some other similar field. Moreover, it would be interesting to compare the results of the product strategies of globalising internationals found in this study with research on born globals. In future in addition to products, also channels, brands, pricing and the operation strategies of globalising internationals could be studied. Moreover, a deeper understanding of co-operation with different value network members could bring interesting findings. It would also be interesting to extend the study from the strategic business unit level to the corporate level.

Keywords: product strategies, globalisation process, globalising internationals, product standardisation, ICT companies

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1. INTRODUCTION

1.1 Background

Strong forces drive globalisation in the information and communication technology (ICT) field. The market has been liberalized, the importance of cost and economies of scale are huge in many fields, global customers are emerging and competition is increasing constantly.

The telecommunication companies operating in this kind of environment have to compete in a wider geographical area and rapidly expand their operations. Furthermore, they have to develop products with a high degree of standardisation, understand different trends in lead markets, and co-operate with other companies. (Alahuhta 1990, 9-19) However, there are also market trends that require locally differentiated products and services, e.g. in the area of industrial systems. Hence, success requires management of the simultaneous need for local adaptation and global integration. (Kosonen 1991, 13-14)

Many ICT companies have internationalised their activities at an early stage and are in the process of globalising or have recently globalised their company. During internationalisation, these companies often developed a diversified business portfolio. At that stage the major concern was related to the structure of their business portfolio. When globalisation started at the end of the 80s and in the 90s, these companies often selected a few strategic businesses to be globalised (See Luostarinen 2001a). At that point the main issues became the product strategy of these strategic businesses selected for global markets and how strategy evolved along with globalisation. One example is the Finnish telecommunication giant Nokia, which first became an international company in the late 80s in a large number of businesses and then later transformed into a global one focusing on mobile telephones and networks.

In addition to the globalisation challenges, high technology companies face unique challenges due to technology driven products and markets. These companies need to constantly look for new markets, manage extremely short and rapidly changing

product life cycles, introduce new technologies, and adapt to collapsing markets. (McGrath 1995, 4)

Understanding globalisation and managing the product strategy of strategic businesses in this environment has become a key success factor for today's international companies in the ICT industry.

1.2 Research gap and problem

In the information and communication technology (ICT) industry, the pressure to globalise existing international business is great. International companies in this field need a well-planned global strategy to be able to realize their potential fully. The companies have to decide about global market participation, global product and marketing strategy, global location of activities as well as global competitive moves. Both huge benefits and risks are involved. (Yip 1992, 15-18) In the ICT field, the importance of effective product strategy is especially important.

The internationalisation process of companies has been widely studied (Luostarinen 1970, 1979 and 1994; Johanson and Vahlne 1977). The prevailing knowledge on internationalisation as a process focuses on firms in the early phases of internationalisation (Melin 1992, 113). Research has also been focussed on both multinationals and already global companies. Recently, the globalisation process has become of interest to researchers (see e.g. Luostarinen 2001a; Kirpalani and Luostarinen 1999). However, little research has been done on the globalising internationals. Globalising internationals are those companies, which have first internationalised after the domestic period and then started to globalise their operations outside the domestic continent (see Luostarinen and Gabrielsson M. 2001).

Also, recent research on the internationalisation of firms has concentrated on operation strategies (see e.g. Luostarinen and Welch 1990; Buckley and Casson 1998), market selection (Tyyri 1994) and channels (Gabrielsson M. 1999). Much less attention has been paid to product strategies, which obviously play a key role when a company is globalised. An exception is the research conducted by

Luostarinen (1979, 1994), who has studied how product strategy changes along with internationalisation. Product standardisation versus adaptation strategies has been studied rather widely with respect to different marketing mix elements (see e.g. Buzzell 1968; Keegan 1969; Levitt 1983; Jain 1989). However, research has concentrated on multinationals and many times US-based companies, while companies originating from small and open economies (SMOPEC[1]) have been studied less. Furthermore, the change in these strategies that occurs during the transition from the international to the global stage has not been studied.

In the above discussion, one area where little research has been conducted was identified. It can be stated in the form of a research problem as follows:

How can international ICT companies from small and open economies meet the huge globalisation challenge of developing products and managing them during global expansion?

1.3 Research question and objectives

Having stated the research problem the main research question may be formulated for the research problem as follows:

How do product strategies change when ICT companies move from international to global and why?

The research objectives can be divided into theoretical and empirical. First the theoretical objectives of this study may be formulated as follows:

1. To identify and analyse what global product strategy alternatives are available and how the product strategies are expected to change when international ICT companies globalise.

2. To describe and analyse the influence of the environment, corporate and business level strategies and resources on the global product strategies of the ICT companies and the other motives and reasons for these decisions.

---

[1] The term SMOPEC has been developed by Luostarinen (1994, 37).

3. To build a framework explaining the determination of global product strategies in the ICT companies and to develop propositions regarding the influence of the explanatory variables on the global product strategies.

Secondly, the <u>empirical objectives</u> of this study are as follows:

1. To analyse whether the product strategies change when international ICT equipment companies globalise and, further to explain how the product strategies change if such development is found.

2. To analyse the motives and reasons for selecting a certain global product strategy and the factors influencing the development of such strategies in globalising ICT equipment manufacturing companies.

3. To examine the theoretical framework and propositions developed in the theoretical part and, if necessary, suggest a revised framework and revised propositions.

The research approach in this study is to first review and analyse existing literature and secondary data and based on this build a conceptual framework and propositions of the relations of the variables (Chapters 1-2). Therefore, the first part is by nature theoretic-conceptual. This lays the ground for the empirical examination of the framework and propositions in the empirical part, utilising multiple case research methodology. In this part a revised framework and propositions are also outlined (Chapters 3-4). In the end, findings are summarised and both theoretical and managerial implications are outlined (Chapter 5).

1.4 Definitions and limitations

The words international and global, and internationalisation and globalisation are often used without a clear definition, which often causes misunderstanding.

A large number of definitions have been proposed in the international business literature for internationalisation (see Luostarinen 1970, 1979 and 1994; Johanson and Vahlne 1977; Johanson and Mattsson 1988). In this study internationalisation can be seen as a stepwise process where companies proceed towards higher foreign market involvement (see Johanson and Vahlne 1977, 23; Luostarinen 1979, 200). Earlier research has found that traditionally Finnish companies have often first internationalised to neighbouring countries and then to other countries with longer business distance within the domestic continent and only later globalised to other continents. (Luostarinen 1994; Luostarinen and Gabrielsson M. 2001)

Globalisation can be analysed on a number of levels: the entire world, a specific country, a specific industry, or a specific firm, and it can have many different meanings and interpretations (Govindarajan Gupta 2000). Previous literature has described globalisation as a change in the management orientation towards a geocentric orientation (Perlmutter 1969) and also as the development of strategies of globalising companies (Yip 1992; Douglas and Craig 1989; Luostarinen 2001a). In this study the term globalisation is understood as a process, in which the firm (A) expands its markets geographically from domestic continent to other continents (see Luostarinen and Gabrielsson M. 2001) and (B) develops towards increasing global alignment of activities across countries (see Craig and Douglas 1996).

This study focuses on "globalising internationals" that can be defined as those companies, which have first internationalised after the domestic period and then started to globalise their operations outside the domestic continent (see Luostarinen and Gabrielsson M. 2001). In Finland these companies faced the globalisation pressure in the latter part of 80s and especially during the 90s that forced them to globalise their international businesses (see e.g. Luostarinen 2001a).

Earlier research has defined two geographical market expansion measures: the internationalisation degree, that is sales outside the home country, and the globalisation degree, that is sales outside the home continent (Luostarinen and Gabrielsson M. 2001). Furthermore, a company has been considered global when over 50% of its total sales take place outside its home continent (Luostarinen

2001a). In this study, Luostarinen's measures are used: a company is international when more than 50 percent of its total sales come from outside its home country. A company is global when over 50% of its total sales comes from outside its home continent. The above-mentioned criteria have been used when selecting companies that have moved from the international to the global stage.

The global market is expected to develop in certain phases during globalisation of companies. Craig and Douglas (1996) have described global market development as an evolution in three phases from the initial entry phase to the local market expansion phase, and further to the global rationalisation phase. In this research, the term international penetrations is used for the second phase as it illustrates better the penetration within the countries that is important at that phase. Moreover, although the term global rationalisation well describes the phenomena in this work, the term global market alignment is used as the name of the last phase, in order to avoid the possible association that the previous international phases have been irrational. The market strategy is expected to change from international to global when entering the global alignment phase and when the company starts to see the target markets as global instead of separate country markets, which leads to alignment of activities across countries. Therefore, as the company globalises, the market strategy is expected to develop from (1) international market entries and (2) international market penetrations phases towards (3) a global market alignment phase. See Figure 1 for an illustration of the geographical market expansion and the global market development phases.

Figure 1. The globalisation concept as geographic market expansion and global market development phases

<div align="center">

Geographical market expansion towards global
</div>

Domestic company	International company Over 50% of sales outside home country	Global company Over 50% of sales outside home continent

Domestic market	International market entries	International market penetrations	Global market alignment

<div align="center">

Global market development phases
</div>

<div align="right">

Time
</div>
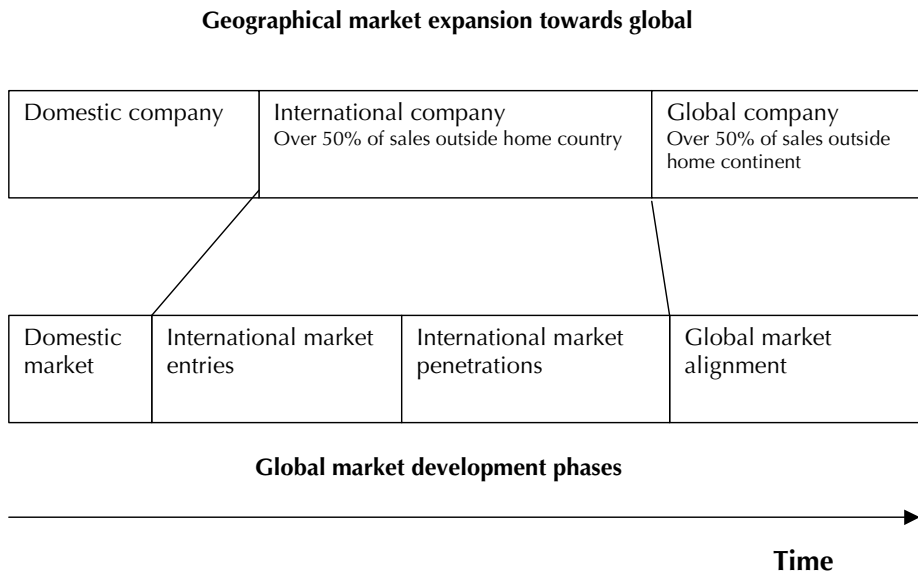
Source: The criteria related to geographical market expansion have been developed by Luostarinen (2001a). The phases of global market development are adapted from Craig and Douglas 1996.

A product strategy is seen as consisting of decisions on several dimensions including the product platforms, product lines and individual products (McGrath 1995, 14; Kotler 1984, 472-481). A global product strategy defines which products are developed and how the characteristics of these products address global requirements (McGrath 1995, 162). In this work, the term global product strategy refers to the different alternatives the company may choose in the question of product strategy to address global market requirements.[2] The product development process is already discussed widely in the existing literature (see for example Craig and Hart 1992 for a review) and therefore it will not be discussed in detail in this research. However, this area will be touched when discussing the standardising of product management processes.

---

[2] A glossary of the most frequently used terms and abbreviations is in Appendix 1.

ICT is an abbreviation for information and communication technology (see e.g. Paija 2001, 11). The focus in this research is on ICT equipment manufacturers. The other areas of the ICT field are not included in this study. This limitation was made due to the different nature of equipment manufacturers compared with pure software companies. However, it is worthwhile noticing that many ICT equipment manufactures also sell software either separately or deliver it together with the equipment, and therefore software sales may also be included in the product assortment of the companies under study. Moreover, the study was limited to ICT equipment manufacturers originated from Finland, which is a typical SMOPEC country.

1.5 ICT cluster and globalisation

1.5.1 ICT Cluster

The information and communication technology cluster ranges from a broad number of different companies from manufacturers to service providers. The Information and communication technology cluster is shown in Figure 2. The cluster can be divided into key industries, supporting industries, related industries, and associated services.

Figure 2. ICT Cluster in Finland

SUPPORTING INDUSTRIES

RELATED INDUSTRIES

Component producers

Contract manufacturers

Education and R&D

KEY INDUSTRIES

Digital content

Packaging

Network infrastructure

Applications software

Network operation

End user terminals

Portals

Traditional media

Entertainment

Other services

BUYERS / APPLIERS

Individuals

Organisations

ASSOCIATED SERVICES

ICT Consultancies

Venture capital financies

Standardisation forums

Source: adapted from Paija 2001, 15. Note: ICT equipment manufacturing, the object of the study is shaded in the figure.

The focus in this research is on ICT equipment manufacturers, which may be classified to include network infrastructure systems, terminals, and ICT component manufacturing.[3] Examples of companies originating in Finland that belong to this category are Nokia, Teleste, Electrobit, Tecnomen, Benefon, Nemo Technologies, NK Cables, Filtronik LK, PKC Group, Salcomp and Savcor coatings.

The gross value of cluster production was EUR 21.4 billion in 1999 and it was dominated by the ICT equipment and electronic component manufacturing, which accounted for 70 percent of the value of production. ICT services represented around 30 percent of the total value. However, it is important to note that ICT equipment sales also include a large number of software and IT services. The importance for Finnish exports of the ICT cluster is crucial. (Paija 2001,16-18) In

---

[3] Contract manufacturers are not covered as they mainly offer manufacturing capacity to the component, network, and end user terminal manufacturers.

2000, ICT product export represented 30 percent of total exports compared with only 5 percent in 1990. (Paija 2000, 3-5 and 2001, 3)

1.5.2 Globalisation of Finnish firms as a growth strategy

According to Luostarinen (2001a), globalisation can be seen as a growth strategy from the company's point of view. He argues that the growth strategy utilised by many Finnish firms after the Second World War was unrelated diversification within Finland. This was an attractive alternative for growth due to the lack of foreign competition as the market was protected by tariff and non-tariff barriers and a high demand for products existed in general. As the market opened up due to trade agreements (GATT and EFTA), the competition increased on the home market, but also opportunities to enter foreign markets emerged, and as a result Finnish companies internationalised in a number of unrelated fields. Their international operations and sales were, however, largely concentrated on the European continent during the 70s and 80s. (Luostarinen 2001a) The European integration development and the gradual opening of these markets was an important factor affecting the internationalisation of Finnish companies to Europe. The peak of this integration was reached when Finland became a member of the European Union. (Hansén 1999) As the demand and competition became global and the trade barriers were gradually decreased on global level during the 90s the companies globalised to also other continents and focused fully into core businesses. Luostarinen proposes further that from 1995 onwards companies have continued to globalise, but started also to diversify to related business areas. (Luostarinen 2001a and 2003) Thus, growth strategies of Finnish companies can be seen to have developed in four stages according to Luostarinen (2001a and 2003): 1. Domestic business and unrelated diversification, 2. Internationalisation and unrelated diversification, 3. Globalisation and focus and 4. Globalisation and related diversification. It can be concluded that the opening of the markets has been an important factor affecting the internationalisation and globalisation of Finnish firms (see also Hansén 1981 and 1999).

Globalising Finnish firms can be divided into two main groups: born globals and globalising internationals (see Luostarinen and Gabrielsson M. 2001). The born globals phenomenon has raised interest among many researchers (see e.g. Oviatt and McDougall 1994; Knight and Cavusgil 1996; Madsen and Servais 1997). The born globals are companies that have started to globalise their operations from the very inception without any preceding long-term domestic and internationalisation periods (see Luostarinen and Gabrielsson M. 2001). Many recently established smaller ICT companies focusing on software and IT services belong to this group (see e.g. Saarenketo 2002). On the other hand globalising internationals are those companies, which have first internationalised after the domestic period and then started to globalise their operations outside the domestic continent (see Luostarinen and Gabrielsson M. 2001). This latter group is the focus of this study. The globalising internationals include many important ICT equipment companies, for example, Nokia and a number of smaller companies as well.

1.5.3 Globalisation drivers and ICT field

The globalisation of firms has accelerated from the early 90s. Some of the key drivers of globalisation are (A) homogenisation of the markets in question of customer tastes, habits and values and the emergence of global market segments (Levitt 1983; Doz 1991; Kirpalani and Luostarinen 1999; Wood et al. 1999), (B) the emergence of global customers (Yip et al. 1988; Gupta and Govindarajan 2000; Douglas and Craig 1989), (C) the decreasing cost of transportation and communication (Levitt 1983; Doz 1991; Yip 1989), (D) decreasing trade, investment and standards-related barriers (Doz 1991; Yip 1989; Hansén 1999; Kirpalani and Luostarinen 1999), (E) the competitive pressures from new competitors and the efficiency imperative (Porter 1986; Doz 1991, 18; Yip et al. 1988; Gupta and Govindarajan 2000; Douglas and Craig 1989), and (F) the small size and openness of the home markets compared with the large and open global markets (Luostarinen et al. 1994, 166-171). Next these drivers will be examined.

Levitt (1983) has argued strongly that the different needs across the markets are becoming similar and only those companies that learn to operate as if the world

was one large market will survive. The emergence of global markets for standardised products and technological inventions in telecommunications opens up new possibilities in economies of scale in production, distribution, marketing, and management (Levitt 1983; Yip 1989; Doz 1991). The Japanese companies' approach to viewing the entire world as a potential market has been the key in their success in many industries, including consumer electronics (Kotler et. al 1985, 173-196). In the ICT field, the markets are becoming more alike. For example, in the mobile telephone business, the needs of the markets are becoming similar and requirements for market adaptation are becoming fewer. Segmentation is based more on products or customer type rather than geographical area. (Alahuhta 1990, 9-19)

Also, the existence of global or regional customers or channels drives this development (Yip 1989; Gupta and Govindarajan 2000; Douglas and Craig 1989). In some markets, customers favour global or foreign marketing and products and this may open up new opportunities for standardised products. Also, as people are travelling abroad it may in some product categories be favourable that they are exposed to the same type of offering and marketing efforts outside their home. (Yip 1997; Levitt 1983) The homogenisation and emergence of global segments brings possibilities for benefiting from a number of cost-related factors due to economies of scale and learning (Yip 1991). In the telecommunications field, for example, global players like Vodafone and DoCoMo are emerging.

The liberalization of all kinds of trade barriers, be they tariff or non-tariff barriers, compatible technical standards or common market regulations open up the global market for competition (Yip 1991; Hansén 1999). Technical standards are especially important in the high technology and ICT industry and this factor has opened up new possibilities for offering global products in, for example, the GSM market. Liberalization in European trade in general and in the telecommunications sector speeds up the globalisation process in the telecommunications industry (Alahuhta 1990, 9-19). Deregulation of operator competition has opened up the operator business to competition. Mainly in government-controlled industries and defence-related industries, trade barriers are still present (Doz 1991).

The above factors are necessary, but not sufficient for globalisation to take place. There must also be companies that exploit these global opportunities, compete in global markets, and integrate their activities on a worldwide basis (Doz 1991). Competition is many times fiercer in the high technology and ICT fields so companies use all possibilities to achieve a competitive advantage through global integration when the potential exists. Increasing global competition and increasing speed in the development of new technologies have led to shorter product cycles, higher innovation intensity, and the increasing importance of economies of scale (Alahuhta 1990, 9-19). In many high technology companies due to high R&D costs it is extremely important to spread the development costs over the largest possible volume of sales from foreign countries, many times globally. This is especially true in ICT companies, in which the outlays for R&D are often high.

Earlier research has identified two macro factors, push and pull, which are expected to drive the globalisation of Finnish companies from small and medium sized economies. The smallness, openness and peripheral location are expected to push companies to globalise, while large size and openness of target market is expected to pull companies to globalise. (Luostarinen et al. 1994, 166-171) For globalisation of ICT companies these factors are expected to be especially important. The size of the Finnish market is not big enough to launch products in the ICT field. ICT companies have to seek global markets for their products. For example, Nokia's net sales to Finland were less than 2 percent of the total in 2001 (Nokia 2002 Annual Report). Also, the ICT markets have developed towards more open, which further pulls companies to globalise.

Based on the above discussion, it can be assumed that in the high technology field in general and in ICT companies in particular, the globalisation drivers are relatively strong and many ICT industries are global by nature. Therefore, telecommunications equipment companies operating in this kind of environment have to compete in a wide geographical area and rapidly expand their operations. They have to develop products with a high degree of standardisation, understand the different trends in lead markets, and co-operate with other companies. (Alahuhta 1990, 9-19). However, there are also market trends that require locally differentiated products

and services in certain fields, such as industrial systems. So the key to success is to manage the simultaneous need for local adaptation and global integration. (Kosonen 1991, 13-14)

1.5.4 The globalisation potential of industry versus product strategy of companies

The strong globalisation drivers are expected to push the international ICT companies to change their product strategy to a global strategy (Douglas and Craig 1989; Yip 1989). This is because to compete successfully, companies should match the globalisation potential of the industry with their global product strategies (Yip 1991).

In Figure 3, this balance is illustrated in the question of product strategy. It can be noted that an area is shown in which the company can be said to have balanced strategy contra industry pressure. When the industry globalisation drivers are strong in the industry, the globalisation potential is high. In this situation, it is beneficial to select a product strategy alternative in which the standardisation of the products is as high as possible. Similarly, if the industry globalisation potential is low, the company should consider a more adaptive product strategy to match the local market requirements. The unbalanced areas shown in the figure illustrate the situation when there is a miss match between the product strategy and the globalisation potential of the industry. Businesses may not always recognize the global opportunities in their industry (Birkinshaw et al. 1995) For example, if a company chooses a strategy alternative of offering products with a low level of standardisation in a global industry, it faces disadvantages due to low economies of scale and is likely to run into a competitive disadvantage against competitors that offer highly standardised products.

Figure 3. The globalisation potential of industry versus the global product strategy of the company
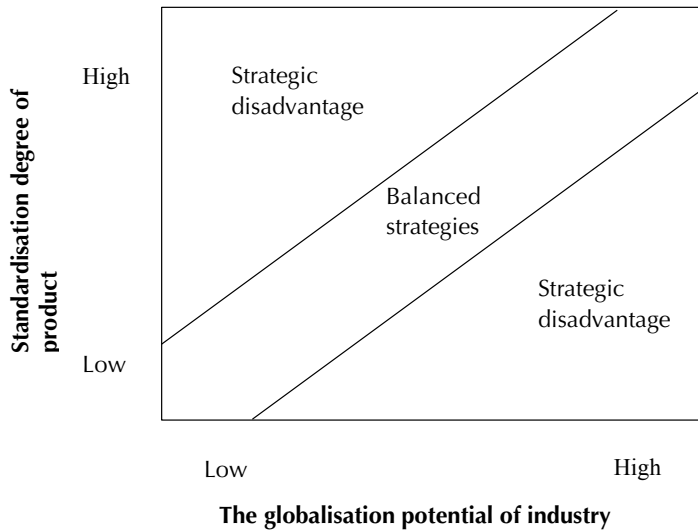
Source: Adapted from Yip 1991, 7

1.6 Product strategy dimensions

The product strategy of high technology companies can be seen to consist of three dimensions: product platforms, product lines, and individual products (McGrath 1995, 14).

First of all, the product platform dimension involves decisions about how to develop product platforms for global markets. From a platform, a multiple of products are developed for a product line. Secondly, the product lines dimension defines the width of the product assortment (the number of product lines), the length of a product line (the number of products in a line), and the positioning of products in each line. It is important to decide whether the width of the product assortment is narrow or broad and what is the length of each product line during globalisation. The third dimension is the individual products that are launched on

the market, including their nature and content. (McGrath 1995, 18-20,) See Figure 4, which illustrates the product strategy dimensions and the requirement in a global environment to standardise these dimensions and manage them so that there is consistency in the dimensions across markets.

Figure 4. Product strategy dimensions

PRODUCT PLATFORMS
Underlying technology,
software and hardware platforms

PRODUCT LINES
Product assortment width (number of product lines),
product line length (number of products in a line),
and positioning of products

INDIVIDUAL PRODUCTS
Nature and content of products

Global standardisation
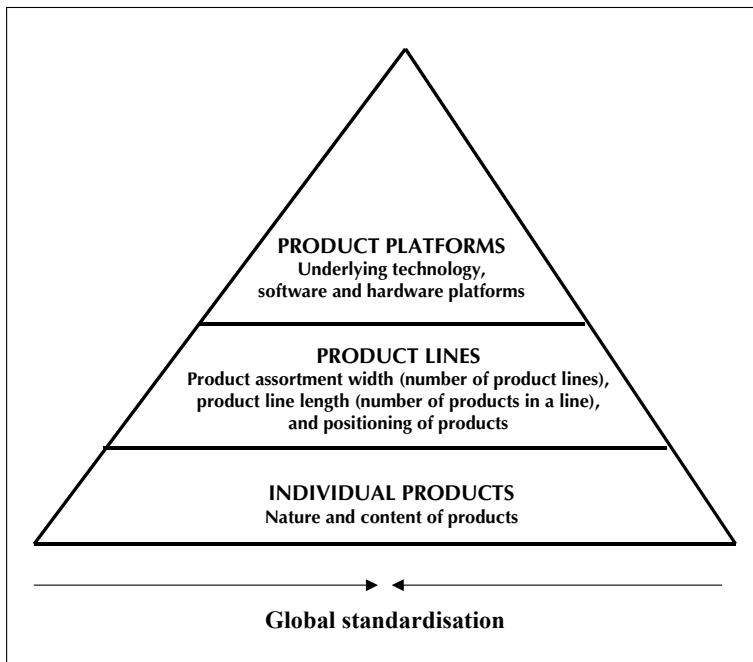
Source: Adapted from McGrath 1995, 18-20

1.6.1   Product platforms

The importance of product platforms in the high technology area has been stressed by many authors (see e.g. Meyer and Lehnerd 1997; Sawhney 1998; Robertson and Ulrich 1998; Rajala 1997, 187-188). They are especially important for ICT companies, but recent research has also found that many other fields also benefit

from the use of product platforms (See Meyer and Dalal 2002)[4]. Instead of developing single products that compete for resources, successful companies develop product platforms from which a number of derivative products can be developed (Meyer and Lehnerd 1997, 2). In the high technology area and in particular the ICT field, the product platforms are the primary element of product strategy (McGrath 1995, 14). Their importance in the ICT field stems from the fact that often the individual products for the whole product line are developed from a product platform and therefore a product platform will affect the whole product line's competitiveness and often have a significant impact on the company's success and financial result.

The product platform may be defined as follows according to Meyer and Lehnerd (1997, 39): "A product platform is a set of subsystems and interfaces that form a common structure from which a stream of derivative products can be efficiently developed and produced".

A well-planned product platform strategy focuses senior management on the most important issues, establishes the foundations of the product line, provides the framework for long-term business strategy, links the company's strategic vision with its product line strategy, and provides a specific direction for technology development (McGrath 1995, 48-49). The key to the product platform area in high technology and especially in the ICT field is the underlying technology. Especially important is the understanding of the defining technology of the platform that differentiates it from other platforms (McGrath 1995, 43).

In the context of globalisation, the importance of the product platforms is that by developing a competitive product platform the company can still make region or country specific adaptations cost effectively. The standardisation of the product platforms has been, for example, one of the key objectives of Nokia Mobile Phones (Häikiö 2001a, 156). Based on product platforms, cost effective models have been developed. This has presumably been an important element in Nokia's ability to respond to the different telecommunications standards in the world, but still keep core elements in the platform standardised.

---

[4] Product platforms have been used in designing products like for example power tools, cars, financial services, and films (Meyer and Dalal 2002).

In the context of product platforms, the understanding of how to build modular products is important. According to Baldwin and Clark (1997), it is important to define design rules when planning modularity in products. First of all, the architecture defines which modules are needed in the product and their function. Secondly, the interfaces specify in detail how the modules will interface. Finally, standards define how to assure and test that the module meets the design rules. In the mobile telephone industry, the key players have started to work together to define key design rules and standards for future products and services to ensure compatibility across countries and devices. Some companies including Nokia and Ericsson have even started to sell parts of their future product platforms to competitors to create additional revenue, often through licensing certain key technologies.

Globalisation seems to exert pressure for a more standardised approach in product design at product platform level, be it software or hardware. It can be assumed that the ICT companies utilising an international entry or penetration market strategy develop their products independently as separate entities. However, companies operating according to a global approach are expected to increasingly standardise the product platform across countries.

1.6.2 Product lines

Important decisions related to the product lines first of all concern the width of the product assortment[5] (number of product lines offered), and secondly the strategy of each product line including a decision on, for example, the product line length[6] and positioning of products within a line.

A product line can be defined according to Kotler (1984, 472): "as a group of products that are closely related, because they function in a similar manner, are

---

[5] The product assortment (product mix) can be defined as the set of all product lines and items that a particular seller offers for sale to buyers. The product assortment width refers to how many different product lines the company carries. (Kotler 1984, 469-470) In this work the term product range is used as synonym for product assortment.

[6] Earlier internationalisation research has also found that the number of products the company offers for sale on a given market is an important issues to consider (See Hansén 1981, 241)

sold to the same customer groups, are marketed through the same types of outlets, or fall within a given price range." In the high technology field, the products of the same product line are often derivated from a common technology platform (McGrath 1995, 61). A business unit can only support a limited number of product lines due to often existing limitations of managerial and financial resources. For each product line a specific strategy is often developed, which will be discussed next in more detail.

Product line strategy can be defined as a time-phased conditional plan for the sequence of developing products within a product line (McGrath 1995, 61). Decisions about the product line length and the direction in which the line is developed in contrast to competition are essential (Kotler and Armstrong 2001, 314). Research on managing and designing product lines has been done by several research streams: economists under the product variety theme (see e.g. Lancaster 1990), operation management literature studying the variety from its implications on design and manufacturing costs as well as manufacturing flexibility (see e.g. Baldwin and Clark 1997; Ramdas and Sawhney 1999), management accounting literature focusing on activity-based costing (see Ramdas and Sawhney 1999), marketing science literature studying the optimal design of product lines based on consumer preferences utilizing heuristics, conjoint analysis and mathematical modelling (see e.g. Dobson and Kalish 1993; Kohli and Sukumar 1990), marketing and high technology management literature discussing product line strategies (McGrath 1995; Kotler and Armstrong 2001), and finally the international business literature describing the product strategy of globalising companies (see e.g. Douglas and Craig 1989). The latter streams, namely the marketing and high technology management and international business literature, are used as the main building blocks because the objective is to understand the nature of the product line decision in the context of the globalisation of ICT companies. In addition, some general principles of the economics of variety will be applied. Altogether, it can be concluded that little empirical research has been done on the product line decisions (Bayus and Putsis 1999) and even less on product line management in the context of globalising internationals.

A product line strategy specific to a certain line has the following objectives according to McGrath (1995, 65). First, the product line strategy should define the target segments of individual products. Nokia Mobile Phones has launched a number of product categories targeted at specific market segments including, for example, products for segments requiring business features (Classic category), first time buyers (Basic category), fashion conscious users (Style category), and users requiring more solid telephones (Tough category) (Alahuhta 2001). It is important to differentiate firm's market offering from directly competing market offerings in ways that prospective customers find meaningful and appropriate. The product is one important component in this positioning. (Darling 1999) It is also important that the product line is focused. Too many products in the product line often confuse both end customers and distribution partners. It has also been found that products may cannibalise each other's sales if positioned too close to each other (Mason and Milne 1994). Secondly, the product line strategy should provide a schedule of the roll out of products within a line. Product road mapping can be seen as a process that requires simultaneous consideration of markets, products, and product platforms and their interactions over time (Groenveld 1997). Due to technological uncertainty, product road maps need to be updated on a frequent basis according to the latest knowledge. Thirdly, product line strategy provides guidance for product development and a schedule for starting the development of a new product.

Previous research has argued that the decision to increase the product line depends on both market and cost-related considerations (Murray and Wolfe 1970; Bayus and Putsis 1999). A long product line can help to satisfy different customers' needs better and will therefore increase the sales of the company and its market share (Bayus and Putsis 1999). Especially in industries where economies of scale are important, the result may be an increase in the cost of production, distribution, marketing, and potential later discontinuation costs when reducing the line length (Murray and Wolfe 1970). It has also been proposed that the rate of market growth has an impact on the length of the product line. For example, high market growth is expected to increase the number of products carried as the companies try to satisfy the growing number of segments. Strategic considerations can also have an important role. It has been proposed that a broad product range can be used to

deter entry or as a defence strategy to protect against competition that is planning to broaden its range. (Bayus and Putsis 1999)

More recent findings suggest that uncontrolled product line expansion can weaken brand image, disturb trade relations, increase costs, and weaken the line logic of consumers (Quelch and Kenny 1994). It is also important to phase out old products in a managed way. Old products pose a number of managerial problems, for example, tight financial and marketing resources must be spread over a large number of products and there may be problems related to resource allocation and co-ordination. (Kotler 1965) Introducing products at the right time, phasing out old products in a managed way, and providing an altogether focussed and well-managed line is important for success in the ICT industry.

As a conclusion, the following issues are important for product lines. First, the number of product lines offered in a business unit is important. The limitation on managerial and financial resources restricts the number of product lines. It can be assumed that companies rationalise the total number of product lines as they move from the international to the global stage due to the need to focus limited resources on the most important product groups. Secondly, the number of products in each product line is also essential. A focussed product line is important for economies of scale. Finally, the positioning of the products in the line and their competitiveness is also essential for success. To this end, a well-planned launch plan with clear target segments and clear differentiation is important.

1.6.3 Individual products

When examining individual products, two issues are especially important. First the nature of the products will be discussed and secondly the content of the products.

There is a number of product classifications based on their nature. Products may be classified according to their durability into non-durable goods, durable goods and services, or based on the target group to consumer goods and industrial goods. (Kotler 1984, 465 – 467; Kotler and Armstrong 2001, 295). Luostarinen (1979, 96)

has categorized the products of manufacturing companies into goods, services, know-how, and systems:

1. <u>Goods:</u> Physical output of the manufacturing firm, including durable or non-durable consumer or capital goods.
2. <u>Services:</u> Planning, supervising, installation, testing, training, development, servicing, and maintenance services are included.
3. <u>Know-how:</u> Management know-how, technological know-how, marketing know-how, patent, trademark, pattern design, and copyright are included.
4. <u>Systems:</u> Turn-key deliveries, co-production arrangements, and franchising packages are included.

The physical goods are often components, materials, equipment, and machines in the ICT field. Erramilli (1990) has divided services for foreign markets into soft services, in which production and consumption occur simultaneously such as for example installation and training, in contrast to hard services, in which production and consumption can be fully decoupled such as for example R&D development (see also Vandermerwe and Chadwick 1989). Luostarinen (2001b) has presented that services for industrial companies may be divided to (A) services that facilitate sales of physical goods, (B) separate service products, (C) services related to know-how sales, and (D) services that are part of system sales[7]. In the ICT field, digital services are becoming increasingly important and these will be categorized as services. Examples of such services are ringing tones or news ordered via the Internet or SMS[8]. Thus services include installation, testing, planning, control, training, development, repair, maintenance, financing and digital services in this study (See Luostarinen 1979, 96 and 2001b). According to Luostarinen (1979, 96) the know-how sales include management know-how, technological know-how, marketing know-how, patents, trademarks, pattern designs, and copyrights. In addition sales of software licenses may be included in know-how sales, if sold separately. Kosonen (1990, 76) has defined systems as unique total solutions to customer needs or problems consisting of hardware and software elements.

---

[7] It is important to notice that in addition to categorisation of the products as sales items to physical good, services, know-how and systems also different types of combinations are possible.
[8] SMS = Short message service

Moreover, systems can be seen to consist of a combination of physical goods, services, and / or know-how (Luostarinen 1979, 95-97; Mattsson 1975, 4; Kosonen 1991, 40). In this research systems are therefore seen as a combination of physical goods, services and / or know-how, which represent a total solution to customers' needs.

Earlier research (Luostarinen 1979, 98) has shown that the products develop according to a certain pattern when companies internationalise. The evidence from Finnish companies indicates that the longer the international business experience the more advanced the product groups that are utilised (Luostarinen 1979, 98). Later in paragraph 2.1 this development will be discussed further. Also, within a specific product category, development can happen. For example within systems, evolution may happen towards expanding the share of services and know-how in the system and by extending the scope of the system (See also Kosonen 1991, 76; Mattsson 1975, 6).

In the question of product content, Kotler (1984, 462- 464) argues that a product may be seen on three levels: the core benefit of the product or service, the tangible product, and finally the augmented product (see also Levitt 1969, 2-3; Levitt 1980; Root 1970, 51; Kotler and Armstrong 2001, 294; Hollensen 2001, 396). The core benefit of the product or service in the ICT area includes issues like performance, technology, and the main functional features. The tangible product is what the customer really sees/experiences including brand name, packaging, features, styling, and quality. Finally the augmented product also includes additional services and benefits like installation, delivery, and after sales service. In Figure 5, the three different product levels common in the ICT equipment field have been illustrated.

Figure 5. Three levels of individual product content in the ICT equipment field[9]
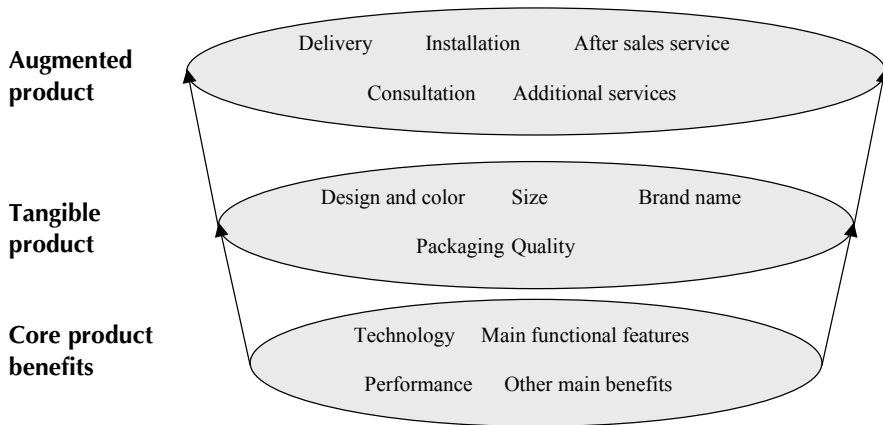
Source: Adapted from Hollensen 2001, 396; Kotler and Armstrong 2001, 294; Kotler 1984, 463.

The role of services is becoming increasingly important in ICT equipment companies and many companies are starting to extend their products by also including services. This is especially important when growth starts to level off. For example, Nokia Mobile Phones have announced that they are targeting 1 B Euro service sales by 2004 via Club Nokia, which is their end user community channel (Alahuhta 2001).

1.7 Discussion on global standardisation of product strategies

1.7.1 Standardisation versus adaptation debate

The debate concerning whether to standardise or to adapt the product and marketing mix elements has gone on for a long time and does not seem to be close to any conclusive theory or practice. The earlier work goes to the 60s when Buzzell (1968) studied standardisation of international marketing strategies and the

---

[9] The figure presents the levels of individual products mainly from the viewpoint of physical goods and related services. In question of a separate service it can be divided to core services, facilitating services and supporting service levels following similar analogy (See Grönroos 1987).

obstacles associated with these, and Keegan (1969) the product and communication strategy.

Based on a literature review[10] of articles that appeared from the end of the 1960s to the beginning of 2003 with the focus on standardisation of product strategy or marketing mix elements, it can be seen that most of the research has focussed on the standardisation of product strategy (see e.g. Hill and Still 1984), advertising strategy (see e.g. Peebles et al. 1977), or the whole marketing mix (see e.g. Sorenson and Wiechmann 1975; Jain 1989; Shoham 2002). This is probably because of the big economic rewards anticipated from standardisation of the product and advertising elements, and from the difficulties seen in standardising the pricing and channel elements. The pricing and channel structures are often country-specific. Therefore, companies cannot standardise these across countries. It can also be concluded that most of the studies have been of a purely theoretical nature and empirical evidence is rare except for a few empirical works, mainly on MNCs operating in developing countries (see e.g. Hill and Still 1984; Boddewyn and al. 1986; Ozsomer et al. 1991; Chang 1995) and studies focusing on consumer preferences and segmentation (see e.g. Verhage at al. 1989; Keillor et al. 2001).

Also, the issue of whether standardisation is feasible, still seems to be unsolved. The most far reaching interpretations have been presented by Levitt (1983), who has argued that emerging global markets provide opportunities to market standardised products across the globe, ignoring regional or national differences. Although increased use of especially product standardisation has been supported in the literature (Sorenson and Wiechmann 1975; Walters 1986; Boddewyn et al. 1986; Ozsomer &al. 1991; Whitelock & Pimblett 1997; Theodosiou and Leonidou 2003), the empirical evidence is scarce except for a few empirical studies mainly on multinational companies (MNC). A study of 27 leading US and European MNCs in the consumer packaged goods industry found that a surprisingly high proportion of companies, over 60%, reported having a highly standardised total marketing program. Extremely high standardisation was found to exist in brands, the physical characteristics of products and packaging. (Sorenson and Wiechmann 1975) Also, a

---

[10] The literature review was conducted by the author. The main findings are presented in the text.

series of related surveys of US companies marketing in Europe reveals that product standardisation was generally up in 1983 compared to 1973, however less than had been anticipated in 1973 (Boddewyn et al. 1986). Also, the standardisation of branding had increased.

The proponents of the adapted approach to global marketing claim that as customer and institutional characteristics differ significantly by area, some geographic adjustment is needed to be able to compete successfully (Simmonds 1985). For instance, market characteristics, industry conditions, and product life cycle stage, and the extent of competition vary in each market, as do the marketing institutions available in each country, including distribution channels, advertising media, and agencies (Buzzell 1968). A recent study of consumers in the US, France, and Malaysia also found that only a few product attributes are emphasised across markets (Keillor et al. 2001).

From the above discussion of the proponents of either full standardisation or then extreme adaptation to different countries, one can conclude that it is more relevant to speak about the degree of standardisation on a continuum, for instance from fully standardised products to only loosely agreed product ideas (Quelch and Hoff 1986). In the ICT industry, one common solution is to standardise the product platform and only make smaller adaptations for different markets, achieving both the benefits of adapted offering and of spreading out often large outlays for R&D among a large number of countries.

An important distinction should be made between the standardisation of product and marketing programs, emphasised by earlier literature, and the standardisation of managerial processes put forward by some more recent studies. The focus in process standardisation is on the marketing philosophy, principles, and technology applied in the planning and preparation of marketing programs. The conclusion in many of the studies is that it is far easier to standardise the marketing planning process than the content of the program. (Walters 1986) Sorenson and Wiechman (1975), for example, conclude that the process of making marketing decisions may be unified; this applies in particular to the system for annual marketing planning. Also, it should be noted that decisions regarding standardisation should be made

only after carefully considering the pros versus the cons and the overall revenues and costs (Buzzell 1968).

In the end the above discussion, merely suggests that more research is needed on the subject. A better understanding of not only program standardisation but also process-related standardisation is important. The world is far more complicated than the modelling in previous research on standardisation decisions suggests. The standardisation alternatives are a spectrum ranging from full standardisation to an adaptive approach at different levels of marketing mix elements. Finally, the question of how standardisation strategy changes as the company moves from international to global has received almost no attention in the literature.

1.7.2 Factors influencing standardisation

The different factors that have been proposed to affect the standardisation degree of product and marketing mix elements will be examined next.

When studying limiting factors to standardisation, Buzzell (1968) found that the following factors are important: (A) market characteristics including the physical environment, stage of economic and industrial development, and cultural factors, (B) industry conditions including the stage of the product life cycle in each market, and competition, (C) marketing institutions including the distribution system, and advertising media and agents, and finally (D) legal restrictions related to product standards, patent laws and tariffs. Further Jain (1989) proposed that in the standardisation of marketing programs the following issues are important: (A) target market, including the geographic area and economic factors, (B) market position, including market development, market conditions, and competition, (C) nature of the product, including type of product and product positioning, (D) environmental factors, including the physical environment, legal environment, political environment and marketing infrastructure, and (E) organisational factors like corporate management orientation, headquarters' subsidiary relationship, and delegation of authority.

Market characteristics can be assumed to affect the possibilities of standardisation. Especially the physical environment, such as climate and product use conditions, cultural differences like customs and traditions, economic differences, for example, in income and differences in customer perception are important (Jain 1989, Buzzell 1968). It can be argued that the greater the similarity in the markets in terms of the market characteristics, the more standardised products can be offered (Sorenson and Wiechmann 1975). It has been argued that markets are becoming more alike (Levitt 1983), although, differences in market characteristics still exist to a certain degree and such factors are therefore important to understand when planning product strategies.

Industry conditions are also expected to affect product standardisation. The stage of the product technology life cycle may differ between countries; this may be assumed to call for different marketing strategies and product strategies (Buzzell 1968). It can be assumed that the more similar the product technology lifecycles between countries the more standardised products may be marketed. In many ICT fields, the spreading of technologies across the globe seems to have been accelerating and differences across countries are therefore diminishing. If the degree of competition is similar in markets, this may favour a more standardised approach (Jain 1989). If the competitive position differs in countries, this may restrict standardisation and call for more adaptive strategies (Buzzell 1968). Also competing against the same companies across the world instead of only local competitors can be assumed to increase the degree of standardisation (Sorenson and Wiechmann 1975; Jain 1989)

A common finding is that the degree of standardisation is expected to differ, depending on the product characteristics. First of all, some product types can be standardised more than others. Consumer non-durables have been considered more difficult than consumer durables to standardise due to the persistence of culture (Whitelock and Pimblett 1997). Also, industrial and high technology products are considered more appropriate than consumer products for standardisation (Jain 1989). Furthermore, in high technology companies, management often lacks both the resources and the time to adapt the product to each market. The high technology market is also very competitive and is characterised by rapid technology

shifts, making standardisation even more appropriate. (Quelch and Hoff 1986) Secondly, another important aspect is product positioning. Standardisation is more appropriate when the home market positioning is also meaningful in the target market (Jain 1989).

Quelch and Hoff (1986) found that two aspects of products are important in assessing their potential for standardisation, namely the extent of economies of scale and efficiencies, and the cultural grounding of the products. They concluded that products enjoying economies of scale and other efficiencies due to competing in competitive and rapidly changing markets, as well as products with low cultural grounding offer more potential for standardisation (Quelch and Hoff 1986). Also, Keegan (1969) stresses the importance of understanding the cost of manufacturing and adaptation when considering standardisation. In the ICT industry, the importance of economies of scale is often essential and the pressures to standardise product offering can therefore be expected to be rather strong.

Also, it has been proposed that the firm's strategy and its determinants affect the standardisation degree. It has been proposed that factors like the type of organisational structure, corporate management orientation, the mode of entry applied in international business, headquarter-subsidiary communications, and the desired degree of co-ordination affect the standardisation degree (Rau and Preble 1987; Jain 1989).

Moreover, the company may also enhance its possibilities of offering more standardised products across countries by a number of marketing activities according to Takeuchi and Porter (1986). They propose that (A) the collection of information from around the world and supporting the development of more standardised products within the company enables the development of more standardised products. (B) Also, demand may be created for more standardised products by heavy advertising and promotion. (C) Finally, segmentation may open up new possibilities in offering standardised products. The company may identify the segments present in most countries, target different segments in different countries with the same product, or identify customer clusters that demand similar products.

It can be concluded that the factors can be grouped as (A) market characteristics including physical environment, stage of economic and industrial development, and cultural factors, (B) industry conditions including stage of product life cycle and impact of competition, (C) legal restrictions related to product standards, patent laws and tariffs, (D) product characteristics related to whether the product is an industrial or consumer product, non-durable or durable, or low-tech or high tech product, and its cultural dependency, and (E) internal factors, including the firm's strategy, economies of scale, corporate's management orientation, and organisational factors.

1.7.3 Standardisation of product strategy and management process

Two approaches to global product standardisation will be examined; product strategy standardisation will be discussed first and then management process standardisation. The product strategy includes the product platform, product lines, and individual product-related dimensions. It is argued that all these may be standardised at a certain level for globalising internationals.

1. The underlying product platform may be standardised across countries. The importance of understanding the product platform level strategies in the high technology area has been emphasised by many authors (McGrath 1995, 42-57; Sawhney 1998). The standardisation of product platforms is common in the ICT area. It has also been one of Nokia Mobile Phones' core targets (Häikiö 2001a, 156).

2. The product lines are standardised if all product lines operate across countries and offer the same number of products with the same type of positioning, irrespective of country. This offers possibilities for globalising internationals to achieve benefits from standardised marketing material and supplying global customers with the same range of products in all markets, while meeting the technology and standard-related requirements.

3. The individual product may be standardised at different levels: the core benefit of the product or service, the tangible product, and finally the

augmented product (Kotler 1984, 462-464; Hollensen 2001, 396). Globalising internationals may standardise the individual product to some extent at all these levels:

a.   Core product or service benefit. In the ICT area as discussed earlier, the core product benefit includes issues like performance, technology and the main functional features. These are often standardised in the high technology area by developing a common product platform that is then adapted to market requirements through modularity and inter-changeability of certain parts.

b.   Tangible product. Increasingly also the tangible product the customer sees and experiences including hardware, software, features, design, packaging, and brand label may be standardised. For example, routers, cables, and mainframes can be standardised across countries at this level.

c.   Augmented product. The augmented product also includes additional services, warranty, delivery, and installation services. It is rare that all these levels are standardised, but due to the free movement of goods and travelling, there is considerable pressure to standardise for example warranty terms.

Also, the product management processes may be standardised. A number of different product management processes can be identified that may benefit from standardisation in globalising internationals. Some examples are presented below.

1. The process for defining the customer input in new product requirements. Gathering input from markets and customers with a standardised approach facilitates the use of information at different levels of the company and has a vital role in a successful global product strategy.

2. The product development process. Companies rationalising their global businesses benefit from standardising the product development process, as R&D centres are increasingly interlinked across the world.

3. The product launch process may offer benefits from standardisation. Rapid product launches across the globe have become a competitive advantage in many globalising ICT industries. Competitive responses from large incumbents can be minimised by entering multiple markets with new products (Shankar 1999).

Based on the discussion on a standardised versus an adapted approach and the strong globalisation pressures in the ICT industry, it can be argued that globalising internationals applying global market alignment strategy are moving from a low level of both product strategy and product management process standardisation towards a higher product strategy and product management process standardisation. See Figure 6 for an illustration of the expected development.

Figure 6. Dimensions of product standardisation
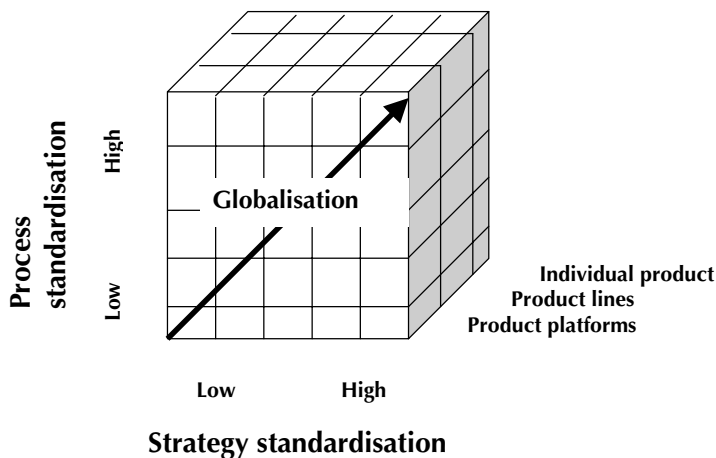
1.7.4 Product strategy alternatives of globalising internationals

According to McGrath (1995, 166-173) a high technology company has the following global product strategy alternatives: (A) it may design its products based on local or regional requirements, (B) leverage an existing product later to other

areas, (C) design a product based on a common platform for global markets that can be modified according to market requirements, or then (D) develop a fully standardised product for global markets. Moreover, Takeuchi and Porter (1986) have divided the extent of physical product differences across countries as follows: (A) country-tailored products, (B) modified products, and (C) universal products.

As discussed, product platforms are important in the high technology area (see e.g. Meyer and Lehnerd 1997; Sawhney 1998). Instead of developing single products that compete for resources, successful companies develop global product platforms (Meyer and Lehnerd 1997, 2). Building further on McGrath's (1995) and Takeuchi's and Porter's (1986) product strategy categorization the following product strategy alternatives can be developed for globalising internationals[11]:

1. <u>Localised product strategy</u>. The company may decide to develop products for only one country or a limited area. This is inefficient, as it does not leverage the often high development costs in the high technology area. However, it allows adaptation to market requirements. For example, prior to deregulation of the telecommunications area, especially the infrastructure business often required solutions that were not only country but also customer specific.

2. <u>Modified product strategy</u>. The company may develop a common product platform that is used across the globe, but allows for product adaptations based on regional or country specific requirements. The cost advantages and leverage of R&D investment worldwide may bring significant competitive advantages compared with competition. This strategy has been utilized in, for example, the mobile telephone industry.

3. <u>Standardised product strategy.</u> The company may pursue a strategy to develop a fully standardised product across the globe. This provides the highest leverage in both development and manufacturing. It is viable when the products require relatively few or no modifications. There are two basic

---

[11] The main criterion used in developing these alternatives is the standardisation degree of the product strategy across countries. However, minor customer specific adaptation may also be required in all these alternatives.

approaches to developing a standardised product according to Takeuchi and Porter (1986). The first option is to develop a product that represents the greatest common denominator, including as many feature requirements as possible in the same product. The second option is to develop a product with an optimised set of functions and features that balance market needs and costs. In the telecommunications industry especially, the routers as well as mobile telephones for world travellers are good examples of highly standardised products.

See Figure 7 for an illustration of the product strategy alternatives based on the standardisation degree of the product strategy and management processes and the development of the target market of the products.

Figure 7. Product strategy alternatives for globalising internationals at different phases of market development
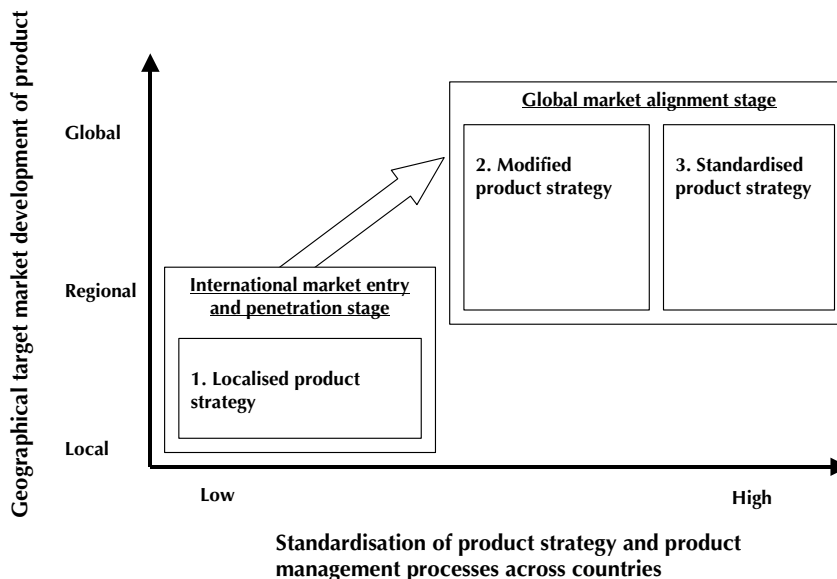
It can be assumed that globalising internationals are evolving through certain phases towards a global one. Globalising internationals first enter the international

markets (International market entry phase), then penetrate deeper into international markets (International market penetration phase), and eventually triggered by the globalisation drivers start to rationalize their activities on a global level (Global alignment phase) (Douglas and Craig 1989). It can be argued that companies in the international entry and penetration phase often utilize localised product strategy to penetrate deeper into the markets. Occasionally, it may also be possible in the very initial entry to use the domestic product with little or no adaptations, but this is probably rather rare. On the other hand, companies in the global phase use more standardised product strategy alternatives as they are striving for global rationalisation of activities (Craig and Douglas 1996), which leads to expect that they use either the modified product strategy or the standardised product strategy. At the global alignment phase the target market for products is often global instead of local or regional (Craig and Douglas 1996). It is also worthwhile to note that it can be expected that instead of using only one of these strategies, some companies may use a combination in the same target area. This can be called a multiple product strategy. The globalisation of international ICT companies and the change in strategy will be developed further in paragraph 2.1.

Based on the earlier discussion of the product strategy dimensions and the product management process standardisation, certain assumptions on the configurations of product strategies can be developed. See Table 1 for an illustration.

Table 1. Global product strategy configurations

Product strategy / Dimensions	Localised product strategy	Modified product strategy	Standardised product strategy
Product platforms: - Common platforms	No significant product platforms across countries / regions	Global product platforms	Global product platforms
Product lines: - Product assortment width (number of product lines) - Length of product line - Positioning of products	Varies based on local requirements	May vary slightly based on regional or sub regional requirements	Same across globe
Individual products - Standardisation on core, tangible, and augmented level	No standardisation at any level	Standardised at core benefit level, and adapted on other levels	Standardised at core benefit & tangible level, increasingly also on augmented level
Product management processes	No standardisation of processes	Increasingly standardised processes on global level	Standardised processes on global level

2. THEORETICAL DISCUSSION AND DEVELOPMENT OF THE FRAMEWORK

2.1 Review of internationalisation and globalisation theories

The international business theories will be reviewed next. First the internationalisation theories and models will be examined, second, the literature related to MNCs and global strategies will be discussed, and third the global market expansion and development will be illustrated[12]. Finally the implications for product strategies will be discussed.

---

[12] International business theories rooted in economics such as eclectic / internalisation theories (see Dunning 1988, Buckley 1988) are excluded from the discussion as these can be seen representing a more static view of multinational companies (Melin 1992).

2.1.1 The process school of internationalisation

The internationalisation process of the firm has been studied extensively by Luostarinen (1970, 1979 and 1994) and Johanson & Vahlne (Johanson and Wiedersheim-Paul 1975; Johanson and Vahlne 1977). These models describe the internationalisation process as a gradual development taking place in specific stages over a relatively long time. Moreover, they are similar in that they are all based on the theory of the growth of the firm (Penrose 1959) and the behavioural theory of the firm (Cyert and March 1963; Aharoni 1966). The model developed by Luostarinen also uses the concept of lateral rigidity (See Vaivio 1963). First the company and target country level, and holistic internationalisation patterns will be reviewed, then the product related decision-making will be discussed.

2.1.1.1 Company level, target country level and holistic internationalisation patterns

The internationalisation of firms may be studied at the target country level or company level. Luostarinen (1970 and 1979) found that when analysed at the company level, internationalisation proceeds in an orderly and dynamic process where different stages can be separated by analysing the product, market, and operation posture. The first operation mode used is often non-investment marketing operations (e.g. indirect export, direct export) as this demands fewer financial resources and is less risky. However, in later stages of internationalisation more demanding operation modes will also be used including direct investment marketing operations (e.g. sales units, warehouse units), non-investment production operations (e.g. contract manufacturing) and direct investment production operations (e.g. assembling unit, manufacturing units) in this order. The first markets to enter are ones with a short business distance, the "hot" countries. As the company further internationalises its activities also countries further away both culturally, geographically and economically become interesting. (Luostarinen 1979, 183-195). The chronological order of introduction of different international sales objects was found to develop as follows according to Luostarinen (1979 and 1994): (1) goods, (2) services, (3) systems, and (4) know-how. However, it was found that those

companies which had introduced all sales objects usually introduced systems last. So it can be seen that the order of introduction of the last two items may also be know-how and then systems (See Luostarinen and Gabrielsson M. 2002). This seems understandable as systems often consist of physical goods, services and / or know-how (See Luostarinen 1979, 95-97; Kosonen 1991, 76).

Moreover, according to Luostarinen (1979, 180-183) four stages can be identified at the company level on the basis of the changes in the product, operations, and market (POM) posture[13]: the starting stage, development stage, growth stage and the mature stage. At different stages new types of products or new types of international operations are introduced and/or new markets are entered. The internationalisation of the firm and the development of the product, operations, and market (POM) posture can be explained by the following factors according to Luostarinen (1979 and 1994): (A) the small size of the home country and openness pushing the firms to internationalise, (B) the large size of target markets and their openness pulling companies abroad, (C) the enabling global environment, (D) firm-related advantages received from internationalisation, and the (E) strategic decision-making characterised by lateral rigidity and organisational learning.

Johanson and Vahlne (1977) have presented an internationalisation process of the firm at the target country level, which is based on gradually increasing knowledge of the company, which then successively increases commitment to foreign markets. In their model, they distinguish between state and change aspects of internationalisation variables. The state aspects including the current resource commitments to foreign markets and knowledge about foreign markets and operations will affect change aspects such as commitment decisions and the way current activities are performed. This will in turn change the state of knowledge and commitment. The basic assumption of the model is that knowledge is an important obstacle to internationalisation and that knowledge can be mainly received by operations abroad. They have also identified a stepwise extension of operations abroad. The operations are started by using exporting. Later a sales subsidiary is

---

[13]   The product, operation, and market strategies have been seen important also in other internationalisation studies. See for example Hansén (1981, 11).

established and then in the final stage a production unit is established in the country. (Johanson and Wiedersheim-Paul 1975; Johanson and Vahlne 1977) As the analysis is at the target country level, it can be challenged whether this pattern holds in every single market. Luostarinen presented already in 1970 that the target country and company level patterns can be identified in operation strategies, and that the target country penetration patterns differs per country (Luostarinen 1970, 128-144). Several researchers have also studied internationalisation, focusing especially on the early stages of internationalisation, often the export stage (See e.g. Bilkey and Tesar 1977; Cavusgil 1984). However, due to the focus on globalising internationals these will not be discussed further in this work.

Further studies of internationalisation have taken account of both outward and inward internationalisation, and co-operative operation modes. Luostarinen (1994) has presented a holistic stages pattern according to which companies usually start their internationalisation by inward operations such as imports of technology and machinery, followed by imports of components, parts, and raw materials and then enter into foreign markets by outward modes. The companies then further develop into a co-operative stage, in which they co-operate with foreign firms, in for example manufacturing, purchasing, and R&D. (Luostarinen and Welch 1990, 190; Luostarinen 1994) Moreover, the Uppsala network model claims that firms increasingly become part of networks during their internationalization process (Johanson and Mattsson 1988). This leads to the assumption that towards the later stages of internationalisation the amount of co-operation can be expected to increase with foreign firms.

Luostarinen has found that companies from small and open economies like Finland specialize, concentrate and focus on carefully selected businesses during globalisation (Luostarinen 1994). He also argues that the traditional stages pattern for internationalisation is sometimes too rigid and too slow. The globalisation strategy of international companies is based on experience and knowledge received during earlier phases of internationalisation and the globalisation process will therefore include jumps over stages, reverse processes, specific operations in certain countries, larger investments, and higher speed. (Kirpalani and Luostarinen 1999)

In contrast to the traditional internationalisation pattern, Oviatt and McDougall (1994) have proposed that some companies may be international from inception, without proceeding through the traditional stages. These companies are newly established companies facing the globalisation pressure from the very beginning. This phenomenon, which is often referred to as born globals (see. e.g. Cavusgil and Knight 1996; Madsen and Servais 1997; Luostarinen and Gabrielsson M. 2001) deviates from the behaviour of the globalising internationals examined in this research that have first internationalised their business and only then entered the globalisation stage. Born globals have to start operating on a global basis from the very beginning. The most efficient operation modes are used and markets with the most potential are entered from the very beginning. More demanding products such as for example systems are often sold from the inception. (Kirpalani and Luostarinen 1999) The major characteristics of born globals are that they seek an aggressive market presence aiming at markets worldwide in the particular segment or niches where they operate from the very beginning (Berry et al. 2001, 11). Born Globals are often small, technology-orientated companies that are managed by entrepreneurial visionaries who view the world as single, borderless market place from the time of the firm's founding (Knight and Cavusgil 1996). The resources of born globals are especially constrained due to their young age and often small size (see Oviatt and McDougall 1994; Madsen and Servais 1997). In contrast the globalising internationals face the challenge of selecting the right businesses for global markets and reallocating the existing resources successfully.

2.1.1.2 Decision-making

The decision making of globalising internationals is examined next in the question of global products based on the behavioural theory (Cyert and March 1963; Aharoni 1966), lateral rigidity concept (Vaivio 1963; Luostarinen 1979), and the internationalisation model (Luostarinen 1979 and 1994).

The behavioural theory of the firm (Cyert and March 1963) describes four relational concepts as the core of the theory of business decision-making: quasi resolution of conflicts, uncertainty avoidance, problemistic search, and organisational learning

(Cyert and March 1963, 116). The quasi resolution of goals concept depicts the organisation as having a number of conflicting goals, which are resolved by using local rationality, acceptable-level decision rules, and sequential attention to goals. Organisations also avoid uncertainty by solving rather short-term problems than developing long-term plans and they try to make the environment more controllable. Moreover, the problemistic search outlines that the search is motivated by a problem, is often simple minded, looking only at the neighbourhood, and is biased on the basis of the participant background in the organisation. Furthermore the organisations learn over time to exhibit adaptive behaviour in the question of goals, attention, and search rules. (Cyert and March 1963, 116 - 127).

It has also been proposed that the company's behaviour is characterised by lateral rigidity, meaning that companies try to stick to their plans; even when faced with an impulse or shock they make only small changes in their behaviour (Vaivio 1963). Luostarinen (1979, 35) argues that the internationalisation of firms is especially characterised by a lateral rigid decision process, in which companies are rigid in a lateral direction towards new alternatives, but are elastic forwards, towards known alternatives. Laterally rigid decision-making is characterised by (A) limited perception, (B) restrictive reaction, (C) selective search, and (D) confined choice.

According to Luostarinen (1979, 51), the impulse exposure position is more unfavourable, inactive search more common, and the span of attention to perceive impulses more limited towards international than domestic markets. The reaction to international impulses is also restrictive due to the inability to react due to resource reasons and an unwillingness due to a mental commitment to domestic markets. The search is assumed to be problem-oriented, simple-minded and biased. Moreover, the choice is also restricted to those product, operation, and market alternatives familiar to the company due to uncertainty avoidance and risk escape[14]. Moreover, Luostarinen (1979, 101) argues that due to high lateral rigidity in decision making towards introducing new sales objects, with which the company is

---

[14] Luostarinen (1979, 43) defines uncertainty avoidance as the guiding principle in the final choice and according to him "those alternatives which are known to the company through earlier positive experience are preferred to those which the company does not know or knows through earlier negative experiences." Moreover he defines risk as "the sum of the uncertainty felt and of the level of resource commitment perceived to be demanded by the alternative and of subjective probability of loss."

not familiar, the company often introduces in a specific order new sales objects as described already: (1) goods, (2) services, (3) systems, and (4) know-how, or (3) know-how and (4) systems. However, as a result of organisational learning the company may increase the stock of knowledge[15], reduce product risk and uncertainty over time, and hence decrease the lateral rigidity. Thus the company changes its preferences and introduces more advanced product categories as the international business experience increases. (Luostarinen 1979, 48-56).

The product-decision making of globalising internationals is also expected to be characterised by lateral rigidity. Although these companies are already international they often generate most of the foreign sales from the home continent. Therefore their product impulses are largely from this area, and they seldom search for global product opportunities. Similarly, the reaction for global impulses is restrictive due to the lack of experience of developing global products and the needed resources. The choice is also restricted due to uncertainty avoidance and risk escape. Developing and launching new products also contains a high risk (Cooper and Kleinschmidt 1987); failure rates have been found to be even 30 to 70 percent of all product introductions (Boversox et al. 1999; Cooper 1980). High technology introductions can be seen as especially risky due to fast-moving and uncertain markets (Beard and Easingwood 1996). Introducing new product lines instead of product improvements is even more risky due to the big investments needed in product development, manufacturing facilities, and successful product launch. Moreover, globalising internationals expanding into new markets face challenges due to unfamiliarity with the specific market requirements. There is also a high level of uncertainty concerning how to adapt products and processes to different cultures (Lord and Ranft 2000). The development and launch of global products in the ICT field often requires substantial investments in R&D and marketing and increasingly the target market for the new products is not only regional but even global, and therefore these product decisions can be seen to contain high uncertainty and risk. Moreover, it can be noted that international ICT

---

[15] A good description of knowledge creation and learning in organisations operating in international and global environment can be found in e.g. recent work by Nonaka and Takeuchi (1995), and Kulkki (1996).

equipment manufacturers often sell mainly physical goods[16]. However, there is increasingly interest to extend to other product categories.[17]

Based on the above discussion, it can be concluded that due to the high lateral rigidity in decision making, globalising internationals may be assumed to be laterally rigid towards introducing new product categories, that is to extend from physical goods, also to services, know-how and systems, but rather to select an existing product category to be developed for global markets. However, through organisational learning and the increasing global business experience[18] and knowledge, product uncertainty and risk are reduced and the company may change its preferences towards these new product categories.

Furthermore, the globalisation process enhances the knowledge of markets and their needs. This is essential for the development of standardised products. Therefore, it can be assumed that the higher the globalisation degree of the company, the higher the probability of the selection of a more standardised product strategy[19]. On the other hand, the existing investments in several countries may also be a burden for a selection of a more standardised product strategy.

It can be summarised that in this research (A) the lateral rigid decision-making process, (B) uncertainty avoidance and risk escape, and (C) organizational learning and global business experience are seen as important decision-making related factors for globalising internationals.

2.1.1.3 Criticism on the stages pattern of internationalisation

There has also been presented criticism of the stepwise orderly development of internationalisation (see Turnbull 1987; Andersen 1993; Leonidou and Katsikeas

---

[16] There are also exceptions to this, e.g. international telecommunication network equipment producers often sell services, systems and know-how, besides physical goods.
[17] For example Nokia Mobile Phones has established a target of expanding further to services (Alahuhta 2001).
[18] The global business experience refers to business experience from other than home continent
[19] This is consistent with the findings by Laroche et al. (2001), that the management's familiarity with a foreign context is expected to increase standardisation of the advertising element.

1996; Hurmerinta-Peltomäki 2001, 27-30). Next the main criticism is discussed and also suggestions to improve future research is proposed.

1. It has been argued that companies do not internationalise in an orderly way (Turnbull 1987; Leonidou & Katsikeas 1996). In this context it is important to distinguish between target country level and company level internationalisation pattern. The company level can be seen as a sum of the target country patterns (see Luostarinen 1970). The evidence from the Finnish internationalisation research demonstrates that at the company level a mainstream pattern of internationalisation can be found (See e.g. Luostarinen 1979; Luostarinen 1994; Korhonen 1999). However, it can be questioned whether the target country pattern is similar in each country as companies do learn from operations in other countries (see also Andersen 1993). The pattern is more valid at the company level than at the target country level (See Luostarinen 1994).

2. It has also been criticized that companies may jump over the stages or even reverse the process and thus not follow the mainstream internationalisation pattern (see e.g. Turnbull 1987). It should be noted that the existence of the mainstream pattern of internationalisation does not mean that there may not be any deviations. Also, it is important to realise that the stages pattern is not a normative model. According to Luostarinen (1994, 22), the stages pattern is not developed to be a normative pattern and it is often too slow, too rigid and may even start from the wrong end. However, the deviations from the mainstream pattern and the reasons affecting this behaviour are an interesting future research field.   Recent globalisation research of born globals (Luostarinen and Gabrielsson M. 2002) has found that these companies globalise without any proceeding long term domestic or internationalisation stages. However, this deviation is understandable as the internationalisation models have been developed in the 70s and 80s and their purpose has not been to explain globalisation, which is a recent phenomenon.

3. The stages patterns have been also criticized for not having explanatory power for why or how the process takes place, what is the duration of the stages and what factors affect the development (see Andersen 1993, Leonidou & Katsikeas

1996). This criticism has mainly focused on the "Uppsala Internationalisation models" (see Johanson and Wiedersheim-Paul 1975; Johanson and Vahlne 1977) and the "Innovation related Internationalisation models" (see e.g. Bilkey & Tesar 1977). For example Luostarinen's (1979 and 1994) research explained the development of product, operation and market strategies and used the pull and push factors and the concept of lateral rigidity to describe the behaviour of firms and their decision-making during internationalisation. One solution for gaining more in-depth understanding is to select a specific industry for closer study. For example Hansén (1981) studied internationalisation in the pharmaceuticals industry and Gabrielsson M. (1999) internationalisation in the PC industry. Case study research could be used to further deepen the understanding of the factors affecting the internationalisation process of firms (see also Andersen 1993). This is even more important when studying the globalisation process that has been researched very little. A recent Finnish study by Hurmerinta-Peltomäki (2001) addressed the time dimension and internationalisation and was able to find that companies are starting internationalisation faster than earlier. This is an interesting new research avenue.

4. Moreover, criticism has been presented regarding methodological choices, especially concerning cross-sectional designs for lacking longitudinal research approach (see Andersen 1993; Leonidou & Katsikeas 1996) and also towards difficulties in defining and measuring the actual internationalisation stage (Turnbull 1987). A large number of studies have been conducted in Finland utilising longitudinal research design and large databases (see Luostarinen 1979; Luostarinen 1994; Korhonen 1999) so the criticism is not fully justified. Developing proper measures for the stages is an important future research area. The definition of the unit of analysis is important in especially bigger companies as the stages may vary depending of unit or level of analysis. The internationalisation degree and globalisation degree applied in this research are good measures when selecting companies for the study due to their simplicity. However, it can be concluded that there exist a need for developing better measures for the stages. The number of countries or continents participated by the company could be considered to be included in the definitions. Moreover,

multidimensional measures could be used in future studies. Key criteria in developing better measures are clarity of definitions, simplicity and measurability.

It is expected that this research, which is focusing on the globalisation of already international companies and in particular on the evolution of product strategies may benefit from the earlier internationalisation research. The presented criticism of internationalisation process and suggested solutions for these should be acknowledged also when studying globalisation.

2.1.2 MNC development school

The emergence of a process perspective in policy research originated by Bower (1970) has resulted in a number of empirical studies focusing on the managerial issues of MNCs. The doctoral dissertations of Prahalad, Doz, and Bartlett have led to the foundation of a stream of research in international management called the "process school of the diversified multinational corporation (DMNC)." This school represents knowledge about MNC management, emphasising the global integration and local responsiveness framework. (Melin 1992, 107) This school complements earlier work in the area of strategy and structure (Chandler 1962), and management orientation (Perlmutter 1969). Some of the earlier work will be reviewed first and then attention will be turned to recent findings within the DMNC school.

2.1.2.1 Structural development of global companies

Much of the international management literature is devoted to the structural aspect of MNCs. During the 70s, there was more interest in structural forms and formal control mechanism. The emphasis changed during the 80s and 90s to less formal ways of coordinating MNCs. (Melin 1992).

Alfred Chandler (1962) has contributed especially to the area of strategy and structure research. He concluded in his study consisting of large enterprises in the

USA that a company's strategy in time determined its structure (Chandler 1962, 383). Stopford and Wells (1972) have further found that companies in quite different fields following similar strategies have developed similar organisational structures. They propose that companies adopt different organisational structures at different stages of international expansion. Two variables affect the chosen organisational form, namely the number of products sold internationally (product diversity) and the importance of international sales (foreign sales as a percentage of total sales). In a large study of 187 large US-based companies, they found that in the early phase of internationalisation many companies had established production subsidiaries abroad mainly as a response to competitor moves which were not closely coordinated. As the companies expanded their activities abroad an international division was established to co-ordinate international involvement. As pressure to integrate activities on a global basis increased, global structures were established to cope with this. If foreign product diversity was high abroad a worldwide product division structure was established. If, on the other hand, the product diversity was low, an area division was established. Also, in some cases a combination of these was used. Finally, as both the product diversity and foreign sales were high, global matrixes were seen to emerge. (Stopford and Wells 1972, 8-30; Bartlett and Ghoshal 1989, 30-31) See Figure 8 on the development of organisational stages.

Figure 8. Stopford and Well's MNC stages model for organisation
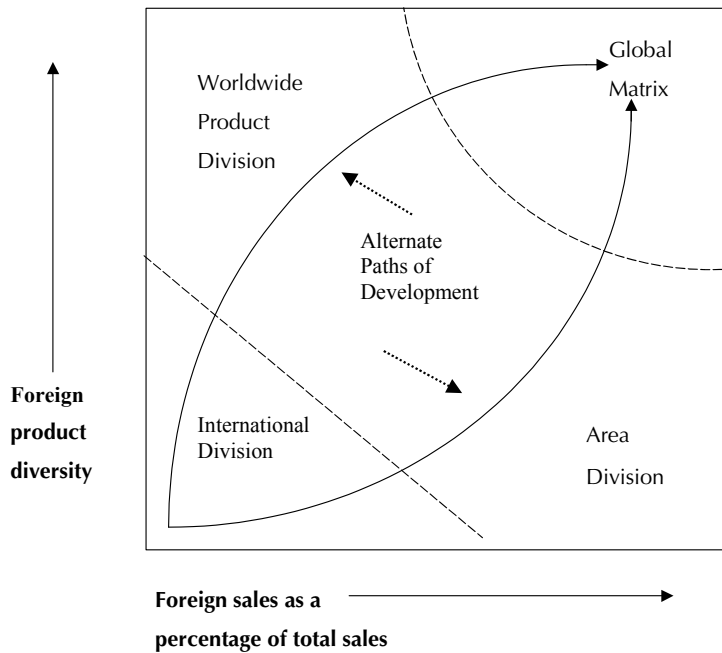
Source: Bartlett and Ghoshal 1989, 30, based on Stopford and Wells 1972.

The major findings of Stopford and Wells (1972) relate to what strategies and structures emerged, but say relatively little about the process of how these companies changed. It is worth noting that many Scandinavian firms retained the parent-subsidiary structure until the 70s and went directly to the global product division structure without introducing the international division at any stage. (Melin 1992)

Earlier research has also proposed that there is a relationship with organisational factors and the standardisation of product strategy examined in this research. Jain (1989) argues that the greater the centralization of authority for setting policies and allocating resources, the more effective the implementation of the standardisation

decision. Moreover, it has been found that product strategies are often decided or strongly guided centrally (Aylmer 1970; Brandt and Hulbert 1977) and thus the product decision often offers a larger potential for standardisation than, for example, other marketing mix elements (See also Jain 1989).

2.1.2.2 Management orientation

A pioneer in reviewing the development of different kinds of MNCs was Perlmutter (1969). Perlmutter (1969) has studied MNCs and their degree of multinationality. He argues that no single criterion of multinationality such as ownership or the number of nationals abroad is sufficient. Quantifiable measures like, for example, investments abroad are useful but not adequate alone. More important is the orientation toward foreigners, ideas, and resources in the company at all management levels. These attitudes or orientation of the firm may be described as ethnocentric (home-country oriented), polycentric (host-country oriented), and geocentric (world-oriented). (Perlmutter 1969) Later the regiocentric (region-oriented) has been proposed to be added as one interesting orientation. (Wind et al. 1973; Heenan and Perlmutter 1979, 20).

In *the Ethnocentric* orientation, overseas operations are viewed as secondary to domestic operations (Wind et al. 1973). The authority lies high in the headquarters (Perlmutter 1969). Governance is based on top down setting of goals and marketing mix related decisions are made at headquarters. The structure is often based on hierarchical product divisions. (Chakravarthy and Perlmutter 1985). Product development is determined primarily by the needs of the home country customers and no major modifications are made to products sold overseas (Wind et al. 1973).

In the *Polycentric* orientation subsidiaries are established in foreign markets, which operate highly independently (Wind et al. 1973). Authority and decision making is relatively low at headquarters (Perlmutter 1969). The direction of the goal setting is very much bottom up and marketing-mix-related decisions are made in each subsidiary. The structure is based on hierarchical area divisions with autonomous national units. (Charavarthy and Perlmutter 1985). Strategy is based mainly on

national responsiveness. Separate product lines are developed and product adaptations are made (Wind et al. 1973).

In the *Regiocentric o*rientation, the company views the region(s) as the potential markets, ignoring national boundaries (Wind et al. 1973). The structure is based on product and regional organisations in the matrix. The firms strive towards regional integrative and national responsiveness. (Chakravarthy and Perlmutter 1985). The products are standardised within a region, but not across, thereby providing responsiveness to regional differences (Wind et al. 1973).

Finally, in the *Geocentric* orientation, the company views worldwide markets as potential markets (Wind et al. 1973). A collaborative approach is encouraged at different levels of the organisation (Chakravarthy and Perlmutter 1985). The company strives for global integration. Standardised product lines are developed for global markets; only minor adaptations are made when this is in the corporate interest (Wind et al. 1973).

The factors affecting the desirability of certain orientation has been studied by Wind, Douglas and Perlmutter (1973), who found that the size of the firm, experience in the target market, the size of the potential market, and the type of product and its cultural dependency affect the orientation (Wind et al. 1973). Further, Perlmutter (1969) found in his study that certain forces drive towards geocentrism. The increase of technological and managerial knowledge in different countries, the potential of international customers, local customers demand for the best product at a fair price, growing world markets, and regional economic and political communities drive towards geocentrism, to mention only a few. (Perlmutter 1969). These external forces are also in place in many cases in the ICT industry, as companies have to seek customers from worldwide markets due to small home country markets. As the competition is high the requirement to offer high quality leading edge products at a competitive price is strong. Also, some intra-organisational forces exert an effect, like senior management's attitudes and commitment towards growth.

Factors seen as obstacles toward geocentrism are economic and political nationalism in the home and host countries as well as management inexperience in

foreign markets as well as the firms' incentive systems, which do not always reward for driving geocentrism   (for more see Perlmutter 1969). In the ICT industry, especially in the telecommunications field, a big change has taken place as the market has been liberalised and telecommunications have been opened up for competition. In the computer field, the US-technology-based export restrictions affect the trade in certain products. Especially in smaller companies, the management expertise in global markets is limited in the ICT field.

It may be concluded that the international management orientation has an influence on the product strategies. Moreover, it is expected that there is a relation with management orientation and the core globalisation strategies, which will be discussed further in paragraph 2.1.2.4.

2.1.2.3 Integration-responsiveness grid and new organisational forms

MNCs are confronted with the need for global integration and co-ordination, and the need for local responsiveness. The integration-responsiveness grid originally proposed by Prahalad in 1975 gives the possibility to describe the pressures related to strategic co-ordination and global integration, and, on the other hand, the local responsiveness in the question of companies (Prahalad and Doz 1987, Ghoshal 1987).

Factors contributing to local responsiveness are the difference in customer needs, differences in distribution networks, the availability of substitutes, and the need to adapt the product, market structure and the diversity among national markets in market structures. Further the host government demands, like norms and standards, trade barriers, the importance of the public sector market, and the regulation of MNC activity affect the requirements for responsiveness. (Prahalad and Doz 1987, 18-23)

Factors that contribute to global integration are the importance of multinational customers, the presence of global competitors, technology intensity, scale and

experience in manufacturing, investment intensity, and existence of universal product needs. (Prahalad and Doz 1987, 18-23)

In the information and communication technology field, the importance of multinational customers is high in many companies, competition is global, and technology intensive. The scale and learning curve effects are in place in many companies. Furthermore, universal customer needs exist. So the forces driving global integration are very high. On the other hand, there are differences in customer needs at a national level in many ICT fields and the requirement to adapt products to a certain extent is there in most markets. The telecommunications field has been extensively regulated on a national level in the past and even monopolistic advantages have been offered to national companies. However, this industry has been deregulated and competition opened to a large extent during the 90s. The importance of technical standards and complying with those is still important, although the standardisation authorities are in many cases on a regional or global level rather than a national one.

A growing number of industries are driven by simultaneous demands for global efficiency, national responsiveness, and worldwide learning. Industries fulfilling these characteristics are called transnational industries (Bartlett and Ghoshal 1987a). In the telecommunications-switching sector, for example, new digital technology requires huge R&D investments to develop new switches but, on the other hand, local adaptation is needed due to national regulations. In the consumer electronics industry, the importance of scale economies is increasing in manufacturing, R&D and marketing, but successful players need also to be able to adapt their products to local customer needs due to a renewed preference for differentiated products. (Bartlett and Ghoshal 1987a, b)

The transnational companies simultaneously seek global integration, national responsiveness, and global learning (Bartlett and Ghoshal 1989, 59). Their assets and capabilities are dispersed, interdependent, and specialized. The overseas operations offer differentiated contributions to integrated worldwide operations. Furthermore, knowledge is developed jointly and shared worldwide. (Bartlett and

Ghoshal 1989, 65) Thus, the structure of a modern MNC can be best conceptualised as a differentiated network (Nohria and Ghoshal 1997, 14).

This requires new ways of organizing strategic control within multinational companies (Doz and Prahalad 1984). The need for national responsiveness and for global integration often conflicts and managers are continuously faced with the problems of managing this tension. (Doz 1986, 1) Managing this trade off between national responsiveness and global integration is an especially important area in product management.

An interesting discussion related to new organisation types and their management has been presented by Gunnar Hedlund (1985). He presents a concept of a heterarchical MNC. This is a particular type of geocentric MNC, which is characterised by having: (1) many centres: new ideas and products may be invented in any country and utilized on a global scale, (2) subsidiary managers are also taking a strategic role for the whole MNC, (3) there exists a mix of centres having different kinds of roles, (4) subsidiaries are given increased freedom, (5) integration is achieved mainly through normative control, (6) information of the whole is available in each part of the organisation, (7) thinking is going on in the whole organisation, and finally (8) coalitions with other companies and parties are frequent. This kind of environment puts new requirements on how product management is handled in MNCs. Information sharing becomes vital for the successful implementation of product strategy.

Based on the above discussion, it may be assumed that new organisational forms like the heterarchic and transnational type are increasingly emerging in industries such as telecommunication, in which there are often requirements to cope with simultaneous demands for global integration and national responsiveness (see also Bartlett and Ghoshal 1987a). The impact of national responsiveness, global integration and global learning with regards to product strategies will be discussed further in 2.1.2.4.

2.1.2.4 Core globalisation strategy

By reviewing the literature, it can be noted that there is a lot of conceptual ambiguity about what a global strategy actually means (see also Ghoshal 1987). Yip (1989) defines the global strategy as consisting of decisions on market participation, product offering, location of operations, marketing approach, and competitive moves. Hout, Porter and Rudden (1982) point out a number of ways to reach an effective global strategy, including economies of scale, pre-emptive moves against competition, and managing the business like an integrated system. They further define strategies used in multi-domestic and global industries. As an organizing framework, Ghoshal (1987) has proposed that the strategies would be classified based on strategic objectives to three groups (A) striving to achieve efficiency in operations, (B) the requirement for adaptation, learning and innovation, and (C) the need for risk management (Ghoshal 1987).

Doz & Prahalad argue that MNCs may choose a multinational integrated strategy, a national responsive strategy, or a multi-focal strategy in which the company combines elements of both national responsiveness and global integration. (Doz and Prahalad 1984, 56; Prahalad and Doz 1987, 18-23) No specific structure provides a solution for achieving a balance between global integration and national responsiveness according to Doz and Prahalad (1984). Instead, attention to the process of reaching a balance in the organisation is more important. Doz and Prahalad (1984) present a framework for strategic control in MNCs as a matrix of strategic decision sub processes and management tools. The sub processes include a cognitive process to ensure that the relevant data is gathered for decisions, a strategic process to create the conditions for consensus, and a power process to manage relative power among managers and to ensure implementation. A range of management tools is presented, including data management, managers' management, and conflict resolution. (Doz and Prahalad 1984)

Bartlett and Ghoshal (1989, 15 & 67) have presented a similar classification of strategies. They have divided companies based on their strategy to international, multinational, global, and transnational strategy. A company applying international

strategy is exploiting parent company knowledge and capabilities. The ability to transfer and adapt the strategy to international market is important. A company applying a multinational strategy is building a strong local presence through sensitivity and responsiveness to national differences. A company applying global strategy is building cost advantage through centralised global scale operations. Global integration of activities is essential. A company applying transnational strategy is leveraging national responsiveness, global integration and global learning. (Bartlett and Ghoshal 1989, 15 & 67)

Porter (1986) presents a framework for strategy alternatives that is based on the configuration of the firm's activities worldwide, i.e. where the activities of the value chain are performed and in how many places (ranging from geographically dispersed to concentrated), and on the co-ordination of similar activities in the world (ranging from low co-ordination to high). The companies can be classified on the basis of these dimensions into: (A) export-based strategy with decentralised marketing (geographically concentrated – low co-ordination), (B) country-centred strategy by multinationals with a number of domestic firms operating in only one country (geographically dispersed – low co-ordination), (C) high foreign investment with extensive co-ordination among subsidiaries (geographically dispersed – high co-ordination), and (D) purest global strategy (geographically concentrated – high co-ordination).

Furthermore, Porter (1986) has defined that in a global strategy a firm seeks to gain a competitive advantage from its global presence by either concentrating configuration, coordinating among dispersed activities, or both. Moreover, the firm may choose between four strategies in a global industry depending on the segment scope and geographic scope, which are (A) global cost leadership versus differentiation, (B) global segmentation, (C) national responsiveness, and (D) entering protected markets (if available) (Porter 1986).

The global integration and local responsiveness grid captures the essence of the efficiency objective and the requirement for adaptation and learning. It was therefore selected as the framework for developing the core globalisation

alternatives that the ICT company may choose. This has also been used widely in international business research (see e.g. Ghoshal 1987; Rugman and Hodgetts 2001). Based on the above discussion, it can be concluded that an international company may globalise its businesses, utilizing three types of core globalisation strategies in principle: (1) A pure global strategy, (2) a multi-domestic strategy (Hout et al. 1982; Prahalad and Doz 1987, 24), or (3) a transnational / multifocal strategy (Bartlett and Ghoshal 1987a; Prahalad and Doz 1987, 24).

In a pure global strategy, the company seeks global integration benefits and looks at the whole world as its market (Prahalad and Doz 1987,24; Hout et al. 1982; Porter 1986). A geocentric management orientation is expected to prevail in companies selecting this strategy (See Perlmutter 1969; Proff 2002). This strategy approach is often beneficial when (A) similar customer needs exist worldwide, (B) luxury products with home-market manufacturing advantages are offered, (C) standardised technologies and highly price–competitive markets exist, and (D) the products are technology intensive with high R&D costs (Hill 1994, 23-24). As noted by Porter (1986, 46), the global strategy may be either focused on many segments or a few segments, and therefore we have two variations of this strategy called (A) global cost leadership or differentiation strategy and then (B) global segmented strategy. For example, it has been proposed that some consumer electronics (Bartlett and Ghoshal 1989, 218) and electronic component (Prahalad and Doz 1987, 24) manufacturers use this strategy.

In a multi-domestic strategy, the company seeks local responsiveness by adapting its strategies to local market needs (Hout and al. 1982; Prahalad and Doz 1987, 24). Manufacturing on site is therefore common. Product ideas are often transferred to other markets to achieve synergies. (Hill 1994, 24-27). For example, branded consumer packaged goods companies utilise this strategy (Bartlett and Ghoshal 1989, 218). In the ICT area, network operators often operate on this basis. Moreover a polycentric management orientation is expected to be often found in companies selecting this strategy (Perlmutter 1969; Proffs 2002).

In a transnational or multi-focal strategy, the company strives to obtain global integration benefits, local responsiveness, and also international learning (Prahalad

and Doz 1987, 24; Bartlett and Ghoshal 1987a, 1987b). A regiocentric management orientation (Proffs 2002) and increasingly new emerging organisation forms like the heterarchic type described by Hedlund (1985) can be expected to prevail in companies selecting this type of strategy. In the ICT area, especially telecommunications switching manufacturers may find that both proximity to customers and global integration are important factors for competitiveness (Bartlett and Ghoshal 1989, 218). Due to the remaining government regulation and the regionally separated markets Nortel, for example, uses a strategy of seeking both high global integration and high national responsiveness in its network business (Rugman and Hodgetts 2001).

If neither local responsiveness nor global integration are sought it does not offer any advantage along the dimensions to the company and cannot therefore be seen as a viable global strategy option. Companies with ethnocentric management can be expected to prevail in this situation as they are driven mainly by home market needs (Proffs 2002). See Figure 9 for an illustration of core globalisation strategies in the ICT field and examples of expected strategies in certain businesses.

Figure 9. Core globalisation strategy in the ICT field

<table>
<tr>
<td rowspan="2">Global integration and co-ordination</td>
<td>High</td>
<td>Pure global strategy
(e.g. electronic component
manufacturing)</td>
<td>Transnational strategy
(e.g. telecommunications
switching manufacturing)</td>
</tr>
<tr>
<td>Low</td>
<td></td>
<td>Multidomestic strategy
(e.g. network operators)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td colspan="3">National responsiveness</td>
</tr>
</table>
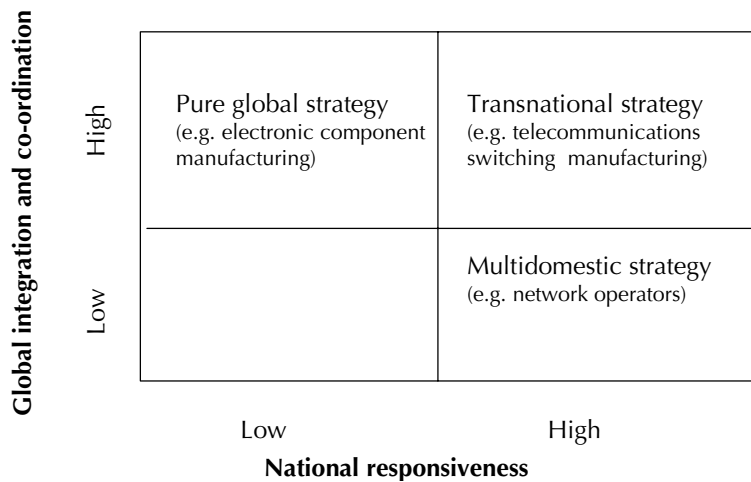
Source: Adapted from Bartlett and Ghoshal 1989, 218; Rugman and Hodgetts 2001

The core globalisation strategy is expected to influence the product strategy. The company selecting a pure global strategy strives for global integration and is therefore expected to select a highly standardised alternative, that is the standardised product strategy alternative. On the other hand, a company that has selected a multi-domestic strategy is striving for local responsiveness and is therefore assumed to select the localised product strategy alternative. Finally, a company applying a transnational strategy is looking for both local responsiveness and global integration and is therefore assumed to be selecting the modified product strategy.

2.1.3 Global market expansion and development related approaches

2.1.3.1 Concentration / diversification degree in global market expansion

It is important to understand how geographical market expansion proceeds from the international to the global. Ayal and Zif (1978 and 1979) propose that

multinational market expansion strategies can be divided into market concentration and market diversification. A market concentration strategy is characterised by a slow and gradual rate of growth in the foreign markets served. Relatively high marketing efforts are allocated to each market, aiming at gaining a high market share in selected countries. After building strong positions on the selected limited market area, the company may slowly move to other markets and expand market coverage. A market diversification strategy is characterised by fast growth in the number of countries covered at an early stage of expansion. Given the same marketing resources available, this means that less marketing effort is allocated per country.

A similar classification based on the degree of the concentration versus the diversification has been presented by Luostarinen (2000a). However, an additional third alternative is proposed by him that uses both concentration and diversification strategies. These strategy alternatives are called either (A) centralisation, (B) diversification or (C) centralised diversification strategies. In a centralisation strategy, the company focuses on a narrow area in the globe, e.g. Scandinavia or a certain part of Europe. In a diversification strategy, the company enters a large number of markets around the globe and maximises coverage. In a centralised diversification strategy, the company targets the main areas in the world but may leave, for example, smaller countries or less important markets uncovered. This kind of strategy could include focusing on selected central European, US, and Asian areas. Also interesting is the speed of implementing the chosen strategy. The company may choose to enter the market in a step-by-step way. If the globalisation pressure is high, a faster approach may be applied including at the extreme, the simultaneous entry of the chosen target countries. (See also Hollensen 2001, 203; Luostarinen 2000a) It is also important to note that each country can be seen as a global platform. The focus of the operations in one country is not only on running a business in that specific area. Those countries that contribute to the whole company and provide a global competitive advantage are the most successful platforms. (Porter 1986, 26-28)

As discussed earlier, Luostarinen (1979, 151) has proposed that business distance, consisting of economic, geographic and cultural distance, affects the country first

entered by the company at the beginning of internationalisation. Due to learning, it is expected that the geographical and cultural aspect will affect the market strategy less during the globalisation process than during the initial internationalisation. Ayal and Zif (1979) have found that there are several characteristics of the product, market, and decision criteria of the firm that influence the market strategy as well. For example, the market growth rate, competitive lead, product adaptation requirements, and external and internal constraints affect the market expansion strategy (See Ayal and Zif 1979 for a review).

The decision on market strategy and operation strategy is also closely interlinked. If the company's operation strategy is to use direct investment marketing operations, for example, sales subsidiaries, a concentration strategy is often chosen due to limited resources. On the other hand, given the same resources, if non-investment marketing operations like sales agents are used, a diversification strategy may be applied (Ayal and Zif 1979). Obviously this also applies vice versa; if the primary strategy has been to cover as many countries as possible, this often limits the available operation mode alternatives. In many cases, the companies end up using a mixture of different operation modes depending on a number of factors including, for example, the market potential and historical development.

The discussion of geographical market expansion alternatives can be summarised by concluding that the alternatives can be classified according to the level of concentration versus diversification as follows:

- Market centralisation. In this strategy, the company concentrates on a relatively limited number of markets and then expands slowly and gradually to serve a larger number of markets.

- Market diversification. In this strategy, the company targets fast growth in the number of countries covered from the beginning.

- Market centralised diversification. This is a combination of the two previously presented strategies and in this strategy the company diversifies to selected areas of the world, however concentrating on these areas on a limited number of countries.

Furthermore, in addition to the concentration versus diversification decision in the foreign markets served, the company needs also to decide how deep it wishes to penetrate each country market, i.e. how many segments to serve in each country (Ayal and Zif 1979) and what kind of operation modes to use (Luostarinen 1970 and 1979).

2.1.3.2 Phases in global market development

The conversion of a business from international to global takes place in several phases and a distinctive market strategy is applied at each stage. Yip (1989) has argued that globalisation proceeds in three phases, which are development of the core strategy, internationalisation of the strategy, and globalisation of the strategy. First, the company needs to develop a core strategy, which is the basis of a sustainable advantage. Secondly, the core strategy needs to be internationalised through international expansion. It is very common that the company ends up with differences in implementation across countries. Third, only after these phases does the company start to globalise the international strategy. The globalisation strategy integrates the separated strategies and strives for worldwide business leverage and competitive advantage.

Also Douglas and Craig (1989) have found that global market expansion develops in three phases in addition to the domestic phase; which are initial market entry, local market expansion, and global rationalisation (see also Craig and Douglas 1996). In this study the main phases are called the international market entry, the international market penetration, and the global market alignment phase. A variety of factors drive the company to change from a specific phase to the next one (Douglas and Craig 1989). These factors may be called triggers or drivers. The globalisation related drivers were discussed in 1.5.3.

High performing firms are distinguished by having a compelling theme that knits together otherwise independent activities and focuses energies on things that matter in the market and how to perform better than the competition. This theme or direction may be called the strategic thrust of the strategic business unit. (Day 1990,

28)   In international markets, defining the geographic extent of operations and direction for expansion is of the utmost importance (Douglas and Craig 1989).

The process starts with the international market entry phase (Phase 1), in which the company's strategic thrust is to expand geographically into international markets to achieve scale advantages. In the following phase, called the international market penetration phase (Phase 2), the company starts to look for new growth potential and expansion in countries where a base has already been established. The idea is to build on existing structure and assets established in each market to achieve scope advantages through spreading administrative overheads. Thus strategic thrust in this phase is to expand within markets already entered. (Douglas and Craig 1989; Craig and Douglas 1996) Product lines and variants may be developed to meet the local market requirements as well as marketing strategies may be adapted to the local environment. The development of the international market entry and penetration phases has been thoroughly examined by Luostarinen (1970 and 1979) and Johanson and Vahlne (1977) as discussed in paragraph 2.1.1, which depict it as a stepwise process where companies proceed towards higher market involvement. Moreover, Luostarinen (1970 and 1979) has noted that the change in operation mode towards more demanding ones is also an important element in this phase.

The final global alignment phase (Phase 3) is characterised by the adoption of a global orientation in strategy development and implementation. Global expansion becomes a key principle in strategy formulation. Attention focuses on global efficiency without losing local responsiveness. The strategic thrust of the company is to find synergies from operating on a global scale and to take maximum advantage of the multinational nature of its operations. Global alignment includes improving efficiency among its operations across the world and also developing a global strategy that identifies the market segments and customers to be targeted in world markets. Opportunities in identifying segments that are rather regional or global become interesting and use more standardised product strategies and processes. A strategic decision relates to the appropriate mix of product businesses worldwide. (Douglas and Craig 1989) It is expected that the operation modes are also rationalised across countries.

The transformation from phase 1 (international market entry) or phase 2 (international market penetration) to phase 3 (global alignment) illustrates the globalisation process of the international companies examined in this research. See Figure 10 for an illustration of the evolution.

Figure 10. Phases in the globalisation of ICT companies[20]
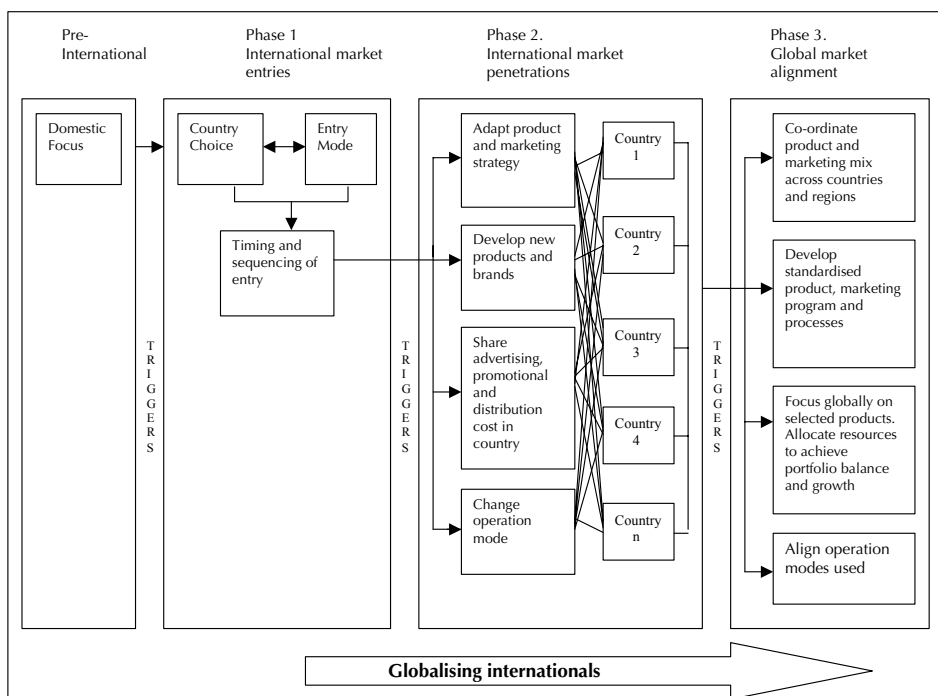
Source: Adapted from Douglas and Craig 1989. Note: In this research the development from stage 1 or 2 to stage 3 is examined.

2.1.3.3 Sources of competitive advantage and global market development

The sources of competitive advantage during the globalisation process may be called the strategic levers (Douglas and Craig 1989). The external factor of national differences and the internal factors of economies of scale, economies of scope, and

---

[20] Here the evolution is described mainly on the level of a strategic business unit. The evolution on the corporate level is examined later in section 2.2.2.

other synergies related to global operation have been proposed to be the source of competitive advantage for globalising companies (see e.g. Ghoshal 1987; Douglas and Craig 1989). The strategic levers are expected to have an impact on global market expansion and development and also on selected product strategies (Douglas and Craig 1989).

National differences affect the company's strategy. Decisions regarding countries from which to source, where to produce and, which markets to attend have an important impact on the global competitiveness of companies. Based on analysing the value chain and comparative advantage of countries, it is argued that firms should locate their activities in those countries that have a comparative advantage in a relevant intensive factor for the company, be it wages, materials, or capital (Kogut 1985). National differences may also exist in the output markets (Ghoshal 1987). Customer tastes and preferences may be different in different countries. This external factor has already been discussed when examining the globalisation drivers and homogenisation of the market in this work and is therefore not repeated here.

Scale advantages have been proposed as an important source for global advantage (Doz 1978; Hout and al. 1982; Hamel and Prahalad 1985) The economies of scale arise from the ability to perform activities more efficiently at a larger volume, or the ability to amortise the cost of intangibles such as R&D or advertisement over a larger sales volume (Porter 1998, 71). Besides the often mentioned scales in manufacturing, R&D also benefits from critical mass and economies of scale (Terpstra 1977). It seems to be that almost all functions of the company benefit from economies of scale (See Luostarinen 1994). There may also be dynamic benefits of scale through the "experience or learning effects" (Ghoshal 1987). The cost of a value activity declines over time due to learning that increases its efficiency (Porter 1998, 73). In a fast changing environment, it is also important to consider how to maintain strategic flexibility while benefiting from scale economies (Aaker and Mascarenhas 1984).

The scope economies are based on the notion that the cost of the joint production of two or more products can be less than the cost of producing them separately. The company may share (A) physical assets such as production equipment, cash or

brand names, (B) external relations with customers, suppliers, distributors, governments across different businesses and markets, and (C) knowledge (Ghoshal 1987). The scope economies may be achieved by sharing investments and costs across segments (segment scope), geographic countries (geographic scope), across the value chain (vertical scope), and business units (industry scope) (Porter 1998, 54-56).

Furthermore, Luostarinen (1994, 28-30) has stressed the importance of a competitive edge in internationalisation. He found that Finnish companies used a mix of different competitive advantages in different phases of the company leading to an onion-like profit circle. According to Luostarinen, the company enters the profit circle with a superior product and becomes a leader in product, price, and R&D. Money is further invested in production processes and the company hence becomes a cost leader. The company further invest the profits in marketing and hence also becomes a market leader. Furthermore, excellent management skills are needed to manage the development of the advantages of the company.

It has been suggested by research that the strategic levers differ at different phases of global market development (Douglas and Craig 1989). In the international entry phase, an economy of scale is an especially important source of competitive advantage. A company often leverages its domestic production base and in this way reduces average unit costs thanks to increasing production volumes. When the company is in the international penetration phase, it expands within the selected geographic markets through adaptive product and marketing strategy and by introducing new product lines. The emphasis at this phase is to achieve economies of broad segment scope by leveraging the established contacts and knowledge of local markets. New products can often be introduced via the same sales channels bringing huge cost benefits. (Douglas and Craig 1989)

In the global alignment phase, the company starts to co-ordinate and rationalise its operations on a global basis to achieve benefits from scale (Hout et al. 1982; Hamel and Prahalad 1985), scope (Hamel and Prahalad 1985; Ghoshal 1987), and possible other synergies. The global and regional level of co-ordination of product requirements becomes important. Improved co-ordination and more integrated

product strategy will often lead to economies of scale in manufacturing and R&D. Centralised product development, production, and marketing will eliminate duplication and increase efficiency (Douglas and Craig 1989). Skills or assets that are transferable such as management skills, brand, and product knowledge may be leveraged globally creating synergies from global operation and broader market scope (Douglas and Craig 1989).

It has been argued that competencies and processes-related advantages may bring a more sustainable competitive advantage than market-related advantages like economies of scale and/or scope. Recent findings, however, indicate that process and competence-related advantages are also vulnerable and may result in obsolete knowledge due to a change in the underlying factors (Christensen 2001). The importance of global brand dominance has been seen as especially important in fighting global competition. Also, it has often been found that the cost advantages are less durable compared with the brand and distribution advantages. (Hamel and Prahalad 1985)

The economies of scale, scope, and other synergies are also expected to have an impact on the product strategies. The importance of the impact of scale and efficiencies on product strategies is supported by a number of researchers. Quelch and Hoff (1986) found that the extent of economies of scale and efficiencies was an important factor when considering the potential for standardisation. Also, Keegan (1969) points out the importance of understanding the cost of manufacturing and adaptation when considering standardisation. As investment in R&D and product development is often high in ICT equipment companies, it is therefore extremely important to spread the development costs over the maximum volume of sales from global markets. Often worldwide product lines are developed and the product engineering and R&D is integrated to avoid duplications (Doz 1978). From the product point of view, this often means that the products have to be as standard as possible to benefit from the economies of scale and the number of product lines and country variants needs to be focussed. For example, Motorola recently announced that they are targeting to cut down their product assortment in the Personal Communication Sector from 65 products in 2000 to 25 products in 2002 (Gomez 2001). In this way, limited resources can be put into developing key

products. This leads one to conclude that the presence of economies of scale is expected to favour a more standardised product strategy.

The economies of scope as discussed earlier are based on the economies achieved from the joint production of several products. If strong scope economies are present it may be beneficial to adapt the product to meet the market requirements from different markets. When common R&D, flexible production facilities, or brands are shared across a number of products, scope economies may be gained although the product is adapted to different country markets. Furthermore, Hamel and Prahalad (1985) have argued that global companies need a broad product portfolio to support investments in key technologies (Hamel and Prahalad 1985). This seems to indicate that the presence of strong scope economies would favour a more adaptive product strategy alternative, that is a localised product strategy and a broader product assortment.

The global mobile telephone maker Nokia, for example, sees economies of scale and scope as an important edge. They leverage investments in brand building, R&D, mobile software architecture development, big customer base, broad product assortment, and optimised sourcing and manufacturing in their business. (Alahuhta 2001)

2.1.4 Impact of globalisation on product strategies

The impact of globalisation on the product strategies based on the theories reviewed will be discussed next.

In the context of global market expansion, it is important to note that companies (A) may expand geographically from international to global markets and furthermore their (B) market strategy may evolve from an international to a global market alignment. In the geographical global market expansion, three different alternatives can be seen. The company may choose centralisation, centralised diversification, or diversification strategy for the expansion. Due to financial and managerial limitations the company can seldom adapt the product to a large number of

countries and therefore it can be expected that a more standardised product strategy is chosen when diversifying to many countries. On the other hand, when a centralisation strategy is chosen more resources are available per selected target area and a more adapted product strategy may be chosen. (see e.g. Ayal and Zif 1979) Furthermore, the company can enter the markets simultaneously or in a step-by-step fashion (see e.g. Luostarinen 2000a). Developing local products for markets requires considerable resources and consumes a long time as market understanding and capabilities related with production and organisation need to be established. On the other hand, globally standardised product strategies may be applied faster and with less total cost. It can therefore be assumed that the faster and the more diversified the geographical expansion, the more standardised the product strategies.

When discussing the evolution of market strategies during globalisation, it was found that companies evolve through distinctive development in phases. An important change is the transformation from international entry or the international market penetration phase to the global market alignment phase, in which the market strategy changes into a globally integrated and co-ordinated market strategy on a worldwide basis. This development was supported by a number of international business researchers (see Yip 1989; Douglas and Craig 1989). Douglas and Craig (1989) have further found that when the company is moving from international market penetration to the global market alignment phase, the product strategy is often changed. In the international market penetration phase, the company seeks to penetrate deeper into local markets and therefore it uses product line extensions and country variants to increase sales. Even country-specific new products are developed. However, when the company is moving into the global market alignment phase, it will strive for co-ordination and standardisation of product lines on a global basis. New standardised products are also developed for global market segments at this phase. This discussion seems to indicate that the localised product strategy is often used in the international penetration phase when the company strives to penetrate deeper into international markets and as it enters the global alignment phase, the company selects either the modified or standardised product strategy alternative. In Table 2, the change and impact when the company

is transferring from the international market phase to the global market alignment phase is illustrated.

Table 2. Evolution of strategies from international to global market alignment phase

Phase of international market involvement	International market (entry and penetration) phase	Global market alignment phase
Key strategic imperatives of a strategic business unit	- Enter and penetrate international markets - Market responsiveness and leveraging capabilities on local markets important especially for the penetration phase	- Global rationalisation, integration and focus - Global co-ordination of strategies and control - Global restructuring - Strategic flexibility
Product strategy	- Localised product strategy - In initial entry, a domestic product may be used	- Standardised product strategy - Modified product strategy
Key characteristics of Product strategy	- Product strategy adapted to country markets - Non-standardised product management processes	- Both product strategy and product management processes increasingly standardised
Typical Firms in ICT	- Medium-sized to large, diversified firms with often country-centred strategies	- Large firms with global strategies

Source: Adapted from Craig and Douglas 1996

Concerning operation strategies, Luostarinen (1970, 1979) found a pattern in the utilization of operations strategies when the international involvement was deepening. Finnish companies used operation strategies in the following order: non-direct investment marketing operations (NIMOS), direct investment marketing operations (DIMOS), non-direct investment production operations (NIPOS), and direct investment production operations (DIPOS). Luostarinen (1970, 92) argues that the need to adapt the product favours the use of direct investment manufacturing and direct investment sales subsidiaries, because closeness to markets provides a

better opportunity to take into account the different requirements of the markets. Moreover, it can be assumed that the closer the manufacturing unit is located to the markets the easier it is to adapt to local requirements. It can therefore be argued that the more centralised the company's production operations across countries, the more likely is the selection of a more standardised product strategy and vice versa the more decentralised the company's production operations across countries, the more adapted is the product strategy. Also, direct investments in marketing operations across countries bring the customer closer and therefore makes it easier to adapt to the market requirement.

Luostarinen (1979, 174) found in his study on the internationalisation of firms that Finnish firms at the company level are introducing different sales objectives in the following order: goods, services, systems, and know-how. Based on the discussion in this study, it is argued that due to high lateral rigidity in decision-making, globalising internationals may be assumed to be laterally rigid towards introducing new product categories, that is to extend from physical goods, to services, systems, and know-how, but rather to select an existing product category to be developed for global markets. However, through organisational learning and the increasing global business experience and knowledge, product uncertainty and risk are reduced and the company may change its preferences. Moreover, it can be assumed that these products, be they goods, services, systems, or know-how, will be increasingly more standardised on different products levels. Standardisation will be applied in addition to the core level, also on a tangible and augmented level across countries.

In the discussion on globalisation strategies it was found that a company may decide upon three core globalisation strategies: a pure global strategy, a transnational strategy or a multi-domestic strategy (see Prahalad and Doz 1987, 24; Hout et al. 1982; Bartlett and Ghoshal 1987a). Moreover, the core globalisation strategy was expected to influence the product strategy. A company selecting a pure global strategy strives for global integration and co-ordination and is therefore expected to select a highly standardised alternative, that is the standardised product strategy alternative. A company selecting a multi-domestic strategy strives for local responsiveness and is therefore assumed to select the localised product strategy

alternative. A company applying a transnational strategy is looking for both local responsiveness and global integration and is therefore assumed to select a modified product strategy.

Based on the discussion, it can be assumed that strategic levers (see Douglas and Craig 1989) will have an impact on the product strategy alternatives (see Quelch and Hoff 1986; Keegan 1969). As investment in R&D and product development is often high in the ICT equipment companies, it is therefore extremely important to spread the development costs over the maximum volume of sales from global markets. Often worldwide product lines are developed and the product engineering and R&D is integrated to avoid duplication (Doz 1978). This often means that the products have to be as standard as possible to benefit from economies of scale. It can be assumed that the presence of economies of scale, economies of learning, and other global synergies regarding R&D, product brand, and assets favours a more standardised product strategy.

The economies of scope can also be seen to have an important effect on the product strategy of globalising companies. The economies of scope are based on the economies achieved from joint production of several products. If strong scope economies are present it may be beneficial to adapt the product to meet the requirements of different markets. When common R&D, flexible production facilities, or brand are shared across a number of products, scope economies may be gained although the product is adapted to different country markets. As mentioned, Hamel and Prahalad (1985) have argued that global companies need a broad product portfolio to support investments in key technologies (Hamel and Prahalad 1985). This seems to indicate that the presence of strong scope economies would favour a more adaptive product strategy alternative and a broader product assortment.

2.2 Corporate strategy

An international ICT company needs to answer the following questions often decided at a corporate level: How to develop the portfolio of product businesses and what product businesses to globalise.

2.2.1 Corporate strategy concept

Earlier research into strategy has dealt with a more prescriptive orientation, understanding strategy as a process of conceptual design, formal planning, and analytical positioning (see e.g. Andrews 1980; Ansoff 1965). Recent work has looked in a more descriptive way into strategy formation and is more concerned with strategy as a visionary, mental, emergent, and passive process, or configuration by nature (Mintzberg 1990). Moving into one of the most important strategic decision areas, Kenneth R. Andrews (1980) has defined corporate strategy as follows:

"The corporate strategy is the pattern of decisions in a company that determines and reveals its objectives, purposes or goals, produces the principal policies and plans for achieving those goals, and defines the range of business the company is to pursue, the kind of economic and human organisations it is or intends to be and the nature of the economic and non-economic contribution it intends to make to its shareholders, employees, customers and communities". (Andrews 1980)

Mintzberg (1990) has criticized the traditional approach (see Andrews 1980), which has presented strategy formation as a deliberate and controlled process of designing a fit between external threat and opportunity and internal distinctive competence, and then formulating the strategy based on this analysis. Instead, he has distinguished between, on the one hand, deliberate strategies, which are realized as intended, and, on the other hand, emergent strategies, which are patterns realized often in the absence of intentions. These two ends may be seen as a continuum along which real strategies lie. He has continued further by identifying a number of types of strategies between these extreme options. In Figure 11, the two main types of strategies are illustrated. Strategy formation is in practice about shifting between

use of a more deliberate one or a more emergent one from time to time. The role of emergent strategies is most important when an environment is too unstable or complex to comprehend. Deliberate strategies may be found most often in environments that are controllable or predictable. (Mintzberg and Waters 1985)

The corporate portfolio strategies, which will be discussed next in more detail, often emphasize the deliberate and execution of the strategies as planned. However, it is important to recognize that the actual outcome, the 'realized strategy' might differ from the original intention of top management. It can further be assumed that globalising internationals, which are often bigger in size and often have established management processes, plan their activities and develop their strategies more systematically than companies at the beginning of their internationalisation.

Figure 11. Types of corporate strategies
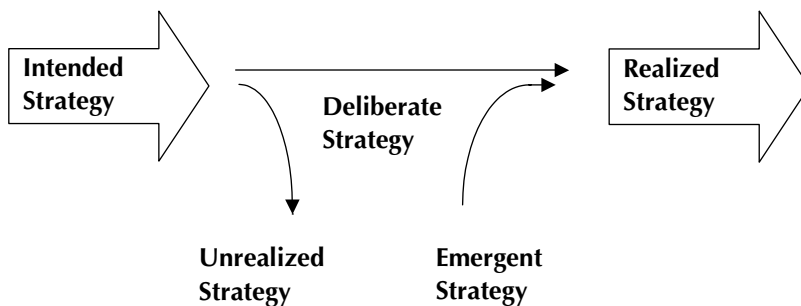
Sources: Adapted from Mintzberg & Waters, 1985

2.2.2 Corporate business portfolio growth alternatives

Corporate growth alternatives can be illustrated by a number of tools. For example, in the Boston Consulting Group's portfolio matrix each of the company's businesses is plotted according to the business growth rate and the relative competitive position measured by its relative market share (Hofer and Schendel 1978, 30). Ansoff (1965, 109) has proposed a growth vector, which defines the scope and the

direction of the firm's future business. The original matrix proposed by Ansoff (1965, 109) included product and mission as the main dimensions. A more recent work (Ansoff 1987, 110) includes three dimensions: the market need, product technology, and market geography. The three-dimensional growth matrix by Ansoff (1987, 122) was selected to illustrate the different growth alternatives of international ICT companies at a corporate level. The analytical simplicity and its applicability to different sizes of international firms favoured this choice. These three dimensions may be analysed on the basis of current business, but also on the basis of the new growth directions of the business portfolio. An international firm has two basic ways to expand the portfolio, either by (A) continuing to serve the present international markets and diversifying into new product or / and market segments, or by (B) moving into new global geographical markets using one of four available alternatives. The main focus will be on the latter direction in this discussion.

Ansoff (1987, 121-127) developed the three-dimensional growth matrix originally for explaining diversification and internationalisation alternatives. When applying these dimensions to a firm globalising its operations it has the following alternatives:

- The company may expand its business globally, but keep serving the same market need with the same type of products and technologies.

- The company may expand its business globally and decide to satisfy new market needs, but utilize existing products and technologies.

- The company may expand its business globally and decide to offer new product and technologies, but keep serving the same market needs.

- The company may expand its business globally, and decide to offer new products and technologies to satisfy new market needs.

Diversification strategies can be classified[21] as follows (Geringer et al. 1989; Rumelt 1982):

- Single business. A firm that is basically committed to a single business in a single industry. Over 95% of the firm's revenues coming from its largest single business.

- Dominant business. A firm that has diversified to some extent. Over 70% of revenues but under 95% coming from a single business in a single industry.

- Related business. Non-vertically integrated diversified firms operating in several industries but whose activities are linked. Over 70% of revenues coming from related business.

- Unrelated business. Non-vertical firms that have diversified without regard to the relationship between new business and current activities. Under 70% of revenues coming from related business, and under 70% from a single business in a single industry.

Luostarinen (2001a, 2003) argues that the strategies for growth of Finnish companies have developed in four stages. In the first stage, growth was achieved through the unrelated diversification of a business portfolio within a domestic market. In the second stage, the companies internationalised in a number of unrelated businesses within the home continent. In the third stage, the companies globalised with a focus on a limited product business area and finally, in the fourth phase, the companies are expected to continue globalisation but diversify into related business areas.

Based on the above discussion, the following main corporate level globalisation strategies for an international firm can be developed (see Luostarinen 2001a, 2000b):

---

[21] The presented classification of diversification strategies is simplified from Rumelt's 1982 classification of seven categories to only four main categories. See Rumelt 1982 for more on measuring the categories.

1. Global focus strategy: Global geographical expansion in a single or dominant business area with current product technology and market segment.

2. Global-related diversification strategy: (2A) global geographical expansion with the present product technology area but offering this to a new market segment or (2B) global geographical expansion in the present market segment but with new product technology.

3. Global-unrelated diversification strategy: global geographical expansion in unrelated market segments and unrelated product technology.

See Figure 12 for an illustration of the dimensions of growth in a global direction.

Figure 12. Geographical growth vector and globalisation alternatives
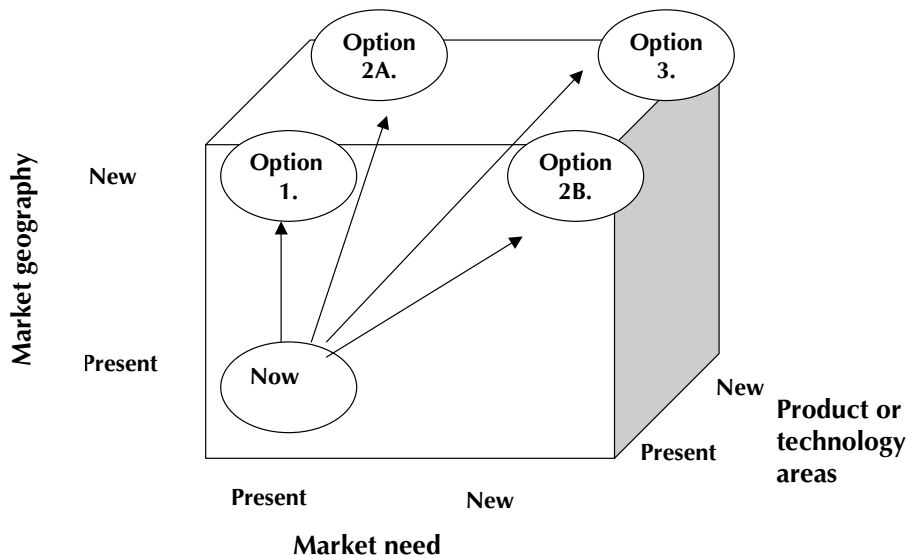
Source: Adapted from Ansoff 1987, 110

Although a number of studies have investigated the effects of both product and geographical diversification's effects on performance, the empirical results have been inconclusive and contradictory (see e.g. Tallman and Li 1996; Hitt et al. 1997,

Doukas and Lang 2003). A recent study investigating 20 large Swedish multinational companies found a strong pattern of product focusing in the process of expanding into a large number of markets (Bengtsson 2000). This has also been the globalisation strategy of, for example, Nokia, which has focussed on mobile telephones and networks and eliminated other product groups from its offering (Häikiö 2001a, 15).

It may be assumed that a global-unrelated diversification strategy (alternative 3) as a growth strategy is difficult for ICT companies from SMOPECs to pursue, as resources, be they financial or managerial, are often limited. Also, the global-related diversification strategy (alternative 2) demands considerable financial and managerial resources, although less than alternative 3. Therefore, it may be assumed that ICT companies will select a global focus strategy (alternative 1) as the primary corporate level globalisation strategy. However, as growth slows down in the ICT industry, global related diversification can be expected to increase.

2.2.3 Selection of product businesses to be globalised and strategic flexibility

Gupta and Govindarajan (2000) have developed a framework for the choice of the product business to be globalised based on the market requirement for adaptation and expected payoffs from globalisation, and they further propose that the product businesses requiring low adaptation and having high expected benefits from globalisation are the most attractive product businesses to be initially globalised (see Figure 13).

Figure 13. Framework for choice of product business for globalisation

Source: Adapted from Gupta and Govindarajan 2000

Strategic flexibility may be reached by first of all diversifying the firm's scope so that no surprises in the environment will have any serious damaging impact on the firm, and then secondly, basing the firm's portfolio on resources and capabilities on the strategic business areas. (Ansoff 1987, 109-111) Strategic flexibility in an especially rapidly changing environment should be used to exploit synergies in different business areas. The corporate office has a key role by balancing the need for divisional autonomy and the potential for future co-operation. When opportunities arise these should be exploited efficiently promoting integration possibilities and changing the rewarding system in a way that rewards such behaviour. (Raynor and Bower 2001)

Furthermore, it has been suggested that the spread of sales around the globe may decrease risk (Rugman 1976). It has been argued that earlier risk protection of Finnish companies was achieved through business diversification, but during globalisation it may be achieved through geographic diversification (Luostarinen 2001a).

2.2.4 Strategic intent

The corporate and strategic business units often communicate their long-term state of will as a vision or strategic intent[22]. In strategic intent, the company sets demanding targets for all levels of the organisation, it envisions a desired leadership position, and establishes the criterion by which the organisation can measure its progress (Hamel and Prahalad 1989). The strategic intent often establishes long-term targets regarding the direction in which to develop the corporate business portfolio, the degree of technical leadership sought, and the globalisation of strategic business units and other long-term targets. The strategic intent may vary a lot depending on the company. The purpose of strategic intent in relation to products in high technology companies is to (A) focus efforts of those persons responsible for identifying new product opportunities in the right direction, (B) establish a framework for developing the product platform and line strategies, (C) guide product development activities, and (D) provide a general direction for technology development (McGrath 1995, 29-30). In a global context, the core globalisation strategy and the direction in which to develop the global products are often an important part of the strategic intent.

Also, one area often described is the technological lead and speed of entry. Ansoff and Stewart (1967) developed four strategies based on the timing of the technologically intensive firm's entry into an emerging industry: (A) first to market, based on strong R&D, technical leadership, and risk taking, (B) follow the leader, based on strong development resources and ability to react quickly, (C), application engineering, based on product modifications to fit the needs of customers in mature markets, (D) me-too, based on superior manufacturing and cost efficiency. Other authors have also examined the timing of entry and found that the first-mover may gain advantages (Slater 1993; Lieberman and Montgomery 1988; Robinson et al. 1992).

---

[22] Since earlier research has been very mixed and often contradictory in respect to vision and strategic intent, this study used both as strategic planning elements that refer to the future state of will of the company and its environment.

It can be concluded that the strategic intent is expected to set long-term targets for developing the corporate business portfolio and also the product strategy at strategic business unit level.

2.2.5 Impact of corporate strategies on product business selection

The expected impact of corporate strategies on product business selection will be examined next.

Earlier research has developed the dimensions of corporate strategy (Ansoff 1987, 110) and strategies for growth of Finnish companies (Luostarinen 2001a, 2003). Based on this research it was proposed that at the corporate level companies may globalise by using three main strategies: (A) global focus, (B) global related-diversification and (C) global unrelated-diversification. A global unrelated-diversification strategy is difficult to pursue, taking into consideration the often-limited resources, be they financial or managerial, available for ICT companies from SMOPEC countries. Also, global-related diversification strategy demands considerable financial and managerial resources, but less than global unrelated-diversification. Due to the possibility of concentrating scarce resources on a single or a few product businesses, it may be assumed that ICT companies will select the global focus strategy as the primary corporate level globalisation strategy (see also Luostarinen 2001a and 2000a; Bengtsson 2000). However, as the growth slows down in the ICT industry, global-related diversification can be expected to increase.

As proposed by earlier literature (Gupta and Govindarajan 2000), it is expected that product businesses requiring low adaptation and having high expected benefits from globalisation are the most attractive product businesses to be initially globalised in the business portfolio of ICT companies.

2.3 Resource-based view

The resource-based view has recently been used in a number of international business studies related to global management, international diversification, and

market entries (Peng 2001). For globalising internationals the importance of resource-based theories in this conjunction is that these theories are expected to explain strategy choices at both the corporate level and the business level in the form of a chosen product strategy. The importance of resources and capabilities will now be discussed from the viewpoint of resource-based theories as well as strategic leverage and stretch.

2.3.1 Resource-based concept

The resource-based view originates from the work of Penrose (1959) and Wernerfelt (1984). The resource-based theory deepens our understanding, especially on how resources are applied and combined and on how to achieve a sustainable advantage.

The resource-based view argues that there is a connection between firm resources, capabilities, and competitive advantage (Hart 1995). The concept of competitive advantage has been discussed a lot in management literature (see e.g. Porter 1985). Competitive advantage can be achieved basically by developing products that have either a cost advantage, differentiation advantage or by focusing on a narrow target area (Porter 1985). Competitive products are also an important element in achieving competitive advantage in a global environment (Porter 1986; McGrath 1995, 16). The connection with capabilities and competitive advantage has also been well established in the literature and distinctive competences have been found as the key to success (Hofer and Schendel 1978; Prahalad and Hamel 1990; Hart 1995). Companies are competing with a portfolio of competences, instead of only products (Prahalad and Hamel 1990). The resource-based view gives a holistic view by stating that a competitive advantage can only be sustained, if the capabilities (competencies) creating the advantage are supported by resources that cannot easily be duplicated (Hart 1995).

The difference between resources and capabilities is that capabilities aim at deploying and co-ordinating different resources (Verona 1999). Barney (1991) has further concluded that firms obtain sustained competitive advantage by

implementing strategies that utilize their internal strengths, through responding to environmental opportunities, while at the same time neutralizing external threats and avoiding internal weaknesses. The objective is to choose a strategy that allows the best exploitation of resources and competencies given the external opportunities (Jolly 2000). The link between resources and product strategy has been established in earlier research. In her seminal work Penrose (1959, 150) states: "…the final products being produced by a firm at any given time merely represent one of several ways in which the firm could be using its resources," and "The selection of relevant product-markets is necessarily determined by the 'inherited' resources of the firm - the productive services it already has."(Penrose 1959, 82). By specifying a resource profile for a firm, it is possible to find the optimal product-market activities (Wernerfelt 1984). In this research, globalising internationals are expected to choose a global product strategy alternative that best meets its resources and capabilities. The connection of resources and capabilities to global product strategy alternatives can be seen in Figure 14.

Figure 14. Resource-based view and product strategy alternatives
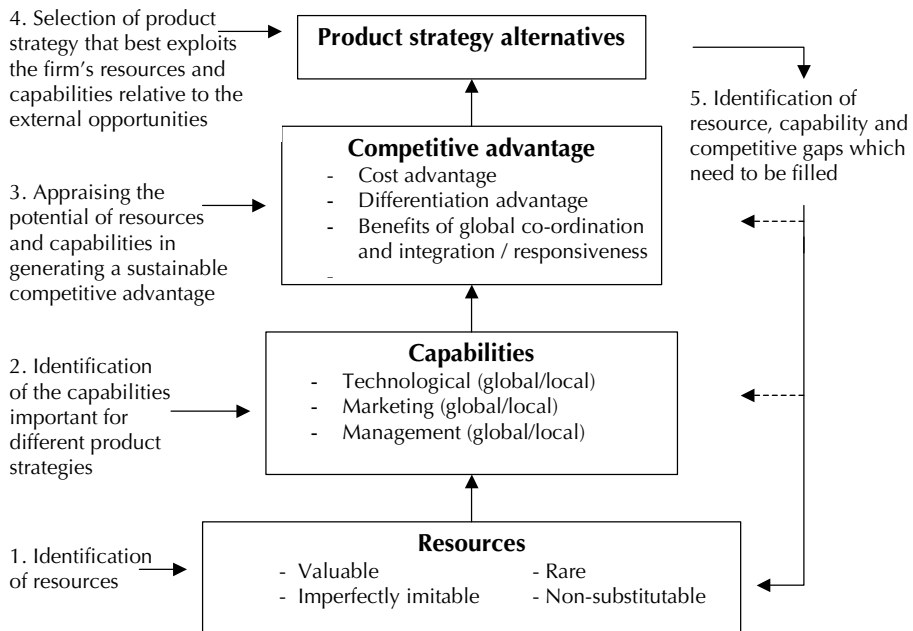
Source: Adapted from Grant 1991 and Hart 1995

Resources can be defined as those tangible and intangible assets, which are tied to the firm. Examples of resources are brand names, in-house knowledge of technology, employment of skilled personnel, trade contacts, machinery, efficient processes, and capital. (Wernerfelt 1984, 172) A common classification is also to group them into: (A) physical resources (plant, equipment), (B) intangible assets (brand names, innovative human resources), and (C) financial resources (Chatterjee and Wernerfelt 1991).

Not all resources are potential sources of sustained competitive advantage. The requirement is that these resources are not available freely within industry and they are not easy to copy, in other words, they are heterogeneous and immobile. Therefore, to have the potential for a sustained competitive advantage, the resource must fulfil four attributes. It must be valuable for exploiting opportunities or neutralizing threats, it must be rare among the firm's current and potential

competition, it must be imperfectly imitable, and there cannot be substitutes for the resource in question. (Barney 1991)

2.3.2 Developing competencies and resources for the future

Wernerfelt (1984) has presented a matrix with resources in another dimension and products in another dimension. This matrix can be used as a framework for developing resources based on the two dimensions. The company can either develop its resource base further or it can develop in which markets it is utilising existing resources. According to Jolly (2000), based on these dimensions, four generic patterns that the firm may use over time can be identified. First of all "market stretcher" directs the strategy towards exploitation of initial resources in multiple markets. Secondly, the "techno explorer" decides to serve one market, but to develop its resources with regard to future technological opportunities. Thirdly a "full deployer" stretches towards both new resources and markets. And finally, the "erratic manoeuvring" does not exploit its resources or develop the markets in a consistent way. According to Jolly (2000), the full deployer company is the best path in terms of resource-based view of thinking.

For globalising internationals, the full deployer path is very difficult to implement from the managerial perspective, as the resource base needs to be developed and global markets entered simultaneously. When international ICT companies globalise their business, the resources, skills, and capabilities need to be developed so that the more standardised global product strategy alternatives can be utilized to stay competitive and to achieve benefits through the global strategic levers like, for example, economies of scale.

A closely linked theoretical perspective to the resource-based approach is competence-based competition. Prahalad and Hamel (1990) have introduced the idea that companies compete with core competence portfolios instead of product portfolios. The core competencies are result of collective learning in the organisation and they may be identified based on the following requirements. First of all, a core competence may provide access to a wide variety of markets.

Secondly, a core competence should make a significant contribution to the perceived end product, and finally a core competence should be difficult to imitate. Core competences consist of skills and unique capabilities (Hamel 2000, 75).

For expanding the business, it is important not only to look at current competencies. Instead Hamel and Prahalad (1989) argue that it is important for companies to set ambitious long-term targets that are far beyond current resources and capabilities and that demand a sizeable stretch by the company. They further argue that there are five basic ways in which management can leverage its resources. First of all, concentrating and focusing resources on key strategic goals is vital. Second, new resources may be extracted from customers or competition. Third, one kind of resource can be complemented with another by either blending or balancing the resources correctly. Fourth, resources can be conserved when necessary by attacking at the right time and with the right target, and then by finally recovering the resources from the market place in minimum time by effective execution. (Hamel and Prahalad 1993)

Some more recent research highlights the importance of dynamic capabilities in achieving competitive advantage. (See e.g. Teece et al. 1997; Teece 1998) The dynamic capabilities can be seen as the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments. Moreover, this approach emphasises the importance of a firm's internal processes as bases for competitive advantage. (Teece et al. 1997) The implication for product strategy is that it is important to develop the resources and capabilities needed to build successful products along the globalisation. It may be expected that certain resources and capabilities favour a specific product strategy alternative, which will be next discussed. Moreover, it is important to understand in addition to the evolution of the product strategy dimensions also the evolution of product management processes.

2.3.3 Impact of resources and capabilities on product strategies

In this study the tool presented by Wernerfelt (1984), consisting of a matrix with resources in another dimension and products in another dimension, is used. The assumption is that by analysing the resources and capabilities, the company may choose the correct product alternative. It may also be useful to plan and develop certain resource combinations for exploiting the desired strategy in the future.

The skills and capabilities needed to develop products consist of (A) technological capabilities, for example, R&D, manufacturing, design, technological knowledge, architecture knowledge, and aesthetics knowledge, (B) marketing capabilities, for example, market research, strategic marketing management, marketing mix policies, product launch knowledge, (C) external integrative capabilities, for example, external managerial processes and networks, and (D) internal integrative capabilities, for example, internal managerial processes, process integration, and the cultural values needed for internal integration (Verona 1999). The integrative capabilities may also be called management capabilities.

The managerial demands of operating an international company versus a global one are quite different. To be able to reduce costs and optimise investment, companies operating with a global strategy need to be able to integrate geographically dispersed activities on a global basis. Furthermore, global strategic co-ordination is needed to manage centrally resources on a worldwide basis. On the other hand, companies operating on the basis of an international strategy need to possess skills and capabilities to achieve local responsiveness. (Prahalad and Doz 1987, 14-25; Porter 1986) Building on the resource-based theory and the global management theory, it may be assumed that companies with strong global technological capabilities, global marketing capabilities and global management capabilities, which are based on valuable, rare, non-imitable and non-substitutable resources, will select a more standardised product strategy. Companies that possess local marketing, technological and management capabilities based on valuable, rare, non-imitable and non-substitutable resources would favour a localised approach.

Examples of the resources expected to contribute to global technological, marketing and integrative capabilities that have the potential of fulfilling the attributes of being valuable, rare, imperfectly imitable and non-substitutable are the following:

-   Globally protected well known brand name (contributes to global marketing capability)

-   Globally patented technology and processes   (contributes to technological capability)

-   Global marketing research (contributes to global marketing capability)

-   Global product platform development knowledge (contributes to global technological capability)

-   Production facilities suitable for large-scale production (contributes to global technological capability)

-   Globally standardised product development process (contributes to global management capabilities)

Examples of resources expected to contribute to local technological, marketing and integrative capabilities that have the potential of fulfilling the attributes of being valuable, rare, imperfectly imitable and non-substitutable.

-   Locally well-known protected brands (contributing to local marketing capability)

-   Local market understanding (contributing to local marketing capability)

-   Production facilities well-suited for small series of production or flexible manufacturing (contributing to local technological capability)

-   Efficient local product development resources close to markets (contributing to local management capability)

In Figure 15 the impact of capabilities on product strategy is illustrated on the basis of the resource-based view.

Figure 15. Impact of capabilities on product strategy alternatives

Product Strategy / Capabilities	Localised product strategy	Modified product strategy	Standardised product strategy
Global technological capabilities		+	++
Local technological capabilities	++	+	
Global marketing Capabilities		+	++
Local marketing capabilities	++	+	
Global management capabilities		+	++
Local management capabilities	++	+	

Note: The number of plus (+) signs indicates the relative importance of the capability for a specific product strategy.

2.4 Product technology life cycles

The product life cycle is a model describing the different stages through which the product passes when it is introduced onto the market and is adopted by consumers. The theory of the adoption and diffusion of innovations provides the underlying rationale (Kotler 1984, 361). The product life cycle (PLC) can be analysed on many levels: industries, product classes, product forms, and brands to mention a few (Lambkin and Day 1989). In this study, the product class level was selected to be able to capture an overall life cycle pattern, and also inter-brand rivalry and the introduction of new forms (see e.g. Lambkin and Day 1989). In the high technology industry, the product class life cycle is often called the technology adoption life cycle (Moore 1995) and it explains how a new product technology innovation diffuses into new segments as the technology matures.

The product life cycle concept has also been used to explain international trade and investments between advanced countries and developed ones as the product matures (Vernon 1966). The rationale behind understanding the product cycles in this study is that each stage calls for a specific product strategy (Rink and Swan 1979).

2.4.1 International product life cycle

The International product life cycle (IPLC) theory presented by Vernon (1966)[23] emphasises the timing of innovation, the effects of scale economies, and the role of ignorance and uncertainty in influencing trade patterns. Vernon (1966) proposes that the trade patterns shift during different stages of the product life cycle. First, as the new product is often quite unstandardised, the degree of freedom in changing inputs is important, the price elasticity of demand is comparatively low and the need for effective communication is essentially high. This makes it attractive for producers to locate themselves in countries that have strong domestic demand. These companies will also start to gradually export their production as the demand starts to grow in other countries. (Vernon 1966)

Second, as the demand for a product expands, a certain degree of standardisation usually starts to take place. This is often due to the growing acceptance of certain general standards at this stage. This opens up the possibility to achieve economies of scale, and the reduction of the production costs starts to be the main concern of the firm instead of product characteristics. This raises questions of setting up foreign production facilities. This becomes beneficial when the marginal production cost plus the transportation cost is higher in the home country than the average cost of production in a host country. (Vernon 1966) Of course, other factors than cost also play an important role as, for example, anticipated tariff barriers and the political situation in the foreign country.

---

[23] Many of the assumptions of the international product life cycle model go back to the changes in classical assumptions made by economists in response to Leontief's findings of US export industries in 1953, which contradicted traditional factor proportions theory. See Wells 1972 for a good review of the history of the international product life cycle.

Third, it may also become profitable to start serving third country markets from the new location, especially if labour costs are lower at the new production unit. Finally, exports back to the mother country may also happen if transportation costs are reasonable. Furthermore, at an advanced stage of standardisation of some products it may become profitable to shift the production to less-developed countries and eventually to start exporting from these countries as well (Vernon 1966).

The international product life cycle theory has been used to explain international trade and investments, and Sood (1975) found, for example, that the international trade and investment of the computer industry could be explained relatively well during the time period 1960 – 1973 based on the international product life cycle. However, in the ICT industry globalising internationals have to introduce the products simultaneously worldwide and often also start manufacturing in several countries simultaneously to be competitive. Therefore, it is argued that the international product life cycle pattern may be applicable mainly in their internationalisation phase, but not be valid in their globalisation stage.

2.4.2 Technology discontinuities and dominant design

At rare and highly irregular intervals, innovations occur that have considerable cost or quality advantage compared with previous technologies. These may be called technology discontinuities. These affect either the underlying processes or the products. Product discontinuities provide a clear competitive advantage in the question of price, performance or quality compared to existing products. For example, integrated circuits replaced transistors in electronics. Process innovations fundamentally change the way that the product is manufactured resulting in quality or cost benefits. (Anderson and Tushman 1990) Moreover, the continuous product and process innovation has been found especially important for companies in global environment (Darling and Box 1999).

Furthermore, discontinuities can be seen as competence enhancing or competence destroying. Competence enhancing discontinuities build on existing know-how embodied in already existing technology, on the other hand, competence–

destroying discontinuities makes the existing know-how completely obsolete (Tushman and Andersson 1986). Christensen (2000, XVIII) has divided the innovations as sustaining or disruptive; a sustaining innovation is such that it improves the performance of products along the dimensions that main stream customers have valued historically, and disruptive technologies are such that they introduce to the market a different value proposition changing the dimensions in which the competition occurs.

According to (Christensen 2000, 113) there are reasons why established companies have difficulty in responding to disruptive technologies that are not related to the difficulty of the technology as such. The reasons are more market driven. First, the customer affects the resource allocation of well-managed companies so that only those products that have customer demand are financed. Second, small emerging markets are not interesting enough for established large companies. Third, there is a risk involved in new technologies and there may be safer choices for established companies in the short run. Fourth, organisations are hindered by their processes and values to make big changes. Finally, the new technology supply may not equal the technology demand of current markets. All in all, these hindrances have led Christensen (2000, 113) to propose that organisations should establish separate small and flexible organisations that target the new opportunities.

The disruptive technology discontinuities may also require the established companies to change their strategy from an international one towards a global one. However, it may be difficult for them to respond to these types of disruptive discontinuities for a number of technological, managerial, and market-related reasons. For example, the introduction of the global technology standard GSM and the deregulation of the operator competition triggered the globalisation of the mobile telephone market at the beginning of the 1990s (Häikiö 2001a, 16). However, the industry leaders including Motorola were not able to make the transformation to the new global standard fast enough. Instead Nokia was able to develop GSM products effectively and introduce them swiftly into new markets, taking the lead in the mobile telephone market (Häikiö 2001a, 71). Responding to disruptive technological innovations is often difficult due to an existing customer base that requires the older technology (Christensen 2000, 263). This can be

assumed to have been the case with Motorola. Its main customers in USA most probably continued to demand a supply of mobile telephones based on analogue techniques. Also, the change to a global strategy requires fully new skills in designing global products and product management. Based on the discussion, it may be expected that when the industry leaders in the ICT field also confront disruptive technology discontinuities requiring a change of strategy towards the global, they face difficulties in responding to these. This may mean that new companies coming from other industries or challenger positions in current industry will take the global lead (see also Christensen 2000, 26).

Anderson and Tushman (1990) explain the technology cycle as developing in two phases. The first phase, which starts from technological discontinuity, is characterised by design competition based on old and new technologies and substantial product-class variation. This is called the "era of ferment". The second phase starts with the establishment of a dominant design, in which a single architecture establishes dominance in a certain product class. Technical improvements become more incremental in nature at this phase. This era is called the "era of incremental change". It continues until the next technological discontinuity comes and restarts the technology cycle.

The emerging of a dominant design is linked with the diffusion of technology (see Abernathy 1978, 82). In the era of ferment, users are confronted with several technological alternatives and choosing any of them is risky. Therefore, it is expected that mass-market adoption starts only when the dominant design has been established. Dominant designs emerge in several ways; users may prefer one standard over another, one powerful user or several users may mandate a standard, a dominant producer may use the market power to make its product a standard, a group of companies may form an alliance around a standard, or an industry committee or regulator may establish the standard, to mention some ways. (Anderson and Tushman 1990)

Dominant design allows firms to design standardised products and interchangeable parts and to optimise processes for volume and efficiency (Anderson and Tushman 1990). Hence it can be argued that the emergence of a dominant design is a

prerequisite for globalising internationals to be able to globalise the product strategy.

2.4.3 Stages of the product technology adoption life cycle

The product life cycle has its origin in research done in the area of the adoption and diffusion of innovations. According to Rogers (1962, 119), the adoption process can be seen as a mental process through which an individual passes from first hearing about an innovation to final adoption. Five stages may be identified in this process: awareness, interest, evaluation, trial, and adoption. The individual may reject an innovation at any stage of this adoption process. Individuals differ in the speed with which they adopt an innovation. On the other hand, the diffusion process can be described as the spread of a new idea from its source to its ultimate adopters or users. The users may be classified into categories based on the relative time they adopt an innovation. Furthermore in empirical cases it has been found that the adopter distribution is close to a normal distribution curve. These adopter categories can be labelled as innovators, early adopters, early majority, late majority, and laggards. (Rogers 1962,161) If the process would be plotted as a cumulative curve it would approach the "S" shape.

These adopter categories may be seen as ideal types that have certain characteristics. The innovators are eager to try new ideas first and take a risk in trying innovations like, for example, new ICT products. The early adopters are the next to adapt after the innovators. They are more integrated in the local system and hence have an important role as opinion leaders in many social systems. The early majority adopt innovations just before the average member of the society and their adoption period is relatively longer than the two previously described categories. The later majority adopts only after the average member has already adopted the innovation. This may be triggered by economic reasons or social pressure by other members. The laggards are the last ones to adopt an innovation and they are often suspicious of innovations. (Rogers 1962, 169-171)

According to Hofer (1975), the most fundamental variable in determing an appropriate business strategy is the stage of the product life cycle. Furthermore the stage of the product life cycle also affects the R&D and product design objectives (Wasson 1974, 247). The product life cycles are extremely important in the high technology area, as they are often short and unpredictable. Alert companies should plan to be among the first to bring the product onto the market as competition will often force prices down in a later phase (Ansoff 1967). Furthermore, it is important for planning a product strategy to understand the likelihood, character, and timing of competitive moves (Levitt 1965). However, it is important to note that the product life cycle has also received criticism and it has been argued that it is not valid in today's world. It may overemphasize the importance of new product introductions, and cause wrong product decisions. Its existence has also been questioned (Dhalla and Yuspeh 1976). It has been proposed that further research is needed on the issue of product life cycle shape, different product levels, and use of PLC by business planners (Rink and Swan 1979). This research will bring more understanding to this area.

Below, product strategy is analysed in different stages of the life cycle on the basis of the literature. The analysis is carried out at the product technology adoption / product class level noted earlier[24].

Market intro/development stage. In the market development stage, customers are innovators looking to be the first to exploit new products and early adopters looking for fundamental breakthrough innovations (Moore 1995, 29-35). Innovators are willing to take considerable risk (Rogers 1962, 185) in trying new unproven technologies, and are often also willing to spend time with incompatible technological solutions. In the market development stage, the aim should be to minimize the learning requirements and gain trial among innovators (Wasson 1974, 213). New technology and adaptation to an early market need is important (Moore 1998, 177). The product line can be very focused, consisting of only a few models (Wasson 1974, 215).

---

[24] The technology adoption life cycle presents adoption by first time users, which is then converted into product class/category life cycle sales. The product class/category life cycle is thus longer due to ongoing repetitive sales (Moore 2000).

Rapid growth stage. When entering the rapid growth stage, the early majority starts to adopt the product technology. The strategy should be to establish market leadership within a well-defined segment (Moore 1998, 177). The product strategy calls for providing a differentiated whole product to the selected customer segments. A complete product needs to be offered as a solution to the customer (Moore 1998, 178). An augmented level product offering like, for example, installation and after market services are examples of vital elements at this stage. Modular design should be used to appeal flexibly to the new user segments (Wasson 1974, 215).

As the product enters the rapid growth period, operational excellence also becomes important. Moreover, leading companies drive the cost down by starting to standardise products, developing volume production, and introducing new product releases to keep competitors off balance (Moore 1998, 199).

Competitive turbulence stage. When entering the competitive turbulence stage, the late majority adopts the product and the market growth rate starts to slow down. Intensified attention to product improvements and eliminating products with little appeal is common (Wasson 1974, 215). At this stage, the products have become a commodity and are highly standardised. Moreover, operational excellence and customer intimacy is important (Moore 1998)

Maturity stage. In the maturity stage, laggards adopt the product technology. Defending brand and product position and attention to cost cutting becomes important (Wasson 1974, 215). Cost cutting in product and design compromises are important (Wasson 1974). Further product line extension should be considered when the product technology starts to mature. An empirical study using the profit impact of market strategies (PIMS) database found that relative product line length was greatest during maturity and decreased during decline (Anderson and Zeithmal 1984). The company is often forced to look for increased sales by promoting more frequent usage, developing more varied usage, creating a new use for the product by expanding the market, or finding a new use for the technology. (Levitt 1965) Furthermore, due to new technical modification and smaller innovations, market growth may accelerate again, providing a pyramided life cycle (Wasson 1974, 110).

In the mobile telephone industry, the constant introduction of new technologies has enabled the market to grow for a relatively long period.

Decline stage. When the product technology starts to decline, milking the offering becomes the key objective. Unprofitable products should be eliminated from the line (Wasson 1974, 215). Pressures to standardise the product offering even further to lower the prices increase. Also, investments to safeguard a competitive position in the next technology wave become important.

Understanding the position in the adoption life cycle and being able to adjust the strategy accordingly is important for success. See Figure 16, which illustrates the product strategy development and the increasing pressure to standardise the product as the product technology passes through the stages towards decline.

Figure 16. Product technology life cycle and global product strategy

Sales	Market development	Rapid growth	Competitive turbulence	Maturity	Decline

	Market development	Rapid growth	Competitive turbulence	Maturity	Decline
Adopters	Innovators & early adopters	Early majority	Late majority	Laggards	
General strategy objective	Minimize learning requirements, gain trial for new technology, and product leadership	Establish a strong brand and distribution niche, product leadership and operational excellence	Maintain and strengthen the market niche, consumer and dealer loyalty, operational excellence and customer intimacy	Defend brand and product position, product improvements, investments in next technology, extend product lines	Milk the offering, ongoing repetitive sales
Outlook for competition	No competition	Early entrance by competition	Tough competition	Competition stabilized	Competition declining and dropping out
Product strategy	New technology, narrow product line, adapted to the early market needs	Modular design to appeal to new user segments, increasingly standardised whole product	Product improvements, eliminate weak products in line, highly standardised products	Low cost models, technology modifications to pyramidise market, broad product line and next technology development	Eliminating of unprofitable products from line

Standardisation of product strategies increases

Source: Adapted from Wasson 1974, 247; Moore 1998; Rogers 1962

It is important to note that two issues are essential for this research in the context of product technology adoption life cycles. First of all, to be able to apply standardisation of product strategies across countries, the product life cycles must be at the same stage in the target markets (see Buzzel 1968; Sorenson and Wiechman 1975).   If products are at different stages of their life cycles in different

countries, then it can be expected that the product requirements might also differ and call for more adaptive product strategies across countries. The type of industry also matters a great deal with respect to product technology life cycles. In local industries, the company selects its product strategy based on the stage of the product technology adoption life cycle in the particular local market. However, in global industries, such as the ICT field, the new technology often diffuses across the globe relatively quickly and the differences in the stages of the product life cycles tend to decrease. Therefore, products are often introduced simultaneously worldwide, using a more standardised product strategy. This puts huge pressure on the successful product introduction globally, taking into consideration the often-substantial resources that have been invested in the products and their introduction. Secondly, the stage of the product life can be expected to affect the product strategy applied. The general pattern seems to be that in the early phases of the life cycle, adaptive product strategies are used and as the product passes through the stages more standardised alternatives are selected (See also Abernathy 1978, 82)[25]. The importance of offering a whole product increases through the stages. Also, as noted earlier, the product line length can be expected to be broadest in the maturity stage.

2.4.4 Impact of product technology life cycles on global product strategies

To be competitive, globalising internationals in the ICT field have to introduce products globally in a large number of countries simultaneously and often to manufacture at several locations close to the market. This implies that the international product life cycle concept introduced by Vernon (1966) may be applicable mainly in their internationalisation phase, but not in their globalisation phase.

---

[25] There may also be seen to exist a relationship with the stages of the product technology adoption life cycle and the required capabilities of the firm discussed in 2.3.3. In the introduction stage, local capabilities in technology, marketing, and management may be expected to be required to a greater extent as the purpose is to conduct product trials and adapt to local customer requirements. During later stages, global technological, marketing, and management capabilities may be expected to be more important as operational excellence is sought (see also Moore 1998, 233). Moreover, the emphasis shifts from technological capabilities towards marketing capabilities along the product technology life cycle (See Gabrielsson M. 1999, 218). Also development may occur within the technological, marketing and management capabilities, for example in the technological capabilities the focus shifts from R&D towards developing manufacturing process during the stages (see e.g. Hofer 1975).

When analysing technological discontinuities it was found that it may be difficult for established companies to respond to disruptive technological discontinuities requiring a shift towards a more global strategy. Global product strategies often require knowledge of new digital technologies, global platforms, and global product development. Also, there are a number of market driven reasons that hinder transformation, such as existing projects with current customers, risks involved in new technologies, existing processes and values (Christensen 2000, 113). This may prevent the established leaders from making a swift transformation from international to global or at least hamper such efforts.

The emergence of a dominant design after technology innovation is an important enabler for the global standardisation of products and product management processes. If the dominant design has not yet emerged, international market strategies are expected to prevail. When a dominant design has emerged, it opens up the possibility to reap the benefits of global standardisation.

The technology adoption life cycle is a useful concept in trying to understand how technology diffuses across segments and what product strategies should be applied. It is important to note that two issues are essential in the context of product technology adoption life cycles. First, it was found that to be able to apply the standardisation of product strategies across countries, the product life cycles must be at the same stage in the target markets (Buzzel 1968; Sorenson and Wiechman 1975). Second, the stage of the product life can be expected to affect the product strategy applied. The general pattern seems to be that in the early phases of the life cycle, adaptive product strategies are used and as the product passes through the stages more standardised alternatives are selected. Furthermore the importance of offering a whole product increases along the life cycle and the product line length is often longest in the maturity stage.

2.5 Summary of theoretical discussion, framework and working propositions

The theoretical discussion is first summarised and then attention is turned to developing the theoretical framework and examining what factors affect the product strategy when an international ICT company globalises its activities. Then working

propositions on the impact of the explanatory variables on the global product strategy will be developed.

2.5.1 Summary of theoretical discussion

The theoretical discussion in part two concerning the (A) internationalisation process, MNC development and globalisation, (B) corporate strategy, (C) resource-based view and (D) technology discontinuities and life cycles and the discussion in part one regarding (E) standardisation of product and marketing strategies will next be summarised.

The internationalisation of a company can be seen as a stepwise process in which the product, operations and market strategy change (Luostarinen 1970 and 1979). The underlying rationale is the lateral rigidity in decision-making and organisational learning. Also criticism has been presented to the stages pattern of internationalisation (e.g. Turnbull 1987; Andersen 1993; see also discussion in 2.1.1.3). It was found that it is important to distinguish between target country level and company level internationalisation patterns. The evidence from Finnish internationalisation research shows that a mainstream pattern of internationalisation can be found (see e.g. Luostarinen 1979; Korhonen 1999), however it can be questioned whether the target country pattern is similar in each country. Further, based on the discussion of globalisation and its impacts it was assumed that the development of market and operations strategies, and the global business experience would have an impact on the global product strategies.

It was noted that an important decision for a globalising international is the selection of the core globalisation strategy, and it can be assumed to have an impact on the global product strategies (see Prahalad and Doz 1987, 24; Hout et al. 1982; Bartlett and Ghoshal 1987a). By analysing the changes in market strategies it was further found that the globalisation of ICT companies can be illustrated as an evolution of market stages. In the change from the international market (entry and penetration) phase to the global market alignment phase, the market strategy changes from penetrating deeper into the local country markets, calling often for

more adaptive product strategies, to a global market alignment phase, calling often for more standardised products. This development was supported by a number of international business researchers (see Yip 1989; Craig and Douglas 1996). It was also found that both operation strategies and market diversification degree have an effect on the product strategies. The strategic levers of economies of scale and scope were seen as important factors when considering the product strategy alternatives.

Furthermore, based on discussion of the portfolio growth strategies (see Ansoff 1987, 110) and the diversification-related theory (Geringer et al. 1989), distinctive global corporate growth strategies were developed (see also Ansoff 1987, 110; Luostarinen 2000b and 2001a). It was further proposed that the global focus strategy would be most used in globalising ICT companies. Previous research as well as experiences of leading ICT companies, e.g. Nokia, support this assumption (Häikiö 2001a, 15; Bengtsson 2000). Moreover, it was expected that product businesses requiring low adaptation and having high expected benefits from globalisation are the most attractive product businesses to be initially globalised in the business portfolio of ICT companies (Gupta and Govindarajan 2000).

The resources, capabilities, and skills were discussed and it was proposed on the basis of resource-based view (Wernerfelt 1984; Barney 1991) and the skills and capabilities required in developing and managing products in a global environment (Verona 1999; Porter 1986; Prahalad and Doz 1987) that certain capabilities favour a more standardised product strategy and certain capabilities a more adapted product strategy.

Dominant design allows firms to design standardised products and interchangeable parts and to optimise processes for volume and efficiency (Anderson and Tushman 1990), and therefore it was argued that the emergence of a dominant design is a prerequisite for globalising internationals to be able to standardise the product strategy (see also Abernathy 1978, 82). The technology life cycle is a useful concept in trying to understand how the technology diffuses across segments and what product strategies to apply. First of all, to enable the use of more standardised product strategies the stage of the life cycle must be similar across the target

countries (Buzzell 1968; Jain 1989). In global industries like the ICT field, technology adoption life cycles are becoming increasingly global by nature and calling for similar strategies across countries. Secondly, based on the stage of the product technology life cycle it seems that more adaptive product strategies are used in the early stages of the life cycle and more standardised ones in the latter phases. Moreover, the product line length was expected to be broadest in the maturity stage.

When reviewing the literature related to the standardisation of products and marketing mix elements it was found that market characteristics, product characteristics, industry conditions, legal restrictions, and some internal firm factors can affect the standardisation of product strategies. Also, it was found that an important distinction should be made between the standardisation of product strategy dimensions and product management processes.

Please see Table 3 for a summary of the theories and models explaining global product strategies.

Table 3. Summary of theories and models explaining global product strategies

Theory/model	Objective	Underlying rationale	Impacting factors	Global product strategy
Internationalisation process	Explains the internationalisation process as a dynamic concept	Lateral rigidity in decision making, organisational learning	Market and operation strategies, global business experience	Development of product categories, choice of product strategy
MNC development and globalisation	Explain the core globalisation strategy alternatives and evolution towards global	Global integration / national responsiveness, strategic thrust, scale, scope and global synergies	Core globalisation strategy, and market strategy evolution in globalisation	Development of product lines, choice of global product strategy
Corporate strategy	Explains the business portfolio strategies and selection of business to be globalised	Corporate business portfolio growth matrix	Business portfolio strategy, strategic intent	Choice of product businesses to be globalised
Resource-based view	Explains the impact of resources and capabilities on strategy	Products are based on company's resources and capabilities	Global or local technological, marketing and management capabilities	Choice of global product strategy alternative
Technology discontinuities and product technology adoption life cycle	Explain the impact of technology discontinuities and the product technology adoption life cycle	Adoption and diffusion of innovations	Technological discontinuity, emergence of dominant design, stages of the product technology adoption life cycle	Prerequisites for using standardised strategies and choice of global product strategy
Global standardisation of product and marketing	Explains the global standardisation of product strategy and product management processes	Planning of effective product and marketing strategy in a global environment	Market and product characteristics, industry conditions, legal restrictions, and internal factors	Standardisation degree of product strategy and product management processes

2.5.2 Theoretical framework

The product strategy alternatives of globalising internationals can be explained by (A) macro and industry environment, (B) corporate level strategy, (C) business level strategy, and (D) internal levers, resources, capabilities and decision-making variables. Figure 17 presents a framework explaining the development of product strategies.

Macro and industry environment

Macro and ICT-industry-environment-related factors are expected to have an impact on global product strategies. These factors were discussed in the context of globalisation drivers, standardisation-related variables, and the technology adoption life cycle.

The macro environment variables can further be divided to include, (A) the home market push, (B) the target market pull, and (C) the general global enablers (Luostarinen 1994, 7). The smallness, openness and peripheral location of Finland push Finnish companies to globalise their activities (Luostarinen 1994, 7; Luostarinen et al. 1994, 166-71). The importance of providing a supportive home base for the headquarters of the globalising international is also important (see Euro 2001). On the other hand, based on Luostarinen, the large size and openness of target markets pull companies to globalise their activities. Also, Hansén (1981, 11 and 1999) has noted that the openness of the markets is an important factor to consider. The large target markets are especially important for the ICT manufacturing companies, which often seek economies of scale and other advantages due to size. Increasingly many developing countries are experiencing more rapid growth than advanced countries and therefore companies seeking growth need increasingly to enter the developing markets in, for example, Asia and South America to be able to grow (Govindarajan and Gupta 2000). The general global enablers also have an important role in explaining global product strategies. The decreasing trade and investment restrictions are increasingly making global products more feasible and less expensive (Doz 1991; Yip 1989; Kirpalani and Luostarinen 1999; Govindarajan and Gupta 2000). Moreover technological advances are expected to drive the globalisation (Levitt 1983; Doz 1991; Govindarajan and Gupta 2000).

The ICT industry variables can be divided into (A) ICT Industry globalisation drivers, (B) technology discontinuities, and (C) dominant design and product technology life cycle. The most important ICT industry globalisation factors are the following: (1) market needs homogenisation (Levitt 1983; Doz 1991; Kirpalani and Luostarinen 1999), (2) existence of global customers and channels (Yip 1989), (3) competitive

pressure, deregulation, and existence of global players (Porter 1986; Doz 1991, 18; Gupta and Govindarajan 2000), and (4) increasing technical industry standardisation (see e.g. Häikiö 2001a). The technology discontinuities (Anderson and Tushman 1990; Christensen 2000, XVIII), and the emergence of dominant design (Anderson and Tushman 1990) and the stage of technology adoption life cycles across countries (Buzzell 1968) are further expected to have an impact on global product strategies.

Corporate level strategy

The corporate level strategy includes the business portfolio strategy, strategic intent and the core globalisation strategy.

An international ICT company needs to answer the following questions at a corporate level in the context of determining its globalisation strategy: How to develop the portfolio of product businesses, what product businesses to globalise and what core globalisation strategy to use. The following business portfolio strategies may be developed for globalising internationals (see also Ansoff 1987; Luostarinen 2000b and 2001a):

- Global focus strategy: Global geographical expansion in a single or dominant business area with current product technology and market segment.

- Global-related diversification strategy: (A) Global geographical expansion with present product technology area but offering this to a new market segment or (B) Global geographical expansion in the present market segment but with a new product technology.

- Global-unrelated diversification strategy: Global geographical expansion to unrelated market segments and utilising unrelated product technology.

The corporate strategy is expected to especially influence the choice of business to be globalised.

An international company may globalise its businesses, using three types of core globalisation strategies in principle. Previous research has proposed that (A) a pure global, (B) a multi-domestic strategy (Prahalad and Doz 1987, 24; Hout et al. 1982) or then (C) a transnational strategy (Bartlett and Ghoshal 1987a) / multi-focal (Prahalad and Doz 1987, 24) is applied.

-   In a pure global strategy, the company seeks global integration benefits and looking at the whole world as its market.
-   In a multi-domestic strategy, the company seeks local responsiveness by responding to local market needs.
-   In a transnational or multi-focal strategy, the company seeks to obtain global integration benefits, local responsiveness, and also international learning.

The core globalisation strategy is included in the corporate level as it is expected that the decision on the core globalisation strategy will be taken in the top management of the corporation. The selected core globalisation strategy is expected to have an impact on the product strategy alternatives.

Furthermore, it is expected that strategic intent has an impact on global products strategies. Strategic intent often establishes long-term targets with respect to the direction in which to develop the business portfolio, the degree of technical leadership sought for and other long-term targets (See also Hamel and Prahalad 1989).

Business level strategy

Also the business unit level decision on market strategies and operation strategies is expected to affect global product strategies.

The geographical market expansion strategy (See Luostarinen 2001a; Ayal and Zif 1979) and the evolution of market strategies from the international (entry and penetration) phase towards the global market alignment phase are expected to

affect the selected product strategies (Douglas and Craig 1989). Furthermore, the decisions related to market diversification/concentration degree and speed of entry are expected to have an impact (See also Ayal and Zif 1979; Hollensen 2001, 203; Luostarinen 2000a).

Also, the operation strategies with regard to the centralisation or decentralisation of foreign production and marketing operations are expected to affect the selected products strategies (See also Luostarinen 1970, 72).

Internal levers, resources, capabilities and decision-making

Company-specific strategic levers, resources/capabilities, and decision-making variables are expected to affect global product strategies. First of all, strategic levers will be discussed and thereafter the importance of resources and capabilities and decision-making variables.

The sources of competitive advantage during the globalisation process may be called strategic levers. The economies of scale, economies of scope, and other synergies related to global operation have been proposed to be the source of competitive advantage for globalising companies (see e.g. Ghoshal 1987; Douglas and Craig 1989). These strategic levers are also expected to have an impact on product strategy alternatives.

The scale advantages have been proposed as an important source for global advantage (Doz 1978; Hout et al. 1982; Hamel and Prahalad 1985). The economies of scale arise from the ability to perform activities more efficiently at a larger volume or the ability to amortise the cost of intangibles such as R&D or advertisement over a larger sales volume (Porter 1998, 71). Economies of scale may be achieved in a number of functions of the firm. There may also be dynamic benefits of scale through the 'experience or learning effects' (Ghoshal 1987; Porter 1998, 73).

Scope economies are based on the notion that the cost of the joint production of two or more products can be less than the cost of producing them separately.

Furthermore, the company may share (A) physical assets such as production equipment, cash or brand names, (B) external relations with customers, suppliers, distributors, governments across different businesses and markets, and (C) knowledge. (Ghoshal 1987) The strategic levers are expected to have an impact on the global market expansion and also on selected product strategies (Quelch and Hoff 1986; Keegan 1969) and this will be further examined when developing the propositions.

The resource-based view originates from the work of Penrose (1959) and Wernerfelt (1984). The resource-based theory deepens our understanding, especially of how to apply and combine resources and how to achieve a sustainable advantage. In this research, globalising internationals are expected to choose a global product strategy alternative that best meets its resources and capabilities. Not all resources are potential sources of a sustained competitive advantage. Hence, to have the potential for a sustained competitive advantage the resource must fulfil four attributes. It must be valuable for exploiting opportunities or neutralizing threats, it must be rare among the firm's current and potential competition, it must be imperfectly imitable, and there cannot be substitutes for the resource in question. (Barney 1991) Building on the resource-based theory and the global management theory, it may be assumed that the companies' technological, marketing and management capabilities may be by nature either global or local and this will have an impact on the selected product strategy.

Decision-making variables are also expected to affect the global product strategies. Luostarinen (1979, 101; 1994) argues that due to high lateral rigidity in decision making towards introducing new sales objects, which the company is not familiar with, the company introduces in a specific order new sales objects. Through organisational learning and reduction of product risk and uncertainty over time, the company changes its preferences and introduces more advanced product categories as the international business experience increases. Increased knowledge of global markets and their needs is also expected to affect the standardisation degree of products. The impact on these factors will be described when building the propositions.

Evolution of global product strategy

The factor to be explained, namely the global product strategy consists of decisions related to the different product strategy dimensions (product platforms, product lines and individual products) as well as decisions on the different products strategy alternatives based on the degree of standardisation:
- Localised product strategy
- Modified product strategy
- Standardised products strategy

Figure 17. Theoretical framework for global product strategies of globalising International ICT companies

MACRO AND INDUSTRY ENVIRONMENT	CORPORATE LEVEL STRATEGY	INTERNAL LEVERS, RESOURCES, CAPABILITIES, AND DECISION MAKING
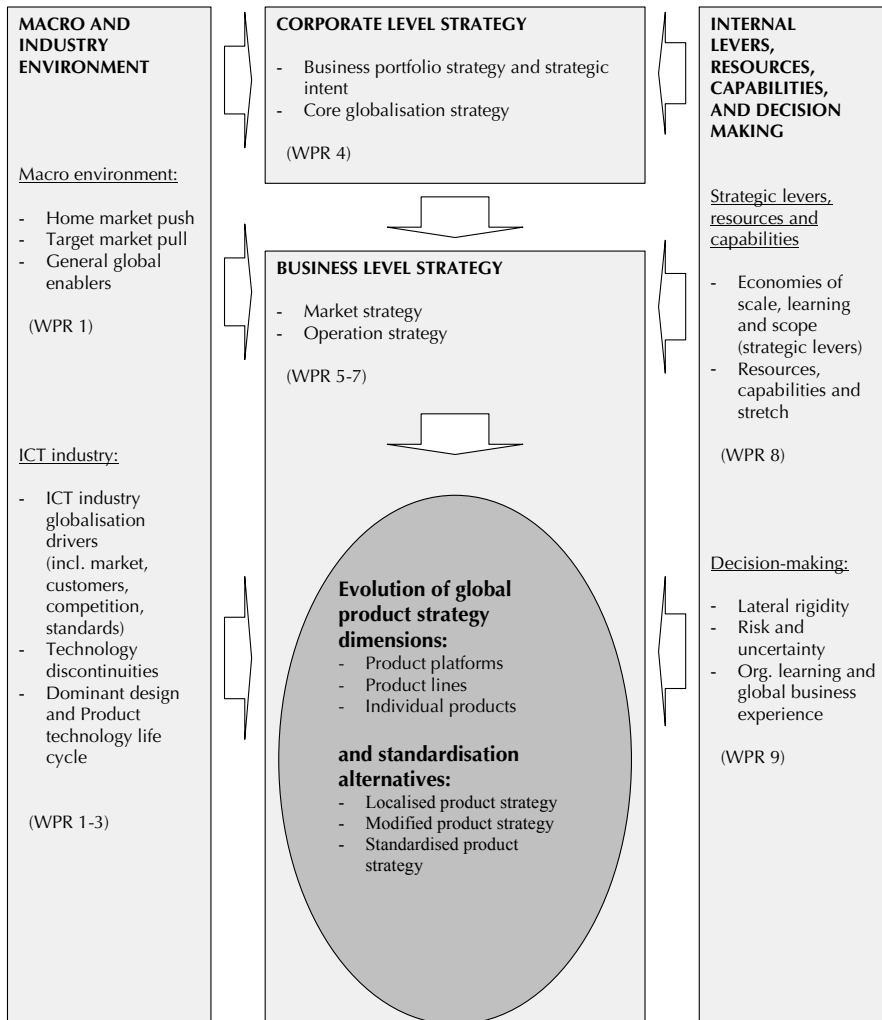
2.5.3 Working propositions

The conceptual framework presented in Figure 17 explains the development of the product strategies for Information and Communication Technology (ICT) companies, as they globalise their activities, i.e. change their market strategy from

an international market towards global market alignment, and develop towards a global company with respect to sales derived outside the home continent.

The macro and industry environment, the corporate-level business portfolio and core globalisation strategy, the business-level market and operation strategies, and the internal strategic levers, resources, and decision-making variables are expected to drive the evolution of global product strategies from adaptive to regionally and globally more standardised product strategies. Moreover, increasingly more advanced product categories are expected to be used.

Macro and industry environment related factors impact on global product strategies

The impact of the macro environment and ICT industry factors on the global product strategies will be examined next.

The macro environment variables affecting the global product strategies are divided as mentioned earlier to include (A) the home market push, (B) the target market pull, and (C) the general global enablers (Luostarinen 1994, 7). The small, open, and peripheral domestic market is expected to push the Finnish companies to globalise their business (Luostarinen et al. 1994). Developing ICT products demands a lot of R&D expenditure and therefore it is not possible to develop products for the home market only. However, as globalising internationals already operate in most European countries and increasingly outside their own continent, the importance of home market size is expected to decrease along with globalisation. Other home market factors can be expected to be increasingly important such as the home country's role in providing a strong home base for expanding to global markets and a favourable location for the headquarters. The difficulty of getting qualified foreign personnel has, for example, been mentioned as one obstacle to Finnish divisional head quarters (Euro 2001, 20). High taxation is another. On the other hand, the large size and openness of the global target markets can be seen to pull companies to globalise their activities (Luostarinen et al. 1994, 166-170; see also Hansén 1999). The large global target markets are especially important for the ICT manufacturing companies. Due to the often high R&D costs it is of the utmost

importance to spread these to a large number of markets, as the home continent is increasingly not big enough and companies need to market the products globally on all continents (See also Govindarajan and Gupta 2000).

A number of general global enablers are providing a favorable environment for global products. The ongoing global trade liberation and regional integration in the different trading blocks around the world is expected to further decrease trade and investment-related restrictions (Doz 1991; Yip 1989; Kirpalani and Luostarinen 1999; Hilke et al. 2002). The General Agreement on Tariffs and Trade (GATT), the European Free Trade Area (EFTA) and the formation of the European Union have reduced tariffs and restrictions for Finnish companies (See also Luostarinen 2001a, Hansén 1999). Moreover, the North America Free Trade agreement (NAFTA) has reduced or eliminated import tariffs across a market of over 380 million people (Mejias and Vargas-Hernandez 2001). New regional integration also includes the Asian Free Trade Agreement (AFTA) in East Asia, the Mercado Comun del Sur (MERCOSUR) in South America, and the Southern African Development Community (SADC) in Southern Africa (see e.g. Proff 2002). Moreover, technological advances are expected to drive globalisation. The decline in transportation and communication costs and the new communication technologies like mobile telephony, video-conferencing, e-mail, and Internet are radically decreasing the distance between companies and customers and make the co-ordination of business activities easier (Levitt 1983; Doz 1991; Govindarajan and Gupta 2000). Global liberalization of trade and investments, regional integration development, and technological advances can be seen to act as global enablers for companies to globalise their activities and develop global products.

In the high technology industry in general and in the ICT companies in particular, it may be assumed that the globalisation drivers are especially strong for a number of reasons. First of all, market need is becoming more similar across countries, and global or at least regional customers and channels are often present. This creates opportunities for providing globally and regionally standardised products (Takeuchi and Porter 1986; Levitt 1983; Jain 1989). In, for example, the mobile telephone industry, segmentation takes place increasingly more on the basis of the product or customer type than on geographical area (Alahuhta 1990, 9-19).

Secondly, in high technology and in the ICT field in particular, competition is very intense and companies often operate on a worldwide scale. Companies use all opportunities to achieve a competitive advantage through global integration when the potential exists. In the telecommunications field, for example, deregulation of operator competition has triggered globalisation of the industry (Häikiö 2001a, 16). The increasing global competition and increasing speed in the development of new technologies have led to shorter product cycles, higher innovation intensity, and the increasing importance of economies of scale (Alahuhta 1990, 9-19). The cross-subsidisation of markets and retaliation to competition are also common tactics in global competition (Hamel and Prahalad 1985) and are increasingly present in the ICT field. The ICT industry is characterised by a number of global players operating on a worldwide scale. This may be assumed to increase the degree of standardisation of products based on earlier research. It has been found that a similar degree of competition in markets may favour a more standardised approach (Jain 1989). Moreover, competing against the same companies across the world instead of only local competitors can be assumed to increase the degree of standardisation (Sorenson and Wiechmann 1975; Jain 1989).

Thirdly, increasing technical standardisation in the industry speeds up the globalisation process in the telecommunications industry (Alahuhta 1990, 9-19; Häikiö 2001a, 16). The development of industry standards like the NMT, GSM, GPRS, WCDMA has had an important impact on the telecommunications industry and has opened up new possibilities for a number of companies including, for example, Nokia (Häikiö 2001a, 71-73). These standards create opportunities to market increasingly standardised products across countries (Yip 1989).

Finally, the potential for product standardisation is expected to differ, depending on the product in question. Some product types can be standardised more than others according to earlier research. Consumer non-durables have been considered more difficult than consumer durables to standardise due to the persistence of culture (Whitelock and Pimblett 1997). Also, industrial and high technology products have been considered more appropriate than consumer products for standardisation (Jain 1989). Many of the ICT products are high technology products, which suggest a generally high degree of use of standardised strategies across countries.

The importance of finding the balance between globalisation drivers and the product strategy has also been emphasised in the literature (Yip 1991, 7). It can be argued that when the globalisation drivers are strong, a more standardised product strategy alternative will be selected. Vice versa, when the globalisation drivers are weak or not present at all, a less standardised product strategy alternative is selected. Based on the above discussion, the following proposition may be postulated:

WPR 1. The stronger the target market pull, the domestic market push, and the macro and industry level globalisation drivers, the greater the use of more standardised product strategy alternatives compared with adapted ones across countries.

In the context of technology cycles it was found that a dominant design allows firms to design standardised products and interchangeable parts, and to optimise processes for volume and efficiency (Anderson and Tushman 1990), and therefore it can be argued that the emergence of a dominant design is a prerequisite for globalising internationals to be able to standardise the product strategy on global basis (See also Abernathy 1978). Furthermore, earlier research (see Buzzel 1968; Sorenson and Wiechman 1975) has found that the similarity of the product technology life cycle stage across countries favours the use of more standardised strategy alternatives. Due to the global nature of the ICT industry it is expected that technology diffuses more rapidly across countries and therefore product technology life cycles are becoming more similar in stage across countries. The following proposition can be postulated:

WPR 2. The greater the dominance of one or a few technologies and the similarity of stages across countries, the greater the use of more standardised product strategies compared with adapted ones.

It was found that established companies may have difficulties in responding to disruptive technology discontinuities. These types of disruptive technology discontinuities may also require established firms to change their strategy towards a global one. However, according to Christensen (2000, 113), this may be difficult due to resource allocation to customer-driven projects, the small size of emerging

markets, the risk involved in new technologies, the obstacles posed by established processes and values in organisations, and the limited supply of new technology compared with demand in current markets. Moreover, often new technological and managerial skills related to global products and their development may need to be acquired. Also, globally unified product management processes may have to be established. Hence, it is asserted that industry leaders will seldom sustain their leadership when facing disruptive technology discontinuities requiring a change of strategy from international towards global. The new global leaders can therefore be assumed to come from other industries or challenger positions in current industry. The following proposition may be postulated:

WPR 3. Industry leaders seldom sustain their leadership when facing disruptive technology discontinuities requiring a change of strategy from international towards global. The new global leaders are likely to come from other industries or challenger positions in current industry.

The impact of corporate level strategy on global product strategies

Companies may globalise their business portfolios with three main strategies at the corporate level as discussed earlier: (A) global focus, (B) global related-diversification and (C) global unrelated-diversification (see also Ansoff 1987; Luostarinen 2000b and 2001a). However, examination of the corporate strategy alternatives showed that the global-unrelated diversification strategy is difficult to pursue, taking into consideration the often-limited resources, be they financial or managerial, available for the ICT companies from SMOPEC countries. Also, the global-related diversification strategy demands considerable financial and managerial resources, but less than the global unrelated diversification. Moreover, due to the possibility to concentrate scarce resources on a single or few product businesses, it may be expected that globalising ICT companies will select the global focus strategy as the primary corporate strategy (see also Luostarinen 2001a and 2000a; Bengtsson 2000). However, as growth slows down in the ICT industry global-related diversification can be expected to increase. Moreover, it is expected that product businesses requiring low local adaptation and having high expected

benefits from globalisation are the most attractive product businesses to be initially globalised in the business portfolio of ICT companies (See also Gupta and Govindarajan 2000).

Furthermore, the core globalisation strategy is expected to influence the product strategy. A globalising international selecting a pure global strategy strives for global integration and is therefore expected to select an alternative in which global integration benefits can be obtained. This leads one to assume that a standardised product strategy would be chosen. On the other hand, a company that has selected a multi-domestic strategy strives for local responsiveness and is therefore assumed to select the localised product strategy alternative. Finally, a company applying a transnational strategy looks for both local responsiveness and global integration and therefore selects the modified product strategy. The following proposition may be developed:

WPR 4. A company applying a multi-domestic strategy is expected to favour a localised product strategy, a company applying a transnational strategy is expected to favour a modified product strategy, and a company applying a pure global strategy is expected to favour a standardised product strategy.

Business level strategy impact on product strategies

The global market strategy consists of two developments. The company can be seen to transfer geographically from the home continent to new continents (see e.g. Luostarinen and Gabrielsson M. 2001) and, on the other hand, the strategies change from an international market strategy (entry and penetration) to a global market alignment strategy (Craig and Douglas 1996).

Earlier research has argued that it is important to standardise products when expanding geographically to global markets and that it is especially important in the ICT field (See e.g. Levitt 1983; Alahuhta 1992, 117-134). Also, research has found that standardisation of products is a feasible option for global companies (Sorenson and Wiechman 1975; Levitt 1983; Walters 1986; Boddewyn et al. 1986; Ozsomer

et al. 1991; Yip 1992). Thus expanding geographically from the home continent to countries in other continents can be expected to require increased standardisation of the product strategy across countries. In the discussion of geographical global market expansion, three alternatives could be developed: centralisation, centralised diversification and diversification. Due to the needed resources, be they financial or managerial, it is argued that a market diversification strategy favours a more standardised strategy. On the other hand, when a centralisation strategy is chosen more resources are available per selected target area and the target is often to penetrate deeper into the market, thus a more adapted product strategy may be chosen. (See also Ayal and Zif 1979) Furthermore, the company can enter the markets simultaneously or in a step-by-step fashion (see e.g. Hollensen 2001, 203 – 204; Luostarinen 2000a). Developing local products for the market requires considerable resources and consumes a long time as market understanding and capabilities related to production and organisation need to be established. On the other hand, globally standardised product strategies may be applied faster and with less total cost. The following proposition may be developed:

WPR 5. As the company expands geographically from international to global markets, and the faster and the more diversified the expansion, the more standardised the product strategies.

In the international market entry and penetration phase, a company first enters and then often penetrates deeper into the international market base with adaptive product and marketing programs and develops country-specific product lines and variants (Douglas and Craig 1989). The company use product line extensions and country variants to increase sales. Even new country-specific products are developed. Product strategy standardisation is therefore expected to be low across countries. The company achieves considerable economies of scope by leveraging existing customer and country-related capabilities. Furthermore, process standardisation is also expected to be relatively low, as localised processes are needed to meet the country-specific product and customer requirements.

As the company moves from the international market phase to a global market alignment phase, the product line strategy is often changed. The company will

strive for co-ordination and standardisation of product lines on a global basis. Furthermore, new products are developed for global market segments at this phase. Also, their strategy becomes globally focused and integrated (Craig and Douglas 1996). Therefore, it can be argued that as the company shifts to a global market alignment phase, the product strategy becomes more standardised, that is global or regional product platforms are developed, the number of lines, the length of lines and positioning will be similar, and the individual products will be increasingly standardised at different levels. Previous literature has also shown that it may be even easier to standardise processes than marketing mix elements like products (Walters 1986; Sorenson and Wiechman 1975), and this can also be assumed to be important in the ICT industry. This leads to assume that product management process standardisation is also high at this phase. The following proposition may be postulated:

WPR 6: As the company moves from the international market (entry or penetration) phase to the global market alignment phase, the more standardised product strategy alternatives and product management processes will be applied.

When discussing operation strategies it was noted that Luostarinen (1979) had found a pattern in the use of operations strategies with deepening international involvement. Finnish companies used operation strategies in the following order: NIMOS, DIMOS, NIPOS, DIPOS. Luostarinen (1970, 92) argues that the need to adapt the product favours the use of direct investment production and direct investment sales subsidiaries, because closeness to markets provides a better opportunity to take into account the different requirements of the markets. Moreover, it can be assumed that the closer their own manufacturing unit and marketing subsidiary are to the markets, the easier it is to adapt to local requirements and vice versa. The following proposition may be postulated:

WPR 7. The higher the centralisation of production and marketing operations globally, the greater the use of more standardised product strategies compared with adapted ones.

<u>Internal strategy levers, resources and capabilities impact on global product strategies</u>

The internal strategic levers have an important impact on the chosen global product strategy alternative. It can be argued that the greater the economies of scale, economies of learning, other global synergies in assets, skills, product development and manufacturing, the more it will favour a standardised product strategy alternative. On the other hand, the greater the economies of scope, the more it will favour a more adaptive product strategy alternative. Furthermore, Hamel and Prahalad (1985) have argued that global companies need a broad product portfolio to support investments in key technologies (Hamel and Prahalad 1985).

Moreover, when the company has valuable, rare, imperfectly imitable and non substitutable resources (see also Barney 1991, Wernerfelt 1984) which can be used to develop global capabilities especially in technology, marketing, management, the globalising ICT company is expected to select a more standardised product strategy alternative than if these capabilities are of a local nature. Accordingly, the following proposition is developed:

WPR 8. The economies of scale and learning, and global capabilities in technology, marketing, and management favour a more standardised product strategy. The economies of scope and local capabilities in technology, marketing, and management favour a more adaptive product strategy; moreover the economies of scope also favour a wide product assortment.

Decision-making variables impact on global product strategies

Luostarinen (1979) found in his seminal study on the internationalisation of firms that at the company level Finnish firms introduce different sales objectives in the following order: (1) goods, (2) services, (3) systems, and (4) know-how. It has also been argued that know-how may precede systems (Luostarinen and Gabrielsson M. 2002). Furthermore, Luostarinen (1979, 97-105) argues that due to high lateral rigidity in decision-making, international operations are often started by extending the same product sold in domestic markets to the international market. Through

organisational learning, the reduction of product risk and uncertainty over time, the company changes its preferences and introduces more advanced product categories as international business experience increases.

The decision-making of globalising internationals with regards to global product strategy may also be assumed to be characterised by lateral rigidity. This can be justified for a number of reasons. The product impulses are largely from only the home continent, there is often no search for global product opportunities, the reaction to global impulses is often restrictive due to the lack of experience of developing global products and needed resources, and the choice is also restricted due to uncertainty avoidance and risk escape. Moreover, new product introductions can be seen to contain a high risk (See e.g. Cooper and Kleinschmidt 1987) and in particular in the ICT field. Therefore, globalising internationals are assumed to be laterally rigid towards introducing new product categories that extends from physical goods, to also services, systems, and know-how. However, it may be assumed that through organisational learning the product uncertainty and risk may be reduced as the company gains information and global business experience in the globalisation process and therefore the company may change its preferences towards new global product opportunities. The company may learn that there is also demand for more advanced product groups (See also Luostarinen 1979, 1994). Based on this analysis, it may be assumed that global companies with longer global business experience utilize more often a wider offering compared to the international companies including in addition to goods also service, know-how, and systems sales (see also Luostarinen 1979; Luostarinen and Gabrielsson M. 2001; Luostarinen and Gabrielsson M. 2002).

Furthermore, the globalisation process is expected to enhance knowledge of global markets and their needs. As this information is essential for the development of standardised products, it can be assumed that the higher the globalisation degree of the company, the higher the probability of selection of a more standardised product strategy. Hence, it is also expected that the products, be they goods, services, know-how or systems, will be increasingly more standardised at different product levels as global business experience increases. Standardisation will be applied in addition to

the core level, at the tangible and augmented level on a regional or global basis. The following proposition may be postulated:

WPR 9. Due to increased global business experience, companies will increasingly use a bigger proportion of services, know-how, and systems as globalisation proceeds.

In Table 4 , the propositions have been categorised at the following levels based on the explaining factor: macro, meso, micro, and milli-micro. This categorisation of variables into macro, meso, micro, and milli-micro level variables has been developed by Luostarinen (1970, 25). This was seen as useful when developing the framework and categorising the explaining variables. First of all, the domestic market push, target market pull and the global enablers can be categorized as macro level factors. Second, the ICT industry globalisation drivers, technology discontinuities, emergence of dominant design, and product technology life can be classified as meso specific factors. Third, the corporate and business level strategy, and internal strategic levers and resources can be seen as micro level factors. Finally, the decision-making related factors can be seen as micro or milli-micro factors as these are concerned with both organisational and individual behaviour.

Table 4. Summary of the working propositions

Level	Proposition
Macro and Meso	*WPR 1: The stronger the target market pull, the domestic market push, and the macro and industry level globalisation drivers, the greater the use of more standardised product strategy alternatives compared with adapted ones across countries.*
Meso	*WPR 2: The greater the dominance of one or a few technologies and the similarity of stages across countries, the greater the use of more standardised product strategies compared with adapted ones.*
Meso	*WPR 3: Industry leaders seldom sustain their leadership when facing disruptive technology discontinuities requiring a change of strategy from international towards global. The new global leaders are likely to come from other industries or challenger positions in current industry.*
Micro	*WPR 4: A company applying a multi-domestic strategy is expected to favour a localised product strategy, a company applying a transnational strategy is expected to favour a modified product strategy, and a company applying a pure global strategy is expected to favour a standardised product strategy.*
Micro	*WPR 5: As the company expands geographically from international to global markets, and the faster and the more geographically diversified the expansion, the more standardised the product strategies.*
Micro	*WPR 6: As the company moves from the international market (entry or penetration) phase to the global market alignment phase, the more standardised product strategy alternatives and product management processes will be applied.*
Micro	*WPR 7: The higher the centralisation of production and marketing operations globally, the greater the use of more standardised product strategies compared with adapted ones.*
Micro	*WPR 8: The economies of scale and learning, and global capabilities in technology, marketing, and management favour a more standardised product strategy. The economies of scope and local capabilities in technology, marketing, and management favour a more adaptive product strategy; moreover the economies of scope also favour a wide product assortment.*
Micro and Milli-micro	*WPR 9: Due to increased global business experience, companies will increasingly use a bigger proportion of services, know-how, and systems as globalisation proceeds.*

3. RESEARCH DESIGN, DATA GATHERING AND ANALYSIS

This section discusses selection of the research method and outlines the research design used, including the unit of analysis, data gathering and analysis, and the evaluation of the quality of the research. Also, the generalizability of the research findings will be discussed.

3.1 Case study versus other research methods

Case study research is understood quite differently in different fields. Usually, the term case study is used to identify a specific form of inquiry quite different from two other types of inquiry, namely the experiment and social survey[26]. (Hammersley and Gomm 2000) See Table 5 for a comparison between these different methods. Yin (1994, 11-13) sees the case study research as a comprehensive research strategy with the logic of design incorporating specific approaches to data collection and to data analysis and has defined the case study as follows:

"The case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when boundaries between phenomenon and context are not clearly evident. The case study inquiry copes with the technically distinctive situations in which there will be many more variables of interest than data points, and as one result relies on multiple sources of evidence, with data needing to converge in a triangulating fashion, and as another result benefits from the prior development of theoretical propositions to guide data collection and analysis."

Quite to the contrary, some other researchers see for example that case study research is not a methodological choice but rather a choice of what is to be studied (see Stake 2000). It is important to note that the case study strategy should not be confused with qualitative research; in fact, case studies may use both qualitative and quantitative data when feasible. One common misunderstanding has also been to confuse case studies with ethnographies or limit them to concern mainly

---

[26] In addition to experiment, survey and case study strategies other methods are also available for researchers, for example history or archival analysis (Yin 1994, 6). Further, total-population-based inquiries have been used in rare instances (see e.g. Luostarinen 1979).

participant observation, which is in fact only one possible source of evidence in case study strategy (Yin 1994, 10-12).

Table 5. Comparison of case study with experiment and survey research methods

Experiment	Case study	Survey
Answers to how and why type of research questions	Answers to how and why type of research questions	Answers to who, what, where, how many, how much type of research questions
Investigation of relatively small number of cases	Investigation of relatively small number of cases (single case or multiple cases)	Investigation of a relatively large number of cases
Information gathered and analysed about a small number of features of each case	Information gathered and analysed about a large number of features of each case	Information gathered and analysed about a small number of features of each case
Study of cases created in such a way that control of important variables is achieved (requires control over behavioural events)	Study of naturally occurring cases (does not require control over behavioural events)	Study of a sample of naturally occurring cases selected to maximize representativeness in relation to larger population (does not require control over behavioural events)
Quantification of data is a priority	Qualitative data is often treated as superior, but quantitative data may also be used when feasible	Quantification of data is a priority.
The aim is either the development and testing of theory or practical evaluation of an intervention	The aim often to understand the case(s) deeply. Also suitable for development and testing of theory, however instead of generalization to population, analytic generalization, naturalistic generalization or transferability is strived for.	The aim is empirical generalization, from a sample to a finite population and may therefore be used for theory development and testing

Source: Adapted from Hammersley and Gomm 2000; Yin 1994, 6

Three conditions are important when deciding about the research method: the type of research questions, the extent of control the researcher has over the behavioural events, and the degree of focus on contemporary as opposed to historical events (Yin 1994, 4). The case study method is particularly well suited for the study of "how" and "why" questions, because these deal with operational links needing to

be traced over time, rather than only frequencies or incidence. In this study the understanding of "how" and "why" questions is important due to the explanatory nature of the study. Furthermore, the case study is preferred when examining contemporary events and when behaviour cannot be manipulated. (Yin 1994, 6) The behaviour studied in this research meets the conditions of being both contemporary and beyond the researcher's capabilities for manipulation. Moreover, some elements of historical research are part of the study. In addition to the above-mentioned conditions, case study research is especially well suited when the purpose of the research is a deep understanding of the nature, relevance, and function of a few cases (Lukka and Kasanen 1993).

According to Yin (1994, 45) the evidence of a multiple-case study is often considered more compelling and the study is altogether more robust than a single case study. However, the obvious disadvantage is often the long time required to gather the information from multiple cases. An additional reason in favour of selecting multiple cases is that it also allows the use of replication logic. Also, it is worthwhile noting that a number of earlier researchers have successfully applied the multiple case study method in their doctoral dissertations in the field of international business (see e.g. Maula 1999; Gabrielsson M. 1999) and management (Ala-Härkönen 1997).

It may be concluded that the case study method is in particular suitable for this research, as the globalising internationals and their product strategies have been studied very little, the purpose is a deep understanding of selected cases in the ICT equipment field, and the study is of explanatory nature. The multiple case study design allows replication logic to be used and the results are expected to be more robust altogether. Based on this discussion a multiple case study approach was selected. The design of the research will now be discussed in more detail.

3.2 Research design

The research design is a logical sequence that connects the empirical data to the initial research question of the study (Yin 1994, 19). Miles and Huberman (1994,

17) have noted that the extent to which the research design is planned 'loose' or 'tight' is an important factor to consider. Yin (1994, 20) further argues that the research design of a case study method includes five important components: the research question(s), the propositions, the unit of analysis, the logic linking the data to the propositions, and the criteria for interpreting the findings. In the introduction section, the research questions were outlined and both theoretical and empirical objectives were presented. Next, the remaining components of the research design will be addressed.

3.2.1 A loose versus a tight research design

The issue of approaching the fieldwork with a looser or a tighter research design has been discussed extensively. For example, in the concept of grounded theory, Glaser and Strauss (1967, 6) develop a design in which theory is discovered from data inductively (1967, 6). In their approach, most hypotheses and concepts are worked out in relation to empirical data during the course of research. Other researchers take the viewpoint that the research design should be tighter (see e.g. Miles and Huberman 1994, 17). They argue that the looser the initial design the less selective the collection of data. Moreover, especially in multiple case studies, cross case comparability will be hard to get (Miles and Huberman 1994, 17). Yin (1994, 27) has further noted that theory development prior to entering the field is essential and this distinguishes the case study research method from other related methods such as ethnography or grounded theory.

The question of how pre-structured a research design should be can be answered by examining how much is already known about the phenomena, what analyses are to be made, what instruments are to be used, and how much resources is available. Also, the researchers' previous knowledge of qualitative studies is an important factor to consider. (Miles and Huberman 1994, 17) To be able to focus the data gathering and analysis meaningfully, the researcher makes an extensive literature review and develops based on this work a theoretical framework and propositions of the relations of the variables. This provided a good background for going into the fieldwork with a more pre-structured approach. Moreover, it was

decided to use the multiple case method for data analysis. Use of a loose design in multiple cases faces the risk of ending up with the double dilemma of data overload and lack of comparability across cases (see e.g. Miles and Huberman 1994, 17). Moreover the time was constrained due to the schedule set for the research, but more importantly by the available time of interviewed managers. It was expected that interviews do not generally last longer than two hours. Based on these arguments, a tighter design was selected to avoid the extreme and thus also allow flexibility to capture novel findings.

3.2.2 Number of cases and unit of analysis

The selection of the number of cases is not done on statistical grounds in multiple case studies; instead the issue should be approached conceptually (Miles and Huberman 1994, 30). The number of cases is related to the number of replications sought for. The more replications designed, the more certainty about the results (Yin 1994, 50). Multiple cases add confidence to the findings (Miles and Huberman 1994, 29). Eisenhardt (1989) has further noted that with fewer than four cases it is often difficult to generate theory with much complexity. In this research five cases is regarded as sufficient to allow for enough replication. This however, will require careful selection of sample cases to allow for both literal and theoretical replication.

The case research may be designed to be embedded or holistic. When the same case study involves more than one unit of analysis it is referred to as embedded. On the other hand, when a single unit of analysis is selected it is called a holistic design. (Yin 1994, 41-42) In this study, it was decided to use the holistic design as the main design. In this study the unit of analysis is the evolution of the product strategies of strategic business units. Due to the diversified nature of one of the cases (NK Cables), a sub unit is also analysed as en embedded unit to give a deeper understanding in this particular case. The embedded unit was selected so that it was the most global business unit within the case.

3.2.3 Multiple case study research process

The overall research process in this study uses many of the multiple case study design, data collection and analysing techniques proposed by Yin (1994). But it also uses principles presented by Eisenhardt (1989) regarding the process of building theories from case study research and techniques used in processual analysis (Pettigrew 1997). Figure 18 depicts the research process used.

Figure 18. Multiple case study research process
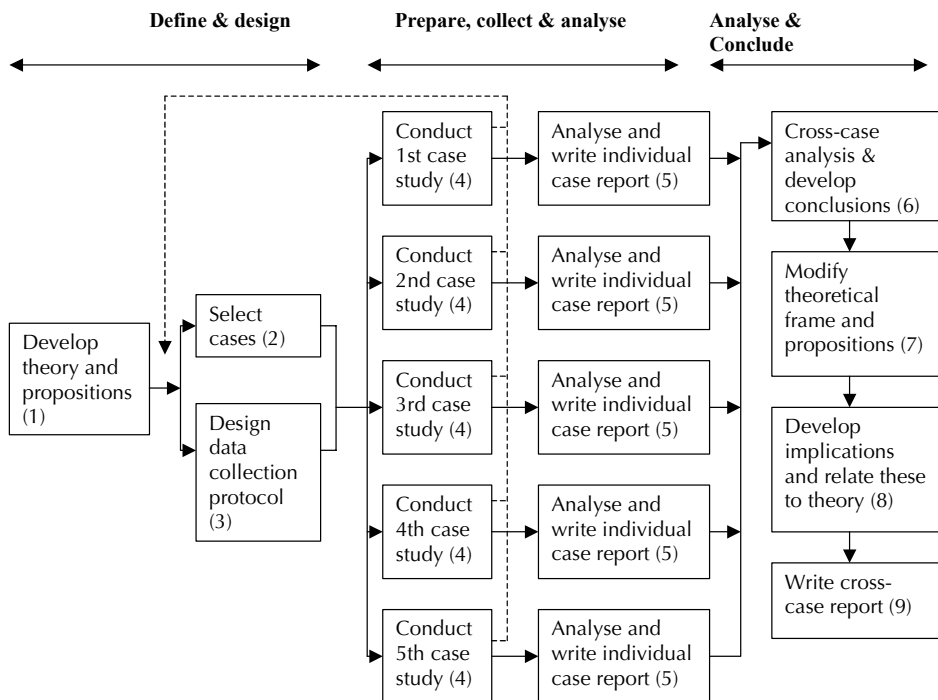
Source: Adapted from Yin 1994, 49. Note: The numbering in parenthesis refers to the step in the research process.

The research has been conducted according to following steps:

Step 1. Development of theoretical framework and working propositions: The first step includes the initial definition of the research question, a priori specification of constructs (Eisenhardt 1989). Yin (1994, 21) proposes further that propositions

should be developed of the relations between the variables. Moreover, he argues that only if you are forced to state some propositions will you move in the right direction. In the study, a theoretical framework including the constructs was developed. Moreover, 9 tentative propositions were proposed. The purpose of the working propositions was to direct attention to the right issues when collecting data. Their nature was very much one of working propositions that may be modified and developed further based on the feed back from the multiple case study[27]. Already at this phase also the collection of secondary data of the ICT equipment companies was started.

Step 2. Selection of cases: In the next step, the cases are selected on the basis of a theoretical sampling, meaning that the cases are chosen for theoretical instead of statistical reasons. The purpose is to replicate previous cases, extend emergent theory, fill theoretical categories, and provide examples of a contradictory type. (Eisenhardt 1989). Yin (1994, 46) further proposes that each case is selected so that it either predicts similar results or produces contrasting results for predictable reasons. In the research, five ICT equipment companies were selected on the basis of the replication logic. Section 3.3.1 describes this selection process, criteria, and companies.

Step 3. Preparing a data collection protocol: Yin (1994) has proposed that a data collection protocol should be developed prior to entering the field. This is seen as an important tactic in increasing the reliability of the research. The case study protocol used in this research is discussed in section 3.3.2.

Step 4. Collection of primary data: The collection of primary data was started by conducting a pilot study in Nokia Mobile Phones (NMP), the purpose of which was to verify the research design and improve the questionnaire used in the interviews. This pilot study was also included in the final study by extending the number of interviews. Yin proposes that data should be collected for individual cases using multiple sources of evidence (see Yin 1994, 91). The use of triangulation by multiple evidences provides stronger substantiation of constructs and propositions (Eisenhardt 1989). The research utilised interviews, press releases, annual reports,

---

[27] It is important to note that the approach is quite different from hypothesis testing, which normally either rejects or accepts the hypothesis.

and company internal documents obtained from the case companies. Also, a formal database was created that included the material as proposed by Yin (1994, 94). All material was kept locked to avoid any possibilities of fraud and to protect material of a confidential nature. Altogether, a chain of evidence was sought that would in principle enable another researcher to follow the same evidence and end up with the same results. Also, field notes were used to write down impressions that occurred during the data collection phase (see Eisenhardt 1989).

Step 5. Analysing within cases: The analysing of data started already during the collection process. This was seen as a fruitful approach (see e.g. Miles and Huberman 1994, 50). An individual case report and conclusion were written for each case. The overall idea was to become intimately familiar with each case as a standalone entity (See e.g. Eisenhardt 1989). This analysis was also implemented by presenting partial results at conferences, which made it possible to obtain comments from the participants. The analytic strategy relied on writing individual case study reports as well as letting the propositions guide the analysis.

 Step 6. Cross-case analysis. Each case conclusion was then replicated in the other cases (see e.g. Yin 1994, 49). The cross-case analysis improves the accurateness and reliability of data and also increases the probability of capturing novel findings (Eisenhardt 1989). The pattern matching logic and understanding of underlying mechanics is important when studying processes (Pettigrew 1997) Therefore, both pattern matching logic and an iterative explanation-building logic was used (see Yin 1994, 111). These will be examined more in detail in the following subchapter.

Step 7. Modification of the theoretical frame and propositions: the framework and working propositions were examined and modifications made when needed, on the basis of the conclusions of the cross case analysis.

Step 8. Developing implications and reviewing those with theory: An essential feature of theory building is comparison of the emergent concepts, theory, or propositions with the literature (see Eisenhardt 1989).

Step 9. Closure and writing of a case summary report: Ideally the researcher should stop adding cases when the theoretical saturation is reached (Eisenhardt 1989). In this study five cases were seen to be enough.

3.3 Data gathering and analysis

3.3.1 Selection of cases

When building theory from case studies the selection of cases relies on theoretical sampling and not on sampling from the population (Eisenhardt 1989). Yin (1994, 46) has proposed that each case must be selected so that it either (A) predicts similar results (literal replication) or (B) produces contrasting results but for predictable reasons (a theoretical replication). It is important for the replication logic that the theory and the propositions developed predict and set the conditions for certain phenomena to appear. (Yin 1994, 46) The cases are chosen so that they replicate previous cases, extend emerging theory, fill theoretical categories, or provide examples of polar types (Eisenhardt 1989).

To select the case companies the researcher familiarized himself with existing secondary data from Finnish ICT companies. Statistics related to ICT markets were reviewed (See e.g. European Information Technology Observatory 2002) to understand the different kind of sectors included in the ICT equipment market. Moreover, the literature listing Finnish ICT companies was studied (see e.g. Paija 2001). Also, the telecommunications and electronics companies listed on the Helsinki Stock Exchange were studied in addition to press releases that appeared during 2001-2002 to obtain a complete list of Finnish ICT companies. Additionally, the researcher's previous experience from the ICT field was helpful.

In the study, the case companies were then selected from the list so that they meet the following criteria:

1. The companies can be defined as globalising internationals, which was operationalised as follows: I.e. they have been established before 1985, and started to internationalise after the domestic period and then started to globalise their

operations outside the domestic continent. (See Luostarinen and Gabrielsson M. 2001)

2. They can be defined as ICT equipment companies. I.e. they manufacture terminals, network infrastructure or components in the ICT field. Moreover, the target was to cover all these three groups to achieve the widest possible generalizability.

3. They are Finnish companies by origin or the business units studied have originated from Finland.

4. They are global or approaching the global stage. I.e. over 50% of their sales come from outside Europe or the proportion is approaching this level (See also Luostarinen and Gabrielsson M. 2002). Also, those cases in which only a specific business unit is global are accepted, although the whole company might not meet the above sales criteria.

In addition, the selected companies should include companies that use different types of global product strategies to achieve literal and theoretical replication when possible. However, this could often be verified only after first interviews.

Based on these criteria, the following companies were selected as case companies for this study:

1. Nokia Mobile Phones

2. Nokia Networks

3. NK Cables

4. Salcomp

5. Tecnomen

Table 6 presents the selected case companies together with some key criteria for selection. Out of these Nokia Mobile Phones was chosen as the pilot case due to good access and a prior relationship with the company.

Table 6. Case companies and selection criteria

Company / strategic business unit	Field	Established	Globalisat-ion degree % in 2001
Nokia Mobile Phones	End user terminals manufacturer	Nokia established in 1885. Terminal production started in 1963.	52[28]
Nokia Networks	Telecommunication infrastructure manufacturer	Nokia established in 1885. First telecom equipment sales in 1965.	49[29]
NK Cables	Cables manufacturer	The Finnish Cable Works established in 1917.	40[30]
Salcomp	Mobile charger manufacturer	Salcomp established in 1973. Manufacturing of power supplies started in 1982.	68
Tecnomen	Telecommunication systems manufacturer	Kyro established 130 years ago. Tecnomen established in 1978 and became part of Kyro in the mid 80s. In 2001 Tecnomen was demerged.	52

A senior management member in each of the selected case companies was contacted to inquire about the interest in participating in the research. The CEO or President was contacted by sending a letter describing the research project. The letter was signed by the researcher and by the supervising professor. If the researcher had previous relations with the company a person known by the researcher was contacted in the first stage. The persons interviewed were often

---

[28] The actual globalisation degree is higher for Nokia Mobile Phones because European sales also include sales in Africa and Middle East in the annual report of Nokia.
[29] The actual globalisation degree is higher for Nokia Networks because European sales includes also include sales in Africa and the Middle East in annual report of Nokia.
[30] The presented globalisation degree is for the mobile networks unit.

asked to recommend persons for further interviews, who had been with the company for a longer period and could describe the evolution of the product strategy particularly well. This technique is often referred to as snowball sampling (See Patton 2002, 237). It proved to be a very good way of identifying persons for further interviewing. In many instances those chosen by snowball sampling proved to have a very deep understanding of the study area.

3.3.2 Case study protocol

A case study protocol was developed to guide the researcher in collecting the data. The protocol is an important tool in increasing the reliability of the case study research (See Yin 1994). The protocol included the following sections:

A. Overview of the case study project and research design:

The overview included the objectives of the empirical investigation and a description of the methodology to be used. Also, relevant readings related to the investigation and case companies were listed.

B. Field procedures and sources of evidence

This section described the procedure for selection of the case companies. It also included a plan for approaching the case companies, e.g. whom to contact, how to contact, and use of recommendation letters. This was seen as important to assure a favourable response when contacting the case companies. Moreover, the sources used for gathering evidence were explained. Each technique also included detailed instructions, for example related to tape recording during the interviews, and making notes during the interviews and in the field. A case study database was used in the research, and information on how to store data was described in the protocol to facilitate easy finding of needed material in the analysing phase.

C. Case study questions

The research objectives, framework, and propositions were operationalized by developing case study questions for the empirical part. These are questions that the

researcher needs to keep in mind when gathering information (See Yin 1994, 64). Moreover, a separate questionnaire was developed for use during the interviews. See Appendix 2.

D. Guide for the analysis and case study report

The strategies and techniques to be used in analysing the data were outlined. Also, a preliminary outline of the content of the empirical part was provided. These were expected to be help in focusing the data collecting more purposefully.

3.3.3 Sources of evidence

Data collection can rely on many sources of evidence. Yin (1994, 78-80) lists the six most important sources for information, which are documentation, archival record, interviews, direct observation, participant observation, and physical artefacts.

A. Secondary material

The data collection was started in an early phase by gathering secondary material on the biggest ICT companies from autumn 2001 onwards. The search for secondary material was intensified as soon as the case companies were selected in September 2002. Companies were contacted to obtain annual reports, press releases, and presentation material. Also, books and articles including information on the case companies were reviewed. In addition, many larger companies had a great deal of information available on their home pages, including annual/quarterly reports, company presentations, conference presentations, different type of web casts, and information on products, etc.

B. Personal interviews

Personal interviews were the most important source of information. These interviews were of focused type (see Yin 1994, 84). A semi-structured questionnaire was used in the interviews (see Miles and Huberman 1994, 37). This

approach increased the comparability of answers, but still meant that the interviews could be matched with the background of the persons interviewed and the time available for the interview. The questionnaire used in the study is enclosed in Appendix 2. The approach allowed the interviewer to formulate the actual questions and order of questions based on the interview situation. Depending on the expertise and position of the interviewed person, some particular issues of the questionnaire were covered in more detail. The interview technique was based on first presenting the main question and then using further probes when necessary. Also, the interviewer used the possibility to explore some interesting new findings or issues that needed a deeper understanding in an informal conversation in the end of the interview. Moreover, during several interviews respondents were asked a question in the end "what essential issues have I missed or have not been covered in the discussion of this subject area?" The sequencing of questions was planned so that questions that were expected to be easier for the respondents and which gave the context for later questions were placed at the beginning of the questionnaire. Also, emphasis was placed on asking truly open questions (See Patton 2002, 353 and 363). The questionnaire was tested in the pilot study. Based on the feedback, the questionnaire was modified. For example, it was discovered that the word "standardisation across countries" was often understood to concern technology standardisation in the industry instead of the company's own product standardisation across countries. The word was changed to "similarity across countries" in the questionnaire. In each case a minimum of two persons were interviewed.

The interviews were conducted during autumn 2002 and spring / summer 2003. An interview lasted normally around 2 to 3 hours. However, some interviews lasted as long as 5 hours. In some cases, the interviews were also followed by a second one or the interviewees were approached via e-mail to verify the results and complement eventual open aspects. Out of interviews summaries were prepared, which were sent to the interviewees for comments to verify the results. Altogether 16 persons were interviewed. The interviews were conducted mainly in Finnish, but English was also used, depending on the nationality of the person in question. The target was to interview persons with knowledge of product strategies

and therefore senior management was selected for the interviews. There is a list of the persons interviewed in Appendix 3.

C. Internal documents and archival records

Also, during or after the interviews internal documents and archival records were obtained from the case companies. Mainly organisation charts, product matrixes, and other product related material were collected. The interviewer also often made observations during the visits related to the products placed in showrooms and the production facilities of the company.

3.3.4 Logic of analysis

Research often benefits from analysis already at early stages (Miles and Huberman 1994, 50). Hence, the data gathering and analysis part have partly overlapped in this study. For example, the data accounting sheet has been used in the early phase to secure that all relevant data are gathered and also initial versions of individual case reports have been written in early phases (See e.g. Miles and Huberman 1994, 81 and 83 for a review of these techniques). More over, two general analytic strategies proposed by Yin (1994, 102) have been used in this research, namely (A) developing case descriptions and (B) relying on theoretical propositions. As the globalisation and evolution of the product strategy can be seen as processes techniques proposed by processual research have also been used when feasible (Pettigrew 1997). Each individual case was first written according to the framework of the study as follows:

A.   Evolution of product strategies from international to global

-       Product strategy dimensions

-       Standardisation across countries

B.   Impacting factors

-       Impact of Macro and ICT industry environment

-       Impact of corporate and business level strategies

-       Impact of strategic levers, resources and decision making variables

Then the working propositions were examined, first within a case and then across cases. Hence, the order in analysing progresses from describing to explaining (See Miles and Huberman 1994, 91). The data were not coded due to the small number of cases and because the interviews consisted of a limited number of top management interviews. Moreover, the tighter research design, the progressing from single to across-case analysis, and categorizing of the data based on the framework and propositions developed in the theoretical part made coding of data unnecessary. The analysis utilises pattern-matching, explanation building, and replication logic (See Yin 1994, 106-111; Pettigrew 1997). The purpose of the pattern matching is to analyse the actual outcomes with the expected pattern, and if these are alike one can conclude that literal replication has occurred. If the pattern is different, but for reasons described by the theory and propositions, a theoretical replication can be said to have happened. Data displays proposed by Miles and Huberman (1994) were used to illustrate the findings. This analysis is further extended with 'explanation building logic', which can be seen as a special case of pattern matching (Yin 1994, 110). The idea is that the final explanation may not be stipulated from the very beginning; instead several iterations are made with the findings across the cases against the database. Also, in some instances when needed information was not available in the database additional persons were interviewed or same person was interviewed again to gather the missing information.

The logic of analyses also uses techniques from processual research, which seeks to understand the links between context, processes, and outcomes (Pettigrew 1997). Firstly, in this research it is important to understand that processes are often deeply embedded in the context and an understanding of the outer and inner context of the firms is of importance. The macro and ICT industry environment and also the internal strategic levers and decision-making variables of the companies are therefore examined. Secondly, there is a need to reveal the sequence and flow of

events over time. The evolution of product strategies is therefore examined over time as the case companies transfer from international to global. To this end, the perception of the managers interviewed and also other secondary material, including documentary material, is used to understand this evolution. Third, the complexity may be reduced by implementing a proper research design. In this research, the research process has therefore been outlined in specific steps.

Based on discussions of the logic of analysis, one can summarise that the analysis was conducted so that in the first stage each individual case was analysed with pattern matching, explanation building, and replication logic. The pattern-matching logic has been used to match the actual evolution of the product strategies (dependent variable) with the expected one based on the working propositions. The purpose has been to either replicate literally the expected outcome, or then replicate theoretically by understanding contrasting behaviour on the basis of reasons explained by theory and propositions. After building an explanation and analysing proposition within each case, analyses have then been conducted across cases. The process is iterative, so that the framework and propositions are modified to achieve the best possible explanation across all cases. The findings are tested against the database to verify the consistency and accuracy. The final outcome of this iterative explanation building process is a modified theoretical framework and propositions.

3.4 Evaluation of quality and generalizability

The quality of the research can be increased by considering tactics for meeting construct validity, internal validity, external validity, and reliability-related test requirements (Yin 1994, 33).

A. Construct validity

Construct validity means that the correct operational measures for the concept being studied have been established. The construct validity can be increased by a

number of tactics, especially in the data collection phase of the study. First of all, in this research a technique called triangulation is used, which has been proposed by a number of researchers (Yin 1994, 92; Eisenhardt 1989; Stake 1995, 107). Patton (2002, 92) has further proposed four types of triangulation:

- Triangulation of sources of evidence (using multiple sources of evidence)

- Analyst triangulation (using multiple analysts to review findings)

- Theory/perspective triangulation (using multiple theories to interpret the data)

- Methods triangulation (using multiple data gathering methods)

Similar types of multiple sources of evidence were used in all cases: secondary data, interviews, internal documents / archival records, and to some extent also observations in this research. The construct validity increases by applying multiple sources of evidence as this provides multiple measures of the same phenomenon (Yin 1994, 92). Analyst triangulation may be conducted in many ways. In this research, the analysis and the conclusions made were presented at research seminars and to senior researchers and professors for obtaining comments; hence, the validity could be increased. Also, partial results were presented at a number of international conferences such as the Academy of International Business, UK Chapter in 2002, and the Academy of International Business, annual conference in Monterey in 2003. Moreover, this research uses a number of theoretical approaches. This is expected to increase the explanatory power of the results. The methods triangulation was reached by using in addition to qualitative also quantitative approaches when feasible. Quantitative information was, however, collected only as part of the case study research method, which was seen to best suit the research questions set in this research.

Secondly, establishing a chain of evidence was seen as an important way of increasing the construct validity (Yin 1994, 98). The idea has been to document the research process including the data collection, analysis and conclusions in such a way that any other researcher could repeat them and reach the same conclusions.

Thirdly, from each interview a summary was made and sent to the interviewees and asked for comments. Hence, it has been assured that the information received during the interviews was understood correctly.

B. Internal validity

Internal validity means that a causal relationship is established, whereby certain conditions are shown to lead to other conditions. The specific tactics to achieve internal validity are difficult to identify. However, the internal validity can be increased by using a clear logic in the data analysis part. (Yin 1994, 33) In this research, pattern matching and explanation building logics have been used to increase the internal validity. Alasuutari (1996, 152) emphasises in this context the importance of local explanation building in qualitative research. The idea is to first build explanations at single case level and only then move to explaining across cases. This order of analysis was used in this study.

C.   External validity

External validity means the establishment of the domain to which the study's findings can be generalized. The issue of generalizability of the results in case study research is an area that is much debated.

Stake (2000) argues that the purpose of case studies is to understand the full and thorough knowledge of the particular, and as readers recognize essential similarities to cases of interest to them, they establish the basis for 'naturalistic generalization'. They recognize the similarities of objects and issues in and out of context and by sensing the natural covariations of happenings. Moreover, a number of researcher argue that when proper weight is given to local conditions any generalization is actual a working hypothesis, not a conclusion (Lincoln and Guba 2000). An interesting viewpoint on this discussion is presented by Yin (1994), who argues that it is important to note that case studies rely on analytic generalization, in which a particular set of results is generalised to some broader theory, contrary to statistical

generalization to population (Yin 1994, 36). Further, Yin proposes the use of a replication logic described earlier.

In this study, replication logic was used to increase the external validity of the findings, and hence the results can be generalized back to theory. Moreover, in this research the evolution of product strategies has been explained thoroughly, providing a detailed understanding of the behaviour to the reader, which provides a good basis for naturalistic generalizations. Due to the fact that the study was limited to the globalising internationals in the Finnish ICT equipment manufacturing field and since the studied companies represent about two thirds of the Finnish ICT equipment exports (see Ali-Yrkkö et al. 2000, 48), the results are expected to be particularly useful in understanding the development in this sector. It should, however, be noted that out of the five cases selected for this study, four cases were part of Nokia during their history at some point. Although, these four companies have operated as separate entities, this background may have an impact on the generalizability of the results. The selection of four cases with Nokia background is, however, justified due to Nokia's importance in the Finnish ICT equipment manufacturing sector. Moreover, it should be noted that only two of these companies, NMP and NET, are still part of Nokia. Also, the study focuses on the evolution of product strategies at strategic business unit level and the corporate strategy is thus only one factor affecting the development of product strategies at strategic business unit level. Further, a case (Tecnomen) without Nokia background was also selected. When analysing the case companies with Nokia background and the one without this background no major differences were found in the evolution of the product strategies at strategic business unit level.

To the extent that the conditions are similar in other industries the result might also be generalizable to other industries as well. Moreover, the study results are expected to be most relevant for companies originating from SMOPEC countries. However, despite this conclusion, one should be cautious about generalization beyond the companies studied. It is up to future research to prove whether such generalization is possible.

D. Reliability

Reliability means that the operations of the study can be repeated with the same results. Hence, it is of importance to pay attention in the data collection phase to careful documentation of the procedures. Reliability can also be increased by using the case study protocol and a case study database. (Yin 1994, 33) In this research both of these approaches has been used as already reported. The case study database including documents, interview tapes, transcribed interviews, annual reports, field notes, and other material obtained during the interviews is organised per each case and is easily available to the researcher. Moreover, the data are clearly separated from reports made by the researcher. Also, a number of other actions have been taken to minimize the errors and biases in the study, including for example, tape recording of interviews and having the interviewees checking the summary reports of the interviews, as already mentioned. Also, on several occasions further interviews were scheduled to gather missing information and verify the results. In one of the case even two former employees were contacted to gather additional evidence.

4. CASE DESCRIPTIONS, CROSS CASE ANALYSIS AND SYNTHESIS

This chapter will first describe and analyse the case companies' background and globalisation, and then the evolution of the product strategies and then examine the propositions. In the end, it will present a synthesis of the findings from the empirical part.

4.1 A description of the case companies and their globalisation

4.1.1 Background

Five case companies were selected for this research. These were Nokia Mobile Phone, Nokia Networks, Tecnomen, Salcomp, and NK Cables. The background of these cases will be described next as well as the organisational development. The

emphasis will be on the historical development and on the position of the strategic business units within the whole corporation.

4.1.1.1 NMP's background

General background:

Nokia Mobile Phones is one of the two business groups within Nokia Group and it focuses on the mobile telephones business within the group and represents approximately 77% of Nokia's total net sales (year 2002).

Nokia Group, which had originally been formed in the merger of a paper mill, rubber industry and cable works, further diversified into several other fields during the 80s. As a result, it operated in a large number of fields. In 1989 it comprised 12 different businesses: consumer electronics, information systems, mobile telephones, telecommunications, cables, machinery, electrical wholesale, rubber, chemicals, paper, power, and floorings (Nokia annual report 1989). The strategy had been to grow aggressively through diversification and internationalisation mainly in Europe, which was believed to offer protection against economic fluctuations. However, due to the radical decrease in trade with Soviet Union and the problems in consumer electronics field the company's financial position became difficult in 1991.

During the early 1990s, Nokia started focusing on telecommunication and globalisation. The company analysed which business areas would provide growth potential and profitability in the future. It was crucial to select an area in which a sustainable position could be built. When the size of the new markets and the competencies, knowledge, and market position were examined, it became evident that the telecommunication area was especially interesting. Although, it could be seen that a global market was emerging in the telecommunication area, it was not evident how global it would eventually be, according to one of the interviewees.

The focusing on the telecommunication was a process, which included a series of divestments during the 90s and simultaneous investments to telecommunication

area. Streamlining of the business was started by CEO Simo Vuorilehto in the beginning of the 90s (Häikiö 2001a, 48). An important point in the development was 1992, when the newly appointed President and CEO of Nokia Jorma Ollila described the vision as consisting of four elements: telecom, global, focused and high added value. The non-core businesses not in line with this vision were divested during the 90s. By the end of 1996, the company had divested all but the mobile telephones, telecommunications, multimedia network terminals, and industrial electronics businesses. 89% of net sales were already coming from two business groups, namely Nokia Mobile Phones and Nokia Telecommunications. In 2002, Nokia consisted of three business groups: Nokia Mobile Phones, Nokia Networks, and Nokia Ventures Organisation. Nokia Ventures Organisation was established in 1998 and it targets expansion into new fields within communication solutions, thus diversificating into related areas such as internet communications, home communication, and other new ventures. (Annual reports 1975-2002, interviews and material received from Nokia). Recently Nokia announced also that it establishes a strategic business unit called the Nokia Enterprise Solutions Group that focuses on especially corporate solutions, which can be seen as further diversification into related fields.

Mobira was established as a joint venture between Nokia and Salora in 1979. Both Nokia and Salora transferred their radiophone businesses to this company. From Nokia's perspective, the purpose was to be able to develop the product offering and expand into new international markets by joining forces. Nokia's volumes were not seen as big enough and trade was too much dependent on exports to the Soviet Union. (Häikiö 2001b, 276-277). Nokia later purchased all Mobira's shares and the company's name was changed first to Nokia-Mobira and finally at the end of the 80s to Nokia Mobile Phones. In this research the abbreviation NMP (Nokia Mobile Phones) will be used to refer to Nokia Mobile Phones, but also to the earlier phases when the company's actual name was Mobira Oy or Nokia-Mobira Oy.

In 2002, Nokia Mobile Phones developed mobile telephones for all major technology standards and had sales in over 130 countries. It has become the world's largest mobile telephone producer with net sales of over 23 billion euros

and an estimated market share of 38%. Manufacturing takes place at 10 plants in nine countries. (Nokia Form 20-F 2002)

Organisational development

In the mid 1980s NMP's (Nokia-Mobira at that time) activities were organised into five independent units: NMT Unit, USA unit, Euro Unit, Oulu unit and PMR unit. The first three units mentioned focused on mobile telephones and the other two on telecommunications equipment and private mobile radio systems. Nokia-Mobira's unit in Oulu producing telecommunications equipment and the PMR unit focusing on private mobile radio systems for the authorities were internally transferred from Nokia-Mobira to Nokia Telecommunications in 1988. According to the newly selected Managing Director Of Nokia-Mobira, Timo Louhenkilpi, this would provide Nokia-Mobira with the possibility to focus fully on the growing mobile telephone market (Tanner 1988).

The units responsible for mobile telephone manufacturing had been divided according to the standards NMT[31], TACS[32] and AMPS[33]. In 1986, each of these had its own product development, sourcing, manufacturing, product marketing, and sales. The NMT Unit developed, manufactured, and marketed mobile telephones suiting the NMT 450 MHz and 900 Mhz systems and other NMT-based cellular telephone systems. Its principal markets in 1986 were Scandinavia, Benelux, Switzerland, Austria, Turkey, Malaysia and Thailand. The NMT unit had a factory in Salo and a Swedish subsidiary. The Euro Unit manufactured and marketed mobile telephones suiting the TACS, R2000 and Netz-C networks, the most important markets of which were in Europe. Its operations in 1986 were based in Britain, France, Ireland, and Hong Kong. The USA Unit was responsible for design, manufacturing, and marketing to the North American and other AMPS based systems. The product range had been tailored to the American requirements. The Tandy Mobira Corporation jointly owned by Nokia-Mobira and the Tandy

---

[31] NMT = Nordic Mobile Telephone
[32] TACS = Total Access Communications System
[33] AMPS = Advanced Mobile Phone Service

Corporation produced mobile telephones in South Korea and these were then distributed through the Radio Shack sales organisation. In the mid 1980s, the world cellular telephone market was very fragmented, with seven system standards. In 1986 AMPS represented 56% of global demand, while NMT represented 20% and TACS 10%. (Nokia Annual report 1986 and interviews)

Towards the end of the 1980s, it was seen that the division into three independent units was not successful as the products were completely different, the same components were bough at different prices in different parts of the world, the production units were independent and did not operate efficiently, and a lot of overlapping work was done in several parts of the organisation. The cost of this was too big compared to the benefits of a greater adaptiveness to markets and flexibility. Therefore, in 1988 product development was brought together by the Managing Director Timo Louhenkilpi. Towards the end of the 80s production was also centralised, which meant a higher degree of integration. By 1991, the division-based organisation had been dismantled and the different functions had been centralised globally. NMP had been converted from a divisions-based organisation into a functional organisation. Moreover, when the product development function had been integrated globally, the company started to develop the product development process, called the concurrent engineering (CE) process. In addition processes for customer satisfaction, global logistics, and competence and systems development were also established in 1992-1993. At the end of the 1990s, the company was divided into CMT (Cellular mobile telephones), DCU (Digital convergence Unit), Special products and Smart traffic products (Häikiö 2001a, 204). In 2002 NMP was further structured into nine business units based on application segments.

4.1.1.2 NET's background

General background:

Nokia Networks is the second largest business group within Nokia and it is responsible for the network business within Nokia, representing approximately 22% of Nokia's net sales in 2002 (Nokia Form 20-F 2002).

Nokia Networks roots in the telecommunication infrastructure business can be found in the electronics department of Nokia Cable Works in the 1960s and Televa, the majority share of which Nokia bought in 1981 (see also Häikiö 2001b, 305). The name has thereafter changed from Telenokia to Nokia Telecommunications and since the end of the 90s it has been Nokia Networks. The abbreviation NET (Nokia Networks) will be used to refer to Nokia Networks, but also to the earlier phases when the company's actual name was either Telenokia or Nokia Telecommunications.

Today, Nokia Networks is a provider of mobile and IP networks infrastructure and related services. It has focused its activities on the GSM[34] standard and its evolution including, the WCDMA. In 2002, it has net sales of over 6.5 billion euros and a market share of over 25% in GSM networks, which translates to around 15-20% of the total mobile network infrastructure market. (Nokia Form 20-F 2002)

Organisational development:

NET was divided to an area management organisation and three divisions, i.e. transmission systems, switching systems and cellular systems in 1993. Each division was split further into a number of products lines. For example, cellular systems consisted of switching systems, base stations, private mobile radio, and customer services product lines. A number of organisation changes have occurred since then. In 2002, the organisation was divided into four major units, which are (A) IP Mobility networks responsible for radio access, mobility core networks, mobile messaging systems and service control platforms, (B) Broadband systems

---

[34] GSM = Global System for Mobile Communications

responsible for fast internet solutions and broad band DSL, (C) Professional Mobile radio responsible for public safety and professional cellular networks, and Professional Services responsible for end-to-end solutions for optimised network performance. In addition to these NET has (E) a Delivery Operations unit responsible for the manufacturing, distribution, and maintenance services functions. The channels to the customers in NET's organization are (F) the customer business teams, which are divided on the bases of geographical areas, but also based on major operator customers. See Figure 19 in which NET's organisation in 1993 and 2002 is illustrated.

Figure 19. Evolution of NET's Organisation (1993 and 2002)
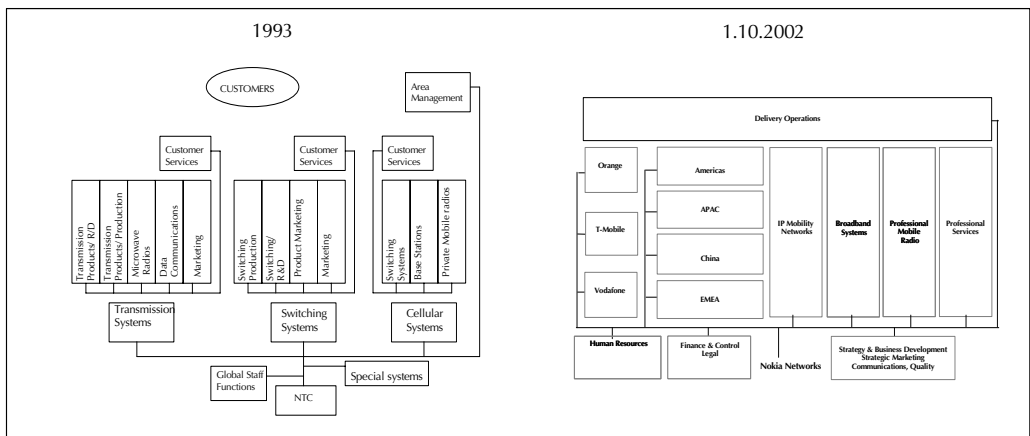
Source: Nokia

4.1.1.3 Tecnomen's background

General background

Tecnomen was established in 1978. It started as an engineering company and then developed into automation system business in the beginning of the 80s in various application areas. In the early 80s an important customer for Tecnomen was Tamglass (part of Kyro Corporation), to which it supplied automation and control systems for glass manufacturing machines. Tamglass had already at that time

international operations and in this way Tecnomen was engaged in a relatively early stage in indirect exports. As the equipment supplied by Tecnomen was seen as critical to Tamglass, Kyro Corporation acquired Tecnomen in 1985 partly to ensure the supply of such equipment to Tamglass. For Tecnomen, financing of the growing international business was difficult during the early 80s and thus the financial support of Kyro was important.

Tecnomen thus became part of Kyro Corporation, which has a history of over 130 years. Kyro Corporation evolved during the 80s from a forest company to a highly diversified international company operating in a number of unrelated businesses. In 1991, over 90% of Kyro's net sales consisted of exports, but sales outside Europe still accounted for less than 30%. It was operating in paper & board, sawmill, energy production, safety glass machines, tempered glass, and telecommunication systems (Tecnomen) fields in the early 90s. In the mid 90s, it decided to focus its activities by divesting its forest-related business. Later, towards the end of the 90s and early in this decade, it started to focus increasingly on safety glass machines and divested all but the safety glass and power businesses from its portfolio. In this process Tecnomen was also separated from Kyro Corporation in 2001, when it became an independent company listed on the Helsinki Stock Exchange. (OY Kyro Ab Annual reports 1984-2002, interviews) Recently Kyro has also diversified into the related stone processing machinery field by acquiring Z. Bavelloni Immobiliare in Italy and Glasto Holding B.V. in the Netherlands.

In addition to industrial automation systems Tecnomen also expanded into data collection systems for inventory, material flows, payroll and production. Starting from the mid 80s new areas in telecommunication were also entered. The first paging system was developed in 1984 and voice mail system in 1991. These were already exported to a large number of countries. In early 90s Tecnomen decided to focus entirely on telecommunication field and it was able to expand to the global markets with the products during the 90s. The spread of the mobile technology standards, opening of new markets and competitive products enabled this development. Tecnomen expanded further from voice mail systems into unified messaging systems and prepaid in 1998 and lately also into multimedia messaging, but ensured that synergies were tight between these fields.

In 2002 Tecnomen focused on developing and supplying value-added service systems for telecommunication operators and service providers. The company had offices in 10 locations worldwide and had supplied its products to customers in more than 40 countries. In 2002 Tecnomen had net sales of 39.9 million euros and employed 457 people at the end of the year. (Tecnomen Annual Report 2002).

Organizational development

Tecnomen was organized in 1988 into telecommunications equipment, industrial automation and data collection systems. In the 80s and early 90s the organization was kept flat and informal communication was encouraged at all levels of the organization. Moreover, the culture was to encourage innovations. As a result a number of innovation were made during the 80s and the 90s. One of the interviewees commented on this period as follows:

"The spirit was that without mistakes there are no innovations. We had often more ideas than what could be realized. We planned beforehand what should be the situation after one, two or three years. If products were not successful, these businesses were either transferred to separate companies or discontinued."

During the early 90s the company focused entirely on telecommunications, and unrelated product lines / businesses were divested or transferred elsewhere within Kyro corporation. In 2002, Tecnomen was organized into sales and customer services, product business organizations including three business units, and staff functions. The sales and marketing were organized into four regions: Europe, Asia Pacific, Middle East and Africa, and Latin America. The three business units were messaging solutions, intelligent networks, and paging systems. See Figure 20 for Tecnomen's organisation in 2002.

Figure 20. Tecnomen's organisation in 2002
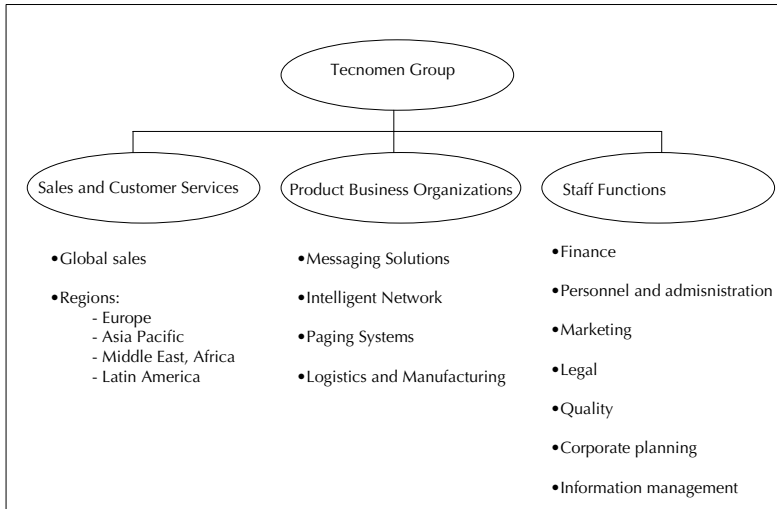
Source: Tecnomen

4.1.1.4 Salcomp's background

Salcomp was founded in 1973 by Salora, a Finnish TV manufacturer. Later Nokia acquired Salora (inclusive of Salcomp) in 1983. Salcomp was bought by EQT Scandinavia in 1999 as Nokia focused on network infrastructure and terminal manufacturing.

The company was first expanded into a number of different businesses, including the production of electronic modules (started 1975), TV and satellite tuners (started 1976 and 1983), power supplier to a large number of application areas (started 1983), and mobile telephone chargers (in 1988).

Today Salcomp is the largest producer in the world of switch mode chargers for mobile telephones. In 2002, net sales amounted to 129.8 million euros and 1370 employees worked at the company (Salcomp Annual Report 2002). The current

owner of Salcomp, EQT, is a private equity group founded by Investor AB from Sweden. EQT currently has holdings in more than 20 companies in a variety of industries such as telecommunications, engineering, medical devices, service outsourcing, technology and consumer products.

<u>Organizational development</u>

In the early 80s, Salcomp was part of the component group of Salora, which included a factory in Uusikaupunki producing TV components, Salcomp's factory in Kemijärvi producing TV/satellite tuners and electronic modules, and also a printed board factory and a metal workshop. Salora started to look for synergies in these areas and it discovered that power supplies would be an area where the skills of these factories could be used. As a result of this co-operation, the first power supplies were developed for IBM by Salcomp in 1983. Later power supplies were developed for a large number of applications, including office, telecommunication equipment and various industrial applications. In the mid-80s, the first switch mode mobile chargers were developed in co-operation with Mobira and production was started in 1988.

In the early 90s, the company decided to focus entirely on switch mode mobile chargers and the production of electronic modules, TV/Satellite tuners and power supplies for equipment other than mobile chargers were discontinued. Hence, the mobile chargers became Salcomp's main focus area during the 90s. Through its acquisition of Aspro Technologies in Switzerland in 2002, Salcomp was also able to expand to linear chargers. Salcomp has not published its organizational chart. However, based on their annual report (2002), it is apparent that the management group's responsibilities have been divided in a functional manner into sales & marketing, operations, quality & strategic planning, R&D, and finance. Moreover, interviewees stated that Salcomp has not organized itself to product businesses or lines.

4.1.1.5 NK Cables' background

<u>General background:</u>

NK Cables was established in 1912 (it was called the Finnish Braiding Works Limited at that time) to manufacture cable products. In 1967, the Finnish Cable Works (former Finnish Braiding Works), the Finnish Rubber Works, and Nokia Oy were merged.

NK Cables had diversified into a number of fields besides cables by the end of the 80s. It had also started internationalisation in an early stage and gained a strong position especially in Soviet Union. By 1987 it had a product range of over 8000 cable products, around 4000 installation accessories, over 11,000 aluminium profiles and processed aluminium products, and around a hundred power capacity products. Development of optical fibres was also started around that time. In 1987 it acquired the Swiss cable machinery producer, Maillefer. In 1990 Nokia Cables, Nokia aluminium, Nokia Cable Harnesses, Nokia Capacitors, and Nokia-Maillefer were restructured into independent companies within Nokia Cables and the Machinery Division. From 1990 to 1995 all except Nokia cables and Nokia-Maillefer were sold as operations were focused on the core areas, cables and cable machinery.

In 1995 Nokia Cables shares were sold to NKF holding in the Netherlands and further in 1996 NKF holding was divested from Nokia's Portfolio and Nokia Cables became NK Cables. Nokia did not consider cables a growth area and this was part of its focus on telecommunication and divestments of unrelated areas. The potential to reach a global market share and position were less promising in the cables area than in telecommunications. Successful development of the cable business would have also required considerable investments in fibre technology in the near future. At that time NK Cables was acting as an umbrella for two separate companies: NK Communications and NK Energy.

During the NKF ownership, NK cables also expanded the business portfolio into the service and systems area. The Network Engineering Services unit was established in 1997 to focus on management of large cable projects. However, lately NK Cables have focused more back on conventional cable manufacturing.

NKF was, however, not large enough to compete and expand in the global markets and as a result NKF Holding was merged with Draka Holding N.V. from the Netherlands in 1999. Moreover, the energy cable business of Draka NK Cables was sold the following year, which meant that the company focused mainly on telecommunication cables. Draka has grown mainly by acquisitions and it was able to expand into telecommunication cables by the acquisition of NKF.

In 2002, NK Cables designed and manufactured cables and cables accessories. In addition to Finnish operations, it has a number of subsidiaries abroad. A high proportion of the company's products are supplied to the global telecommunication sector. The net sales of NK cables in the year 2002 was over 200 million euros. NK Cables is part of Draka's large network of 60 companies operating in 25 countries in Europe, North and South America, and Asia. Draka Holding N.V. employed around 8300 people in 2001 and it sales amounted to 1.9 billion euros. (Draka Holding Annual Report 2001) Draka Holding is structured into two product groups: the Telecommunication Cable & Systems Product Group, and the Low-Voltage & Special-Cable Product Group. NK Cables is part of the former.

Organisational development:

NK Cables has been part of a number of organisations. During the Nokia period, the Nokia Cable Industry Division composed a Nordic region and a Central region (1994). A large part of the Nordic region consisted of the operations of NK cables and a large part of the central region of the operations of NKF. The Nordic region was then further divided into fibres, telecommunications, power, installation, and other activities.

During the NKF Holding period (1996-1999), the name of the company was changed to NK cables and it was structured into two main divisions, Energy and Tele. Telecommunication Cables also included the cellular network cables, telecommunications network cables, and automation and data cables business units. An important change was the establishment of cellular network cables as an independent business unit with a global mandate within the NKF Holding to develop, produce, and market RF cables and accessories worldwide.

During the Draka period (1999 onwards), the company name has been changed to Draka NK Cables and it has been structured into Fixed Networks, OPGW, Mobile Networks, and Installation and Industry. The Fibre business unit's reporting is changed so that, although legally part of NK Cables, it reports operationally to POF in the Netherlands and is responsible for the Draka's global fibre raw material and its production. The power cable activities of NK were sold to Pirelli Cables and Systems in Italy as an effort to further focus on telecommunications in 2000. The new organisation of NK Cables as of 1st January 2003 can be seen below (Figure 21). The abbreviation NK Cables will be used to refer to Draka NK Cables, but also to the period when the company was under the ownership of NKF or Nokia.

Figure 21. NK Cables Organisation (1.1.2003)
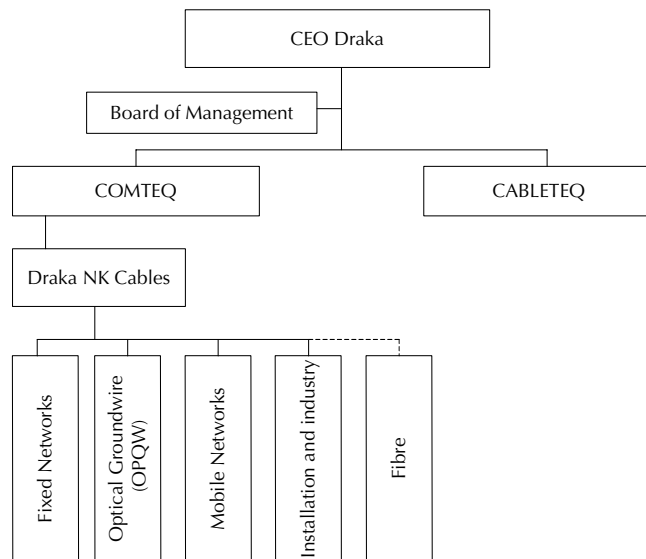
Source: NK Cables

4.1.2 Globalisation

Globalisation took place in the case companies at different times. One of the case companies, NMP, globalised in the late 80s and early 90s, before the others. Three of the case companies, NET, Tecnomen and Salcomp, globalised during the 90s and reached a global stage by the turn of the century. One of the case companies, NK Cables, joined through an acquisition a global company, Draka Holding, with operations in 25 countries on all continents. The mobile networks business unit within this case company evolved towards a global stage while other products became part of a worldwide MNC structure with geographical product specialisation. Figure 22 illustrates degrees of globalisation of the cases from 1992 to 2001. Next the development of these companies towards global stage are examined in detail. The emphasis will be on the development of foreign markets and operations. The evolution of products in the globalisation process is discussed further in 4.2.

Figure 22. Development of the globalisation degrees of the case companies
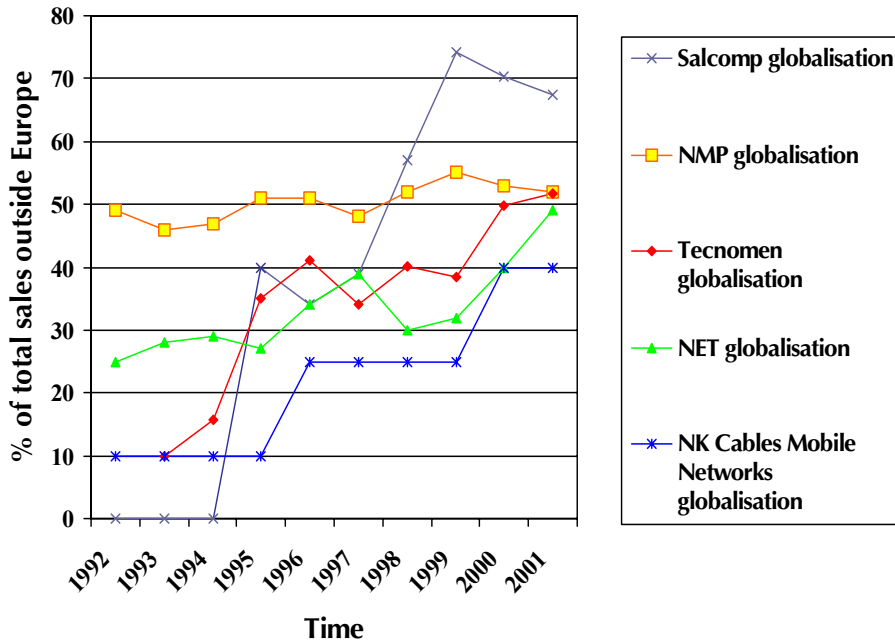
Source: Compiled by the author based on annual reports and internal material provided by the companies. The globalisation degree is calculated as a percentage of sales derived outside Europe compared with the total net sales of the company/unit (see also Luostarinen and Gabrielsson M. 2002). NMP and NET figures also include Africa and Middle East sales; the actual globalisation degree can therefore be expected to be bigger. The figures of NK Cables Mobile Networks for 1992 to 2002 are based on estimates provided by the company. Salcomp's early 90s figures are based on estimates provided by the company. Tecnomen's data for 1993 to 1997 are based on internal material provided by the company.

4.1.2.1 NMP's international stage and globalisation

NMP started to internationalise its activities at an early stage, in the late 70s and early 80s, by entering neighbouring areas like the Soviet Union and Scandinavia, following a conventional market strategy and first entering those countries with less business distance. The forces of both Mobira and Salora were combined in 1979 to

enter the newly established markets for terminals based on NMT (Nordic Mobile Telephone) standard emerging in Scandinavia. These markets were entered with car telephones / transportable telephones and later with handheld telephones.

In the next phase, the TACS markets in the UK and the AMPS markets in the USA were entered in the mid 80s. An important step was the agreement with Tandy Radio Shack for a joint venture for entering the US markets in 1984. Moreover, the TACS markets in Italy and Spain were entered and the R2000 market in France in the end of 1980s. Simultaneously, Nokia started to enter the Asian market. Nokia Mobile Phones first entered Malaysia in 1985 with a local distributor. Asia first adopted the NMT 450 and later the TACS, AMPS, and NMT 900 standards. By 1992, mobile telephones were sold in 60 countries, by 1993 in 90 countries, and by 1995 in 120 countries.

The further global market expansion was largely based on which country adopted a certain standard and which operator received the license. The business distance was less important than in the international entry stage. The country in question was entered as soon as the market emerged, using a local importer or partner who had good relations with the license holder in that country. Later, a sales subsidiary was established. The global expansion of NMP can be summarised as a development in which a large number of foreign markets were entered in the 80s. By 1992 a high proportion of its sales, 49 percent, was derived outside of Europe. In the mid 90s and towards the end of 90s over 50% of sales were coming from outside of Europe.[35] In the 90s NMP focused on penetrating to the markets further and increasingly aligned its global activities with respect to operations, products, and marketing.

---

[35] Here it is important to note that NMP reports combined sales for the Europe, Africa, and the Middle East. The importance of Africa and Middle East can be expected to have risen at the end of 90s. These countries represented around 20% of total Europe and Africa sales in 2001 according to one of the interviewees. Hence, the actual globalisation degree can be estimated to be over 60% for that year.

4.1.2.2 NET's international stage and globalisation

NET globalised at a slower phase than NMP. The main export areas until the early 80s were Sweden and the Soviet Union (see also Kosonen and Engelvuori 1998). By 1986, the company had been able to enter international markets in three main product groups: transmission systems, dedicated networks (professional mobile systems), and digital exchanges. The main markets for dedicated networks were - in addition to Finland – the Scandinavian countries, the Soviet Union, the UK, Australia, and China. Transmission systems were exported to some 20 countries at that point. Digital exchanges were sold mainly in Finland and Soviet Union.

An important milestone had been the introduction of the digital mobile switch in 1986. It was developed for NMT networks and later for GSM networks. With the introduction of NMT network products, NET entered the Nordic countries and gradually the other countries adopting this standard. Also, an important factor affecting international expansion was the collapse of trade with the Soviet Union in 1991, which forced NET to focus on other international markets like Sweden, Germany, the UK, France, Thailand, Malaysia, and Australia in the early 90s (Häikiö 2001a, 25).

The GSM standard changed the situation and enabled NET to penetrate the European markets first and then to expand gradually to the global markets. The first GSM contracts were made in the early 90s. Sales offices were established in the UK (1982), Sweden (1989), Denmark (1989), France (1990), and Germany (1989). By the mid 90s, all major European countries had been covered including for example sales offices in the Netherlands (1990), Italy (1993), and Poland (1993)[36].

During the 90s, marketing activities expanded to Asia with GSM based network products. For example, Thailand, Singapore and Australia were entered with export mode in the late 80s and early 90s. The penetration approach included that after a major GSM deal had been received, NET gradually built a sales office and support organisation in the Asian country in question. In 1994/95 the importance of China was realized and efforts were made to penetrate that market, also with mobile

---

[36] The years of establishment for each sales office are from www.Nokia.com.

infrastructure (Already earlier in the 80s, e.g. dedicated networks had been delivered to China). This included appointment of more senior management to this area. It led to huge growth in sales in China from 1996 to 1998. Japan was also seen as a strategic country in 1997 around the time of the struggle over standardisation for 3G. The target for NET was to enter the market with WCDMA technology based network products, which was eventually achieved in 2000.

In 1995, the efforts were also directed to expanding to the US GSM markets. Nokia Networks obtained some network customers in the mid 90s, e.g. Voice Stream (1995), but it was only after two major US operators converted from TDMA to GSM technology that the market really opened for NET. Gaining the AT&T (2000) and Cingular Wireless (2001) as customers meant that NET established itself as a major vendor in the US market. See Appendix 4 for NET's GSM infrastructure customer references in the world.

The expansion of NET to foreign countries can be characterised as internationalisation first to neighbouring countries by the early 80s and then elsewhere in Europe during the end of the 80s and early 90s. The focus was clearly at this stage in Europe. Nokia Networks' internationalisation degree, i.e. sales outside Finland, was only around 27% and its globalisation degree, i.e. sales outside the home continent, was around 7% by the end of the 80s.[37] Later the company globalised to Asia and then at the end of the 90s to North America. An important factor in this development was the spread of GSM to these continents. From the mid 90s onwards, the company has sought the benefits of global integration and synergies from operating on global scale. The different country operations have been integrated globally and global customers are targeted. This has meant that the company has moved on to the global alignment phase. Towards the end of the 90s a globalisation degree close or even above 50% was achieved. [38]

---

[37] These figures are calculated on the basis of sales information for NTC group provided in Häikiö 2001a, 23. The SEV countries are included in the European figures.
[38] NET reports combined figures for Europe, Africa and the Middle East. Hence, the actual globalisation degree is considerably higher than that shown in the figure.

4.1.2.3 Tecnomen's international stage and globalisation

Tecnomen started its internationalisation by delivering in the early 80s automation and control systems for glass manufacturing machines to its most important customer Tamglass. Tamglass had already at that time started internationalisation and in this way Tecnomen was engaged in a relatively early stage in indirect exports.

The next stage in the internationalisation was the start of delivering paging systems starting from mid 80s first to Europe and then later to Asia. In the beginning sales went mainly to Norway, Denmark, Austria, Switzerland, and Ireland largely following the conventional pattern in market strategy development explained by business distance. The mobile network manufacturers were used as partners, which facilitated the entry to the new markets.

In 1991, the first voice mail system was delivered to Sonera, and soon after sales of these products were started to international markets as NMT and GSM standards spread first to Europe and then outside Europe. For example in 1992, voice mail systems were supplied to Tele Danmark's NMT and GSM networks. Increasingly voice mail systems have been supplied outside Europe. By 2002 these systems had, for example, been supplied to Malaysia, Kuwait, Saudi Arabia, Taiwan, Thailand, and Indonesia. The important Chinese market was entered in 1997.

Tecnomen expanded from voice mail systems to unified messaging systems in 1998. The first delivery of unified messaging systems went to Telenor Mobil in Norway. Tecnomen also expanded their product offering with prepaid systems in 1998 and first delivery was made to Americel in South America, which represented a deviation from the conventional market strategy of first entering countries with less business distance. In 2003 there were altogether around 40 countries in which Tecnomen was present. Tecnomen has not yet entered the North American markets.

The driving force in internationalisation and globalisation has been successful products, spread of mobile technology standards and opening of new markets. Also,

the main customer in home market, i.e. Telecom Finland (Sonera), has had a great impact on which products have been developed by the company. The products were first developed for the home market and then demand in other countries appeared.

In 1999, Tecnomen adopted a new area based organisation, in which the globe was divided into (a) Europe, (b) East and South-East Asia (c) the Middle East and Africa, and Latin America. At this stage, specific strategies were developed for these areas and a more global approach was introduced. Previously, only country-specific sales subsidiaries had been established. At the moment, Tecnomen has 13 offices in 11 countries. In addition agents and global partners are used to market the products.

In 1993, Tecnomen's sales were divided so that 90% of the total came from Europe and 10% from outside Europe. In 2001, 52% came outside from Europe and the rest from Europe. Tecnomen developed from an international into a global company during the 90s. Interestingly, areas with a high business distance such as South America were entered at a relatively early stage of globalisation. Towards the end of the 90s, Tecnomen has started to integrate the activities in different countries on a regional basis. A regional organisation has been established to co-ordinate on regional level the sales and marketing, which has meant a higher global alignment of activities. Appendix 5 presents the global customer references of Tecnomen per area. As can be seen, some businesses operate worldwide while others focus on certain areas, such as prepaid business mainly to Latin America.

4.1.2.4 Salcomp's international stage and globalisation

Salcomp started internationalisation by exporting modules for organs to Germany already in 1981. During the 1980s, exports of both tuners and power supplies expanded rapidly to Europe. By the end of the 1980s, products were sold to Sweden, Denmark, England, France, Germany, Italy, Spain, and the Soviet Union. This was in line with the conventional pattern of first entering international countries with a short business distance. Exports accounted for 33% of sales in 1990 and originated mainly in Europe. The proportion of exports increased rapidly

and by 1991 already amounted to 49% and by 1992 to 67%. This marked the change of Salcomp from a domestically oriented company to an international one as more than half of its sales came from foreign markets.

The first customers outside Europe were gained at the end of the 1980s in Hong Kong and Taiwan for tuners. However, sales still focused on Europe at that time and it was only in the mid 1990s that Salcomp was able to penetrate Asia and the USA with mobile telephone charger products. It can be seen that the company was following its biggest customers, Nokia and Ericsson, into the global markets. The operation mode used during the early 90s was exporting. In 1997, sales offices were established in the USA and in Hong Kong in Asia. The reason was the fast growth of the charger market in these regions and the fact that it was not possible to take care of customers in these areas without local presence. These sales offices employed only a few persons in the beginning.

Also, at the end of 1990s, it became evident that manufacturing had to be established abroad to be able meet the speed and flexibility required by customers overseas. Moreover, in some countries there were very high import duties e.g. in China. Therefore, in 1998 production was started in Doumen in China, which was outsourced to Flextronics. At that point it had become evident that Nokia was going to divest Salcomp from its business portfolio and therefore Nokia was not willing to make huge investments in foreign production facilities. In 2000, production was started in Mexico to serve the growing mobile telephone manufacturers there and in the USA. The manufacturing was outsourced to Elcoteq. However, it was soon noticed that major mobile telephone manufacturers were expanding in Asia and therefore this production was discontinued in 2001 and transferred to China. Furthermore, in 2000 production for the local markets was started in Saõ Paulo in Brazil. In 2002, it established a factory of its own in China through acquisition of the Swiss company Aspro. It can be seen that the operation strategies developed from non-direct investments towards direct investments as the company further penetrated the global markets.

The company has recently also started to align the operations of Aspro and Salcomp to achieve global integration benefits and synergies. By 1998, 90% of sales came from foreign markets and 57% from outside the home continent. As over half of sales came from outside the home continent, the company had reached the global stage at that point. It further increased the globalisation degree (proportion of sales outside Europe) to 67.5% by 2001.

4.1.2.5 NK Cables' international stage and globalisation

In a sense NK Cables globalisation has differed from those of the others as it has been part of a number of larger domestic corporations and was recently acquired by a large foreign MNC. The global market expansion of NK Cables can be divided on the bases of owners into three stages: (1) Nokia cables period (before 1996) when the company entered international markets, (2) NKF Holding period (1996-1999) when the company further penetrated to the international markets and entered the Americas, and the Draka Holding period (since 1999) when the company started to rationalise its activities on global level. (See also Al-Obaidi and Gabrielsson M. 2002) The evolution during these different periods will be described next.

During the first stage (before 1996), NK cables established itself on the international markets. In 1948, it started to export to the Soviet Union, which became the most important export country in the 80s. NK cables established a number of foreign manufacturing operations during this period. The first manufacturing operations abroad were in Egypt in 1959 and a few years later in Turkey in 1963. The Central European markets were entered with the acquisition of a special cable producer in Germany in 1983.

Exports to the Soviet Union were based on the bilateral trade agreement between Finland and the Soviet Union and therefore termination of this arrangement at the end of 1990 meant a significant decrease in exports. This meant that NK Cables started to focus on Asia and especially the huge markets of China. In the beginning of the 90s, the most important export countries with respect to sales were Russia, China, Thailand, Indonesia, India, the Czech Republic, Romania, and the Baltic

Countries. The North and South American markets were not entered due to scarce resources and tough competition. During the Nokia Cables period in the early 90s, the sales of the total NK Cables telecom sector were distributed, so that around 55% were derived from home markets, 15% from rest of the Europe, and 30% from outside Europe. At that time the mobile networks business unit focused on Europe as only 10% were derived outside Europe. During this period a number of sales offices were established, for example in China (1993), Sweden (1995), Latvia (1996), and Lithuania (1997). NK cables also established a number of manufacturing operations at the end of the 80s and the beginning of the 90s to the Soviet Union (1988), Estonia (1992), and China (1994). A very big acquisition was made when in 1990 Nokia bought a majority of NKF, an energy and telecommunication producer (situated in the Netherlands) with operations in Europe and South-East Asia. NKF and NK Cables were in the early 90s, however, operated as separate companies.

In the beginning of the 1990s, it was apparent that GSM would become a global standard and this meant that a large number of base stations would be built all around the world. Simultaneously, machinery related to the production of coaxial cables for cable TV had been left redundant, as the Finnish TV cable construction to major cities had been completed. It was realised at NK cables that this machinery could be used to produce the feeder cables (RF Cables) needed to connect base stations with antennas. Vice President of the Mobile Networks at NK Cables Kaj Söderling comments on this discovery and the start of the business as following:

"This machinery was almost sold abroad. Then someone from R&D started to talk about GSM and that the world would be full of GSM base stations…This would require a lot of cables…. In the beginning we had a few people and some old machines in Oulu... We started from there."

The global expansion of the RF cable business developed so that first Europe was conquered, then Asia and then in the latest phase from 1997 onwards the USA. Appendix 6 contains a summary of foreign operations and times of establishment. At that time, global expansion was largely based on following the biggest

customers, of which the most important was Nokia.   One of the interviewees commented as follows:

"We were very much following Nokia…wherever Nokia went, we went also."

During the NKF Holding period (1996-1999), NK Cables further established its position in Europe and expanded to the North and South American markets. This expansion was largely due to the increasing importance of the mobile network cables business within NK Cables. The company penetrated further into the European markets and accordingly established sales companies in Latvia, Lithuania, Russia, and Romania. The RF cable markets had developed into a global one and a presence in America was also considered important. The company established a number of sales companies outside Europe including Brazil (1996), Thailand (1997), and Mexico (1997). The US sales company had been established earlier (in 1991), but it expanded its product assortment to include RF cables in 1997. To be able to support the growing RF cables customers, a number of logistic centres were established in for example the USA, China, and Mexico during this period. Also, RF cables production units were established in China (1999) and Brazil (2000) in addition to the one operating already in Finland. The NK Cables telecommunications business as a whole derived about 40% of its sales from Finland, while 40% came from the rest of Europe and 20% from outside Europe. The Mobile Network Business unit derived only 10% from Finland at this time, while most sales came from the rest of Europe and increasingly from outside Europe as well (25%).

In 1999, NKF Holding (inclusive NK Cables) was merged with Draka and NK cables became part of an extensive subsidiary network of around 25 countries covering all continents. During this period as a result of global rationalisation some businesses within NK cables are growing rapidly and moving towards the global stage, e.g. mobile networks business, while other businesses, e.g. copper and fibre cables, are structured more to serve neighbouring regions like Scandinavia, the Baltic countries, and East Europe. The company has thus entered the global alignment phase. The Mobile Network Business unit has been given a global mandate,

including responsibility for global sales, distribution, and manufacturing. This has meant that the sales of this business unit derived outside of Europe have increased rapidly to around 40% at the moment (For NK Cables as a whole this amount is only 15%).

4.1.2.6 Summary and discussion of the globalisation of the case companies

The companies had internationalised first to nearby countries mainly in Europe, following the conventional internationalisation pattern discovered in earlier research of first entering countries, where the business distance is small measured by geographical, cultural, and economic distance (see Luostarinen 1979, 144-152). The integration development in Europe and opening of the markets for competition was also an important factor affecting the expansion to neighbouring countries (see Hansén 1981, 142; Hansén 1999; Häikiö 2001a, 66). Moreover, the operation strategy followed the earlier found pattern of using first marketing and non- direct investment operation modes and then progressing gradually to more demanding operation modes. (See Luostarinen 1979, 107-124).

Then the companies entered global markets outside Europe where growth potential was apparent. Business distance seemed to be less important at this stage as countries with relatively great business distance like those of South America and China were often entered in an early stage. The spread of technical standards and openness of markets was more important in this development and often dictated, which markets were entered (see also Hansén 1999; Häikiö 2001a, 16). Three of the case companies also followed their major customers closely to the global markets (NK Cables, Salcomp and Tecnomen). The order of utilisation of operation modes in the globalisation process seemed to progress from marketing operations and non-direct investment operation modes towards production and direct investment modes. Interestingly, the operation strategy resembled the pattern found in earlier research on internationalisation (See Luostarinen 1979, 107-124). As the companies developed towards a globally more mature stage measured by globalisation degree, it was evident that they started to seek global integration benefits and global synergies. This is in line with earlier globalisation research,

which predicts that global alignment of activities in different markets becomes important at the global stage (See Craig and Douglas 1996; Yip 1989).

Globalisation took place at different times in the case companies. One of the case companies globalised at an earlier phase than the others in the early 90s (NMP), while the other three cases (NET, Tecnomen and Salcomp) evolved towards global status by the end of the 90s and the beginning of this decade. In 1999 the fifth case company, NK Cables, joined a global corporation, Draka Holding, and one of its business units within the company is evolving towards global stage. As this research is interested in how the product strategies change when the companies move from international to global, it was decided to analyse the product strategies and their evolution within the following time periods in each case:

- NMP: 1985 - 2002

- NET: 1990 - 2002

- Tecnomen: 1990 –2002

- Salcomp: 1990 – 2002

- NK Cables: 1993 – 2002

With respect to NK Cables, an understanding of the unit developing towards global status, namely the Mobile Networks unit, was considered especially interesting and therefore it was selected for analysis as an embedded unit besides analysing also the development of NK Cables as a whole.

4.2 Evolution of product strategies

4.2.1 Evolution of the product strategy dimensions and management processes

The product strategy dimensions and product management processes development are described next in the five case companies. The emphasis will be on identifying significant changes in the strategy.

4.2.1.1 Product platforms

Product platforms are an essential part of ICT equipment manufacturers' product strategy. As discussed earlier, product platforms can be defined as "a set of subsystems and interfaces that form a common structure from which a stream of derivative products can be efficiently developed and produced" (Meyer and Lehnerd 1997, 39). The importance of the product platforms and development in each case company is discussed first and then the cross case findings are summarised.

4.2.1.1.1 NMP's Product platforms

When the product marketing had been unified in 1991 NMP started to see how the same components, designs, and user interfaces could be used in different units and mobile telephones designed for different technology standards across the world. This new platform thinking was first used in analog products (e.g. 101, 102 and the first colour covered phones). Modularity was an important aspect of the new way of designing products.[39] The same elements were used in TACS, NMT and AMPS telephones in different parts of the world. The next big change was the development of the digital DCT 1 platform[40], which starting point was the use of the same design elements in products across the world. This platform was able to support GSM, TDMA and PDC standards. The product derived from this platform was the highly successful 2110, which was the smallest product on the market and had a new display and user interface concept. The use of global platforms enabled NMP to allocate R&D resources to important product development areas and then to use these in all standards globally.

The current President of Nokia Corporation Pekka Ala-Pietilä[41], who was the President of NMP from 1992-1998, commented on this change as follows:

---

[39] Modularity means that complex products can be built from smaller subsystems that can be designed independently yet function together as a whole (Baldwin and Clark 1997)
[40] DCT = Digital Core Technology
[41] Pekka Ala-Pietilä's presentation on 18 September 2002, at the Helsinki School of Economics

"There are many changes in product strategy. The biggest change in the 1990s was the concept of building blocks[42] in the devices. So you could build different standards: TDMA, CDMA, GSM and even a PDC phone for Japan from the same building blocks. We had an architecture[43] that enabled us to have economies of scale in R&D. That was a big change in the design part in the 1990s."

Figure 23. The Development of Product Platforms at NMP

DCT 0	DCT1	DCT2	DCT 3
2 products	1 product/standard	1-3 Products/standard	2-3Products/standard
GSM	GSM	GSM	GSM
	DCS 1800	DCS 1800	DCS 1800
	DAMPS	DAMPS	DAMPS (800+1900)
	PDC (800+1500)	PDC (800+1500)	PDC (800+1500)
		CDMA	CDMA (800+1900)
		DCS 1900	DCS 1900
		(EFR)	GSM/DCS 1800
		(HR)	GSM/DECT
			(AMPS MOD)

Time →
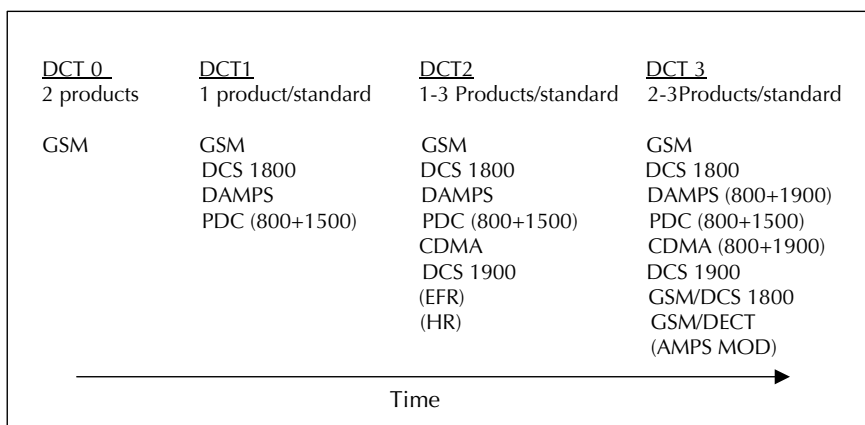
Source: Adapted from Häikiö 2001a, 156.

Thereafter, new global product platforms have been introduced at regular intervals (See Figure 23). The change, which came with DCT 2 and DCT 3, was that the same platform was used in multiple products, which offered the possibility to derive products for different global segments with the same platform. For example, the DCT 3 platform was designed so that Nokia 6110 (classic category) and Nokia 5110 (basic category) products could be derived from the beginning from that platform. More recently, the introduction of a number of new services such as MMS (Multimedia Messaging Service), JAVA, and browsers has meant that the importance of software modularity is increasing. This has also meant that product architecture has become

---

[42] Building blocks can be understood in this context as modules or elements from which individual products are built.
[43] An architecture specifies what modules will be part of the system and what their function will be (Baldwin and Clark 1997)

layered with clear borders. One interviewee at NMP described the latest change as follows:

"The product platforms have developed towards clearer interfaces[44]. A modular structure is today in use, which gives flexibility to respond to the challenges of product lines and product concepts. This type of structure is important to be able to achieve economies of scale and be able to enter the markets fast."

For example one of NMP's telephones introduced in 2002 utilises following layered product architecture. See Figure 24.

Figure 24. Layered Product Architecture

MARKET AND CUSTOMER SPECIFIC LAYER	Minor localisations based on local tastes and operator requirements
PRODUCT SPECIFIC LAYER	
HW MODULES	
APPLICATION LAYER	Highly standardised across markets
ENGINE LAYER (TELECOM SW + HW)	
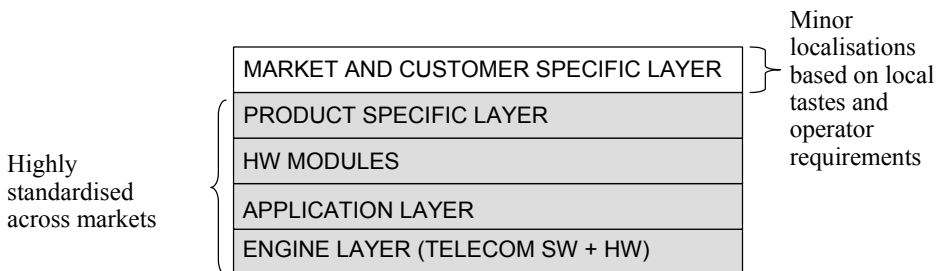
Source: Compiled by the author based on interviews at NMP.

The latest development has also meant that companies in this industry are not only competing in a vertical direction with complete products, but also in a horizontal direction with different elements of the platform. Nokia has responded to this challenge with increasing horizontal co-operation with different parties. It has actively promoted open architectures in which the industry together defines the standards. For example the Open Mobile Alliance (OMA) has been established to create open technology standards for the mobile industry. Another example is the Symbian joint venture initially established by Nokia, Ericsson, Motorola, and Psion to develop a common operating system for wireless devices. Moreover, NMP has

---

[44] Interfaces describe in detail how the modules and elements of the product platform will interact, including how they will fit together, connect, and communicate (Baldwin and Clark 1997)

started to license its series 60 software platform to competitors. Only recently it was announced that NMP had licensed the series 60 software platform to a number of mobile telephone manufacturers including Matsushita, Samsung, Sendoa, and Siemens.

The development of NMP's product platforms can be summarised as follows. The company has developed from a situation in the mid 1980s, in which products did not use common product platforms across different units, regions or countries in a significant extent, towards an architecture in the 1990s in which modularity and product platforms are used globally across different technology standards and product segments. Moreover, a novel finding is that the co-operation with the horizontal value network members seems to have increased along with globalisation during the last two years.

4.2.1.1.2 NET's product platforms

NET's infrastructure products use global product platforms as bases for deriving individual products. A highly successful platform has been the DX 200, which has evolved to become the basis for Nokia's mobile and fixed network switches and base station controllers. The development of the digital DX 200 switch started in the early 70s, when most telephone exchanges were still analogue. Its success is based on its modularity and the use of commercial computer language and Intel microprocessors. A number of different applications and customer- and country-specific variations can be built on top of the DX 200 platform. Also, the platforms allow flexibly for increase in capacity. In addition to the DX 200, also ATM and IP-based platforms have been developed for switches. Nokia announced in 2002 a new platform technology for All-IP systems called Nokia FlexiFamily. In this announcement [45]Ari Virtanen, Vice President of Nokia Networks, commented as follows:

---

[45] Nokia Press release dated 20th of February 2002

"Gradually, a major part of our networks will be built on top of the FlexiFamily platforms."

Global platforms are used in a number of network products. In addition to mobile switches base station controllers and base stations are also built on the basis of platforms. For example, in the base stations it is important to achieve constant cost reductions in new platforms as they are produced in large volumes.

NET has actively co-operated in the vertical direction with both suppliers and customers. Much of the production and also product development of different elements and platforms have been outsourced. Also, horizontal co-operation with value chain members has increased during the last few years. NET has worked towards open standards in network products in areas that have usually been proprietary. For example the Open IP Base Station Architecture Initiative was made by NET in 2002. Sales of platforms to competitors, which was announced in 2002, is an important change on the platform side. This type of horizontal co-operation in open interfaces within the network elements and plans to sell platform elements to other network vendors is a recent new development for NET. NET's initial technology offering towards other vendors consists of FlexiServer, base station, and location-measurement-related modules. See Figure 25 illustrating the change in network platforms and its impact on network infrastructure producers.

The efficiencies related to scale economies are an important reason for this change in product strategy. The networks are becoming more and more complex and it seems that no-one can develop alone all the needed elements for the network because of the huge R&D investments required. Therefore, companies must focus on their core competencies and purchase the rest from their competitors. This enables them to obtain economies of scale in both R&D and manufacturing.

Figure 25. Evolution towards open platform elements
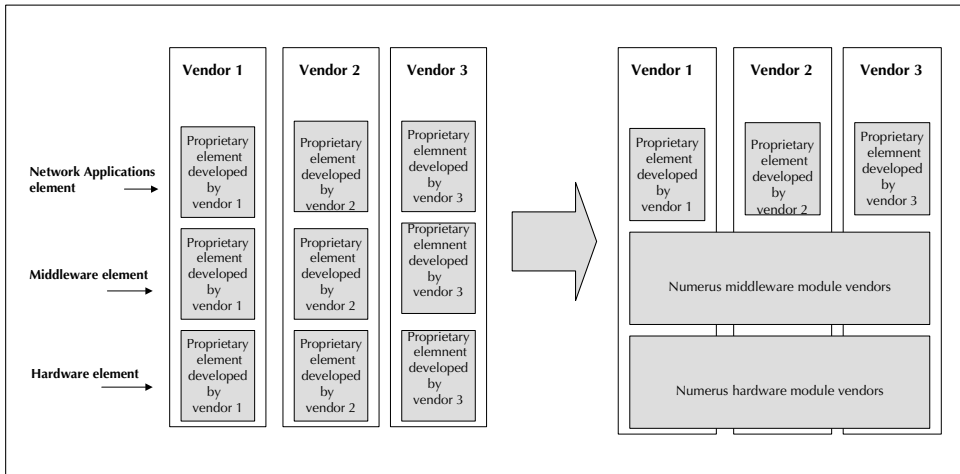
Source: Adapted from Nokia Networks presentation by J.T. Bergqvist in Cannes 2002

4.2.1.1.3 Tecnomen's product platforms

Tecnomen sells systems used by operators in their networks to offer services to end-users. These systems are to a large extent based on their eZoner platform. Messaging solution products are built on the Tecnomen eZoner service platform, which consists of software and hardware designed by Tecnomen and third party equipment. Also, the prepaid and other intelligent networks systems products use partly the eZomer platform. The products use Sun Microsystems servers and Linux operating systems across product lines to a large extent. Also, the operations and maintenance centre (OMC) is common.

Modularity is an important element of the eZomer platform as it can be scaled flexibly, based on capacity requirements. The platform includes interfaces to the telecommunications network, invoicing systems, subscriber registers, to voice and Internet systems. Also, Tecnomen is able to offer entire solutions, consisting of a number of elements including for example a multimedia messaging service centre (MMSC), voice mail and unified messaging, or alternatively one of these entities can be deployed as a standalone solution. Tecnomen designs the products in

accordance with international technical standards. For example, the MMSC complies with the 3GPP standards. Approximately two times a year a new release that improves the performance is brought on to the market.

The basic product platforms have become similar all over the world. However, smaller adaptations may still be necessary, especially for telecommunication standards and language-related issues. For example, a CDMA network brings certain changes in the products compared with GSM. Moreover, the features built on top of the platform may be adapted to operator requirements. In the individual products, the end user interface is always adapted to the customer requirements.

4.2.1.1.4 Salcomp's product platforms

In the late 80s, the products were built on the basis of customer specifications. As the mobile charger products were introduced development of the first product platforms was started. At that time, the platforms were designed for only few customers and their target area was Europe. The nature of the product platforms has evolved to become global in the sense that the same product platforms are currently used for products delivered all around the world. For example, the Eagle platform is shipped to Brasilia, China, the USA, Europe, Korea, and Australia to mention some countries. Also the latest development has been towards building common platforms, which are then marketed to all customers as a basis for deriving customer-specific models.

Salcomp has standard platforms and OEM customer specific platforms. Eagle is an example of a standard platform using switch mode technology. It can be found in 4 different variations according to output power and concept (e.g. 2,5 W, 4W and 6W). Other standard switch mode platforms are Hawk, Samba, and Django. As a result of the acquisition of Aspro Technology AG, a number of linear platforms has been added to the offering. Then there are also OEM platforms that have a customer-specific outer design of the enclosure. For example Nokia, Ericsson and Motorola require their own outer design in the chargers.

In the development of chargers, whether they use standard platforms or OEM platforms, changes have to be made to the electronics based on customer requirements. Standard platforms are used as much as possible in product development. With respect to OEM platforms, both the electronics and the plastic enclosure must be adapted to customer requirements.

The number of product platforms for power supplies increased considerably during the 90s. In the early 90s only one product platform was available. Now 14 switch mode platforms, 9 linear platforms, and 4 other than mobile telephone platforms are in use.

4.2.1.1.5 NK Cables' product platforms

The structure of cables differed considerably depending on the business in question, whether it is copper, fibre or mobile networks cable manufacturing. In fibre cables, the cables are produced on the basis of a large number of fibre technologies, fibre types, and structures. Fibre cables differ considerably depending on customer requirements and are therefore tailored strongly to customer requirements. In contrast, the products of the Mobile Networks business unit (e.g. RF cables) are strictly defined with respect to structure. They will be discussed next.

The RF cable products are based on a de-facto standard established by a US based company called Andrew. They were able to establish a dominant design based partly on the US MIL standards for these cables because they have had a very high share of around 50% of the global markets. Hence, the major cable, connector and network manufacturers have started to use this specification.

The structure of the RF cables is the same in all products. The only difference is the dimension of the cable. See Figure 26. However, product platforms are not used in the sense that certain parts of the products have their own plans and are developed separately.

Figure 26. Structure of the RF cable

Source: Draka NK Cables
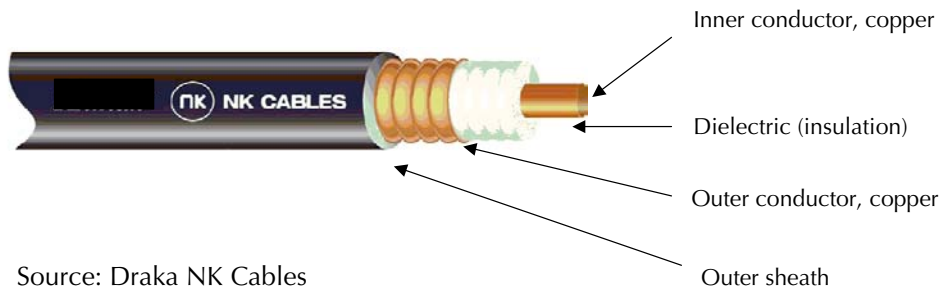
RF products are constantly developed to achieve lower cost and lower attenuation. High technical skills are required to get the insulation exactly correct between the two copper cables and to achieve the required attenuation levels. In the earlier phase, the technical features, including the attenuation, were very important, but now as the product has become more and more a commodity, the price and logistic availability have become important differentiators between competitors. The product structure of RF Cables is the same across all countries and also customers worldwide. Also, the same machines are used to produce different RF cables.

4.2.1.1.6 Cross case analysis of the evolution of products platforms

In four of the cases, namely NMP, NET, Tecnomen, and Salcomp, the use of product platforms and modularity was seen as an essential part of the global product strategy. Increasingly modularity was utilised when designing products. In one of the case companies, NK Cables, the structure of the product was very similar for the RF products although a separate product platform strategy as such was not emphasised. In all of the case companies, use of product platforms across customers and countries had increased with the globalisation.

An important finding relates to the increasing horizontal co-operation seen on the different platform elements. For NET, NMP, and Tecnomen increasing co-operation

in the horizontal direction with different value network members had been seen, especially with the competitors. This could take a number of forms including the following:

- Working together with competitors to establish common technology standards. For example, NMP, NET and Tecnomen were active in Open Mobile Alliance.

- Selling platform elements to competitors. E.g. NMP and NET were marketing platform elements also to competitors.

- Selling products as part of the product portfolio of a competitor while selling them also directly to the same customer groups. E.g. Tecnomen.

Increasing horizontal co-operation in the value network was not apparent in Salcomp or NK Cables. This may be due to the companies' position in the value chain as component suppliers and the nature of the products in question. An interviewee at Salcomp commented on the reasons why platform elements have not been marketed to competitors as follows:

"The reason lies in the product nature and structure. It is rather simple and supplying these types of platforms does not help the other parties at all."

Another reason might be the stage of globalisation of the company in question. An increase in horizontal co-operation seems to concern companies that have reached the global stage and are searching for opportunities to expand their business further. Some of the interviewees mentioned explicitly that horizontalisation could be seen as an advanced stage in globalisation process of companies.

Earlier research has proposed that co-operation and interaction in the companies' external network increases along with internationalisation. See the holistic internationalisation model of Luostarinen (1994) and the Uppsala Network model (Johanson and Mattsson 1988). The finding that co-operation also increases along with globalisation is an interesting result. Moreover, an important distinction is made in this work as the value network is divided into vertical (e.g. customers and suppliers) and horizontal (competitors) (see also Möller, Rajala and Svahn 2002). It

is argued that horizontal co-operation increases, especially during globalisation. Also some evidence was obtained that the increase in horizontal co-operation was connected with specific development in competition in ICT industry and in particular the stage of the technology life cycle.

It can be summarized that as the case companies moved from international stage towards global the importance of global product platforms and modularity increased. Also, there is evidence that horizontal co-operation increases in technologies and different platform elements.

4.2.1.2 Product lines and individual products

The development of product lines and individual products when the company globalises is examined next. First the actual development will be discussed case by case and then the findings will be analysed across the cases.

When analysing the product lines, special interest is on the development of the product assortment width (number of product lines / product categories) and the product line length (number of products in each line). It is important to note that two types of product line structures can often be found: A) product lines in the sense of a product offering to customers, and B) the internal product line structure/organisation. The main focus will be on the former in this analysis, but as background important developments in internal organisation are also covered when these provide a deeper understanding of the phenomena. In the discussion on individual products the main emphasis will be on the development of the nature of products.

4.2.1.2.1 NMP's product lines and individual products

Product lines

As described earlier, in the mid 80s the activities were organized in NMP into five independent units: NMT unit, USA unit, Euro unit, Oulu unit and PMR unit. The

first three units mentioned focused on mobile phones and the other two on telecommunications equipment and private mobile radio systems. The focusing on the growing mobile phone market meant that the other than mobile phone related units were transferred internally to NET in 1988. In the beginning of the 90s, the product development of mobile phones was also brought together under common management and product management processes.

Further, in the mid 90s, NMP established a product line organisation responsible for having a competitive mix in all major standards. The product lines were divided according to the cellular standards, e.g. GSM, TDMA, CDMA, etc. The reason for this was that responsibility for the continuous introduction of new products and profitability was unclear and situated in different places in the organisation (See Laaksonen et al. 1998, 64). In 1999, the company was divided into DCU (Digital Convergence Unit) and CMT (Cellular mobile telephones). CMT focused on conventional models and DCU focused on multimedia products.

A big change was implemented in 2002 when NMP changed from standard-based product lines to business units based on segments. In this new structure NMP has the following units: Mobile Phones, Mobile Entry Products, Imaging, Entertainment and Media, Business Applications, Mobile Enhancements, Mobile Services, Time Division Multiple Access (TDMA) and Code-Division Multiple Access (CDMA). This change was driven by the fact that the market was segmented on the basis of applications. An in-depth understanding of these segments is important to be able to create the right kind of products, supporting services, and business models. Increasingly unified cellular standards, multi standards engines and increasing modularity facilitate this change. Pekka Ala-Pietilä, President of Nokia Corporation, commented on this change as follows: [46]

"Now as we speak today the biggest change is that we really focus on the domains (entertainment, imaging...). It is not only about segmentation. It is much more sophisticated. It goes to the imaging as an ecosystem, entertainment as an

---

[46] Pekka Ala-Pietilä's presentation 18 September, 2002 at the Helsinki School of Economics.

ecosystem… and then you dive into a segmentation within the ecosystem or value domain, and that is a big change."

It may be concluded that in the mid 80s the product assortment included mobile telephones for various analogue standards, pagers, network equipment and private mobile radio systems. In the late 80s / early 90s the company focused on mobile telephones and the product assortment was then gradually widened to include a large number of product lines and product categories / products in each line. Figure 27 illustrates the development of the products lines.

Figure 27. Development of main product lines of NMP

Mid 80s:	Early 90s	Late 90s	Year 2002:
- NMT mobile phones (Scandinavia) - TACS, R2000, Netz-C mobile phones (Europe) - AMPS mobile phones (USA) - Pagers - Network equipment (base stations) - Private mobile radio systems	Mobile phones based on analog and digital standards (business users)	- Cellular mobile terminals - GSM, TDMA, CDMA product lines etc. - Basic, classic, fashion, premium categories - Digital convergence phones - Communicator and data products	- Mobile phones (conventional) - Mobile entry phones - Imaging phones - Entertainment and media phones - TDMA phones - CDMA phones - Mobile enhancements (accessories) - Mobile services - Business applications

Time

Source: Compiled by the author based on research data. The figure presents the main product lines offered to the market. These were structured internally as product lines or towards the end of 90s often as business units.

An important change has been the broadening of the product lines from a narrow focus on only business users at the end of the 80s to a segmented product range targeted to a number of different end-user segments during the 90s. NMP was among the first of the mobile telephone manufacturers to introduce the concept of a clearly segmented product lines. The idea has been that each product is launched to a certain segment, and it is not allowed to slide down in the range to a low end product over time. Instead, products are replaced with new ones when they are no longer competitive. For example the Nokia 5110 and 6110 models were designed from the beginning to be very close in terms of product development (DCT 3

platform) and production. However, from the end user point of view the 5110 was for the consumers (Basic category) and the 6110 for business users (Classic category). One of the interviewees commented on this change as follows:

"As a result of the clear segmentation 5110 and 6110 were huge successes as they suited their target groups needs so well. Segmented product categories started to emerge…although less models than Motorola the end users experienced that Nokia had a broader range."

Nokia has also put a lot of effort into the outer design of the mobile telephones. When the 8810 (the first premium category mobile telephone) was developed, it was understood that small size alone was not a sufficient competitive factor. Hence, other values were also considered important in this category, including beautiful design, shining metallic cover, and high price.

Until the end of the 90s, the product categories developed mainly around voice centric devices driven by style-related considerations. The products were segmented into a number of style-related categories (e.g. basic, expression, active, classic, fashion and premium). During the last 2 to 3 years, functional categories have also started to emerge enabled by new technologies and evolution towards 3G (e.g. in addition to voice also entertainment, imaging, media, and business applications). NMP currently illustrates its product assortment as a matrix with six style characteristics and five functional categories (see Figure 28). Each model needs to be differentiated from every other with respect to features, functionality, and design to meet different consumer values, needs, preferences, and life styles. (Nokia Annual Report 2002)

Figure 28. NMP's product category matrix

Application / Style	Voice	Entertainment	Imaging	Media	Business Appl.
Premium	⬭				⬭
Fashion	⬭				
Classic	⬭	⬭	⬭		⬭
Active	⬭				
Expression	⬭	⬭	⬭		
Basic	⬭				

Source: Nokia Annual Report 2002. The ovals indicate that NMP had launched a product publicly to the segment in question by the end of 2002.

It is also important to note that the number of products and launches increased considerably during the 90s and the beginning of the 21st century. This has been possible because of the modular product architecture and use of global product platforms. It has also been possible to bring out new products so that the differences between the products decline. By increasing the common parts in the products it has been possible to bring out products for a larger number of segments and to different areas in the world. The segments targeted in the beginning of the 90s were mainly business users. During the 90s, a number of consumer segments have emerged and NMP has successfully broadened the scope in the product range to target these consumer segments with different needs and requirements. See Appendix 7 illustrating the new product introductions of NMP for selected years.

Nature of the products

NMP sells a large range of different mobile telephones, so the products are mainly physical goods by nature. However, since the end of the 1990s, the company has also developed services and delivered them through Club Nokia, which is their end user community channel. Recently digital services are also offered through Nokia WWW- pages to consumers.   Also, a separate business unit responsible for developing services and running Club Nokia has been established. This can be seen as an enlargement of the service dimension.

Club Nokia offers a range of digital services, call centre support, service back-up, and information on Nokia products. Nokia has focused on terminal enhancing digital services such as ringing tones and wallpapers for mobile telephones. The services can be accessed through WAP (Wireless Application Protocol) enabled telephones, WWW pages and SMS. Personalisation is one of the key features. Nokia Mobile Phones have announced publicly that they are targeting service sales of 1 billion euros by 2004 via Club Nokia (Alahuhta 2001).

Nokia has also started to sell licenses for their Series 60 software platform for smart mobile telephones to their competitors. This is part of an effort to keep the market open and to prevent one single company from obtaining a controlling position in the value network. This also marks a trend towards increasing co-operation with horizontal partners such as competitors. It will also open up a totally new product category for Nokia, selling licenses, which can be classified as know-how sales.

It can therefore be concluded that Nokia Mobile Phones has started to widen their range of product categories by including services and also know-how categories to their offering. This development seems to follow a similar pattern found in earlier internationalisation research (see Luostarinen 1979, 94-105).

4.2.1.2.2 NET's Product lines and individual products

<u>Product lines</u>

The biggest change in the product lines concerns the number of product lines and categories. In the early 90s, a limited number of infrastructure elements was needed to build a network. The core elements were the switch, base station and the transmission-related equipment in for example mobile networks. Moreover, the main application was voice in both fixed and mobile networks. In 2002, the networks also needed to support new applications such as multimedia, in addition to voice. As a consequence, a large number of additional elements is needed to build a complete network. For example packet data networks, application servers, multimedia platforms, libraries, and content machines are needed. See Figure 29 for the development of NET's product offering.

Figure 29. Expansion of NET's product offering
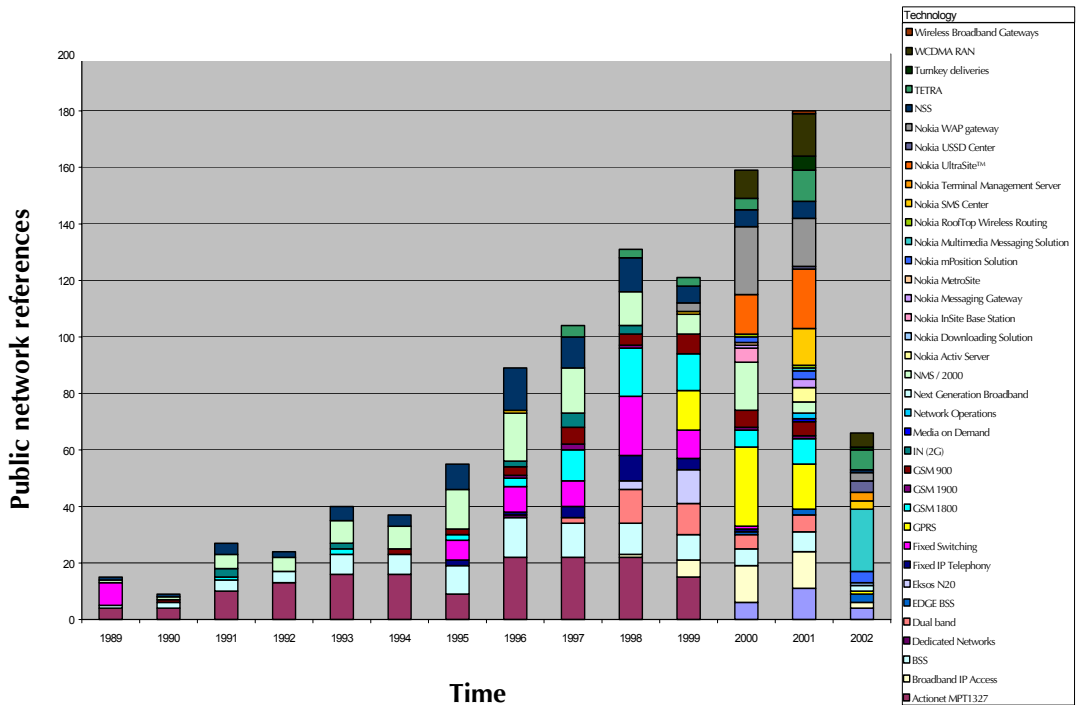
Source: Complied by the author based on information from Nokia's references for network sales. The number of public network references per product category / technology is given per year.

The comments by the interviewees on the development, were as follows:

"The biggest change in the product lines relates to expansion of the required elements in providing the service…this implies a much more complex product line structure than what NET had 5 years ago. The breakdown of where the business comes from has developed from three sources in the mid 90s to currently at least 10 to 12 major sources."

"You need to have a deep enough product portfolio. Scalable products that can deal with enough of customers globally and wide enough, so that you can do enough different things that customers are asking for. This enables you to acquire market share globally."

NET's product range has developed to include a number of different product categories. See Figure 30, which illustrates NET's current product assortment.

Figure 30. NET's Product Categories 2003

Core Network -Backbone -Fixed Switching -GPRS Mobile Packet Core -Mobile Gateways -Mobile Registers -Mobile Switching -TETRA Core Networks	**Broadband Access** -Access Nodes -Intelligent Edge -Nokia NetActs Briadband	**Services for operators** -Plan -Deploy -Maintain -Train -Integrate -Optimize -Operate
Radio Network -Base Station Sites -Radio Controllers	**Narrowband Access** -Dynanet and PDH -Eksos -Mechanics & Power -NBA Modems	**Terminals** -TETRA
Operations Support Systems -Nokia NetAct	**Security** -Firewalls -Internet Traffic Management -Intrusion Protection -IP Security Platforms -Platform management -Security Content Management -Virtual Private Networks	**Wireless Transmission** -Microwave Radios
Service Enablers -Charging -Content Downloading -Dispatching and Connectivity -Intelligent Network Platforms -Location Services -Messaging and Presence -Mobile Browsing -Mobile Commerce -Service and Subscriber Management	**Operator Wireless LAN** -Network Management -Wireless LAN Access Zones -Wireless LAN Core Network	

Source: Nokia, NET's Product Catalog in 2003

Another important change is the gradual shift from fixed towards mobile networks. Units and product lines have been reorganised due to this development and also a large part of the activities usually carried out by NET have been outsourced, especially in the fixed area. In NET, the product lines have a global responsibility. This was also the case earlier, but due to the geographical focus on Europe the product lines operated mainly in Europe.

<u>Nature of the products</u>

The nature of the product has evolved so that in the 70s NET produced digital transmission equipment, but not switches. In the mid 70s, NET saw that there would be more market requirements for total system solutions, including in addition to transmission equipment also switches and made therefore in 1976 the decision to develop such a switch. It succeeded in this development work and the first DX 200 switch was installed in Korppoo, Finland in 1980 (Häikiö 2001b, 162). In 1985 it decided to use the DX 200 as the base in the NMT switches and later also in the GSM switches. The DX 200 gradually became a platform for a number of network products. One may conclude that from the 70s to the 80s NET was able to expand its scope from an equipment (goods) supplier to a systems supplier delivering entire fixed and mobile network equipments, inclusive of installation services.

In 2002, NET's products were by nature systems that include physical products, installation, start-up, and integration services and also technical and marketing know-how. In base station systems the physical aspects are emphasised as the number of hardware units needed for a delivery is large. Hence, logistics and manufacturing are important. The services are often related to installation and start-up. In mobile switches there are fewer hardware units and the services related to integration and installations are important. A general trend in the nature of products is that the role of software has increased.

NET increasingly outsources delivery- and maintenance-related services to its partners and is focusing on services concerning planning, optimisation, and operating of networks. Within NET's organisation, the professional service unit focuses on this high value-added service area. Altogether, NET focuses on areas where the value added is greatest and the rest is outsourced to partners (E.g. Tietoenator and Vipro are some examples).

The technical support in network sales has always been an essential element. However, in addition to the delivery and maintenance services a number of new types of service and know-how products are offered:

- Network optimisation services and operator planning process development
- Outsourcing of some or all of the technical activities in network operations, including e.g. network monitoring, performance management, and system administration.
- Consultation for operators e.g. consultation in strategic marketing and application creation

The comments by interviewees on the development were as follows:

"Increasingly Nokia outsources delivery- and maintenance-related services and focuses itself on network optimisation, project management, and network operation services, which are more of a consulting type. NET has moved towards supporting operators holistically."

"Due to the fact that Nokia is more global than some of its local operator customers it learns how complex value chains works in new services like MMS. This has enabled us to offer consulting type of services to operators on how to get moving fast".

Also the number of turnkey projects has increased. Hence NET provides the total system as a turn key delivery, including - in addition to network equipment - for example network planning, site acquisition, project management, installation, pre-launch optimisation, and network integration and also consulting type of services. Some recent references of turnkey deliveries agreed lately are listed below[47]:

- CHT Taiwan, Taiwan (2002)
- MobilCom, Germany (2001)
- Tekomsel, Indonesia (2001)
- Wind, Italy (2001)
- TIM, Peru (2001)
- Telia Mobile (2001)

Also it is important to note that the importance of integration services has increased lately. This is because more and more complex systems, which are standardised

---

[47] Source: Nokia. The list was compiled from Nokia Network customer references.

across the world, have to be adapted to the existing local systems of operators, such as for example customer, service, and invoicing related IT systems.

It can be concluded that NET has expanded from physical goods to systems in an early phase. However, it has further developed the offering to include services and know-how sales as globalisation progresses. One reason for the extended offering seems to be the number of new operators with less technical competence, especially in Asia and South America.

4.2.1.2.3 Tecnomen's product lines and individual products

<u>Product lines</u>

In the end of 1980s, Tecnomen had three main product lines, namely telecommunications, industrial automation, and data collection systems. It decided to focus its operations on the rapidly growing telecommunications field, namely the paging and voice mail systems in the early 90s. As a result it was able to penetrate the global markets with these two product lines and gradually expand to unified messaging (1998), prepaid systems (1998), and multimedia messaging (2001). As a result, in 2002 the company had five main products lines, which were voice mail/unified messaging, multimedia messaging, prepaid systems, intelligent peripheral products, and wide area paging systems. During 2001, R&D was organised into three business units: messaging solutions, intelligent network systems, and paging systems. See Figure 31 for an illustration of the development of the product lines.

Figure 31. Development of product lines of Tecnomen

1988:	Mid 90s:	Year 2002:
▪ Telecommunications equipment (Paging systems, messuring and data transmission systems) ▪ Industrial automation (custom designed control systems for automation projects, e.g. furnaces) ▪ Data collection systems (applications for inventory, material flows, payroll and production)	▪ Paging ▪ Voice mail	Messaging solutions BU: ▪ Voice mail/unified messaging ▪ Multimedia messaging Intelligent Network Systems BU: ▪ Prepaid systems ▪ Intelligent peripheral products Paging Systems BU: ▪ Wide area paging systems

Time

Source: Compiled by the author based on information in Tecnomen's Annual Report 2002 and Kyro's Annual Reports 1988 - 2001.

Each product line has its own strategy concerning global coverage. Voice mail / unified messaging operates globally. Paging systems operate in Europe and the Middle East. Prepaid business has from the beginning been targeted outside Europe towards South America and lately to Africa as well. The Tecnomen's product line strategy is to seek synergies among customers and technologies.

The CEO and President of Tecnomen Vesa Helkkula commented on this as follows:

"In the international phase the company can provide customer tailored systems…. and products planned for smaller geographic areas. However, the more global the company is the sharper the product focus must be. Tecnomen's core strategy is about operating in global businesses, which offer synergies in technologies and markets to each other."

Nature of the products

Tecnomen supplies its customers with total system packages that include equipment (goods), software licenses (Know-how), installation and training services, and maintenance and support. The products are therefore a combination of physical goods, services, and know-how sales and can therefore be classified as systems. In the international stage at the beginning of the 90s, the deliveries included the same type of categories, but their scope has now enlarged from single solutions like voice mail to larger entities like messaging solutions including a number of functionalities such as voice mail, MMSC, and content download. Hence one can say that the product nature has evolved towards more demanding and bigger deliveries. See Figure 32 for Tecnomen's main product introductions.

Figure 32. Tecnomen's main product introductions

Main product introductions:	Introduced year:
- Control systems for automation	early 80s
- Paging	1984
- Voice mail	1991
- Unified messaging	1998
- Prepaid	1998
- Tecnomen MMSC	2001
- Download Portal & Centre	2002
- Voice Portal	2002

Source: Compiled by the author based on information received from Tecnomen.

4.2.1.2.4 Salcomp's product lines and individual products

Product lines

Salcomp has developed from a large number of unrelated product lines in the beginning of the 90s to a company focused on the manufacturing of mobile telephone chargers by 1996. The company has further expanded within the power supplies area by introducing linear power supplies in addition to switch mode

supplies, thereby moving into related diversification (See also Luostarinen 2001a). The linear power adapters line was acquired from Aspro Technology AG in early 2002, a Swiss-owned company with R&D and production in Shenzhen, China. This acquisition allowed Salcomp not only to expand their product range by including linear power supplies, but also to broaden their technology base by having their own component production. The switch mode technology is applicable mainly to high-end telephones due to charging efficiency, small size, and light weight, although it is still more expensive than linear technology. Thus, it is important to note that the companies may widen the product assortment with acquisitions of complete product lines or products externally in addition to developing products internally.

In 1999, Salcomp decided to expand its business into new application areas for chargers, mainly to different types of personal handheld devices. It has developed chargers for devices outside the area of mobile telephone applications, such as GPS receivers and MP3 players. Salcomp's development of product lines[48] can be seen in Figure 33.

Figure 33. Evolution of Salcomp's product lines

Year 1990:
- Mobile phone chargers
- Power supplies for industrial solutions
- Power supplies for office equipment (e.g. printers, monitors)
- Subcontracting to electronic industry

Year 1996:
- Mobile phone chargers (switch mode)

Year 2002:
- Mobile phone chargers (switch mode)
- Mobile phone chargers (linear)
- Personal handheld device chargers (PDAs, GPS receivers, shavers and MP3 players)

Time
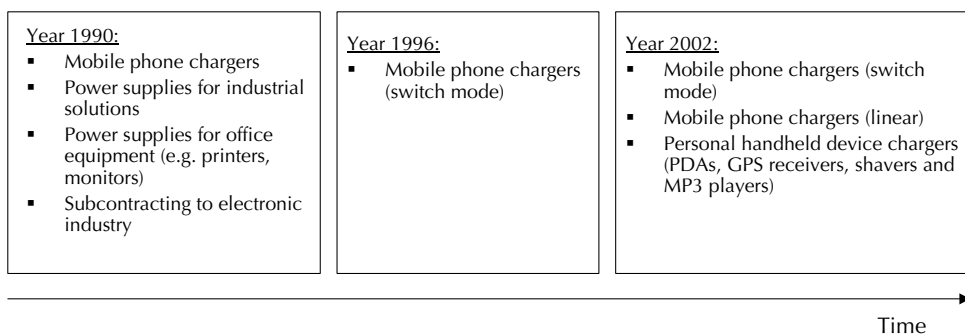
Source: Compiled by the author based on information received from Salcomp.

---

[48] Salcomp has not internally divided itself into the product lines presented. This represents the main product offering to the market.

Salcomp accelerated the introduction of new products at the end of the 90s to its mobile telephone charger product line. For example, in 2002 a number of linear adapters were included to the product range. See Figure 34.

Figure 34. Introductions of mobile telephone charger products

```
1988: Standard and Cigarette lighter charger for Mobira
1991: New charger for Nokia (ACH)
1994: AQC product family
1996: AQC10, AQC12, AQC15, Falcon
1998: Repo, Swan, Jones and Samba
1999: Ahma, Focus, Fox, Hawk and Mike
2001: Bee, Birdy, Samba, Hawk, Django
2002: Eagle, Hawk, Samba, Django (switch mode products), &
       Linear adapters in Conventional Housing, Plug-In Monoblock (Linear products)
```

Source: Compiled by the author based on internal material received from Salcomp

Nature of the products

Salcomp's products are physical goods by nature. The company does not offer services, know-how, or systems for sale. This has been so since the very beginning. The price is also such that the products are not repaired if broken and no maintenance service is offered. There has been no expansion to more advanced product categories as the focus has been on managing fast growth in the mobile charger business. However, the company has constantly developed the chargers further by introducing frequently new charger models for mobile telephones and also lately chargers for other wireless devices.

4.2.1.2.5 NK Cables' product lines and individual products

Product lines

NK Cables had a number of product lines by the end of the 80s covering such areas as cable products, optical fibres, installation accessories, aluminium profiles, and power capacity products. During globalisation, the company focused on telecommunication cables and increasingly on mobile network cables. In 2002 NK

Cables operated four separate businesses including fixed networks, OPQW, installation and industry and mobile networks, each of which has a number of product lines. The Fixed Networks business includes copper cables, optical fibre cables and network engineering services. The OPQW business has optical ground wires (OPQW) and sea cables (SMC). The Installation and Industry business has building wires, automation and data, and copper conductors. The Mobile Networks business has two main product lines, the RF cables and jumpers. Although RF cables account for most sales jumpers are sold increasingly. RF cables include two main product categories, which are antenna feeders for base stations and radiating cables for use inside tunnels and buildings where free-space propagation of electromagnetic waves is impossible.

Due to a relatively large diversity of product lines, it was decided to investigate the mobile networks business unit as an embedded unit to understand the development of product lines. This unit had received global responsibility for producing and marketing their products and it was the most global measured by globalisation degree in 2001. Hence, the choice of this unit for further analysis is justified. The Mobile Networks business unit's product range has developed so that in the beginning of the 1990s the products consisted mainly of antenna feeder cables. However, customers also started to require jumpers and other accessories in the mid -90s. Accordingly, NK Cables have expanded the product range towards entire antenna line systems consisting of feeder cables, jumper cables, super flexible cables, connectors, tools, grounding kits, EMP protectors, and other accessories. In addition to the antenna line products, coaxial antennas for tunnels and indoor solutions (radiating cables) are also supplied by NK Cables. The products produced by NK Cables in-house are the feeders, jumpers and antennas for tunnels/indoor solutions. The rest are sourced from partners. The function of the feeder cable is to transmit signal power between the transmission equipment and the antenna in a telecommunication network's base stations. Jumpers are typically used to connect the feeder cable to the transmission equipment or the antenna. See Figure 35.

Figure 35. The evolution of NK Cables Mobile Networks product lines

Year 1993:	Year 1999:
• Antenna feeder cables	▪ Antenna feeder cables ▪ Jumper cables ▪ Radiating cables ▪ Super flexible cables ▪ Connectors ▪ Other accessories ▪ Installation training services

Time

Source: Compiled by the author based on information received from NK Cables.

It can be summarised that along with globalisation, NK Cables have focused on telecommunication cables. Moreover, the responsibility of product line has changed so that certain business units/product lines focus on nearby markets in the MNC structure as others have been given a global mandate. The Mobile Networks Business units and product lines have been given global responsibility for development, production, and marketing/sales within the whole Draka Corporation for their product range. Further, within the areas with a global mandate, it is apparent that the number of product lines has increased to respond to the demands of global customers requiring complete antenna lines.

NK Cables' product nature

Although the nature of the products is still largely physical goods within NK Cables development towards more advanced product categories is also evident. The company expanded within the domestic market to network engineering services at the end of the 90s, although this area was divested from the company in the beginning of 2003.

When analysing the embedded unit (mobile networks) it can be seen that development has happened from antenna feeder cables towards total antenna line systems including antenna line feeders, jumpers, connectors, and other accessories. Also radiating cables and super flexible cables are offered. The antenna line system offers a total system for connecting the transmission equipment with the antenna. Although the system consists of a relatively high proportion of physical goods, logistical services and technical know-how are also required. NK Cables has also considered expanding to base station antennas, but after investigation they had found that this new area would not have synergies with the existing product range and this type of enlargement was not requested by their current customers. A more recent development has been an opening into the service area by offering installation training to manufacturers such as Nokia. The revenues from this area, however, are still relatively small. Another increasing service is offering enhanced logistic services to current customers. Cables are increasingly delivered from a warehouse close to the customers and as a new service the cables are cut to the right length prior to delivery to customers. These operations are handled in logistic centres established in conjunction with the foreign sales offices from 1997 to 2000. Such logistic centres can be found in Finland, Germany, the USA, Singapore, Mexico, and China.

It can be summarised that NK cables have expanded to global markets mainly by using physical goods, but then started to expand to more challenging antenna line systems (mid -90s) and gradually also to installation training services (end of the 90s). It is worthwhile noting that NK Cables Mobile Network's globalisation degree is around 40% at the moment and it is therefore not as global as the other cases studied in this research.

4.2.1.2.6 Cross case analysis of the evolution of product lines and individual products

For globalising internationals it is important to decide upon the number of product lines and products in each line, the geographical responsibility of product lines, and

also the nature of individual products. Moreover, it also became evident in the empirical analysis that it is important to analyse the relatedness of the product lines. The developments of these are discussed next across the cases.

The understanding of what comprises a product line is of importance as this varies between companies and interviewed. In this research, the number of product lines and products in each line offered to customers were reviewed as the main focus. To understand the evolution of the product lines, it is important not only to understand developments within the strategic business unit but also to gain a holistic view of the company at corporate level. Analysis of the case companies at the corporate level revealed that these were all part of larger companies in the international phase. They had often diversified into a number of often unrelated fields and internationalised activities mainly in Europe. As the companies grew, one or a few strategic businesses were selected for the global expansion and the others were divested from the business portfolio. Also, the divested strategic business units often became successful global business under new ownership. Nokia operated in a large number of different unrelated businesses including consumer electronics, information systems, mobile telephones, telecommunications, cables, machinery, electrical wholesale, rubber, chemicals, paper, power, and floorings. It decided to focus on mobile telephones (NMP) and network equipments (NET). The Kyro group, of which Tecnomen was earlier part, was active in paper & board, sawmill, energy production, safety glass machines, tempered glass, and telecommunication systems (Tecnomen) fields in the early 90s. In the mid 90s, it decided to focus its activities and divested the forest-related businesses from its portfolio. Further in 2001, the telecommunications business (Tecnomen) was separated from the Kyro Group to become an independent company and listed on the Helsinki Stock Exchange. NK Cables was originally part of Nokia's business portfolio, but was sold to NKF Holding in the mid 90s. NKF was focusing on cables and this provided good bases for NK cables to expand globally. Later in the end of 90s Draka Holding acquired NKF (including NK Cables) and NK Cables became thus part of a network of 60 companies. Also, Salcomp was originally part of Nokia, but then acquired by a private equity company, EQT Scandinavia, with the aim of listing it later as a separate company.

During the international stage, the companies had thus expanded into a number of unrelated strategic businesses, each having a number of diversified product lines. The total number of different product lines was often very large in the international stage in these companies. As the companies started to globalise, they selected one or a few strategic business units for global expansion; these were to have the most potential for global markets. Moreover, these strategic business units often selected a limited number of product lines at the beginning of globalisation. This can be seen as an entry stage towards global. During globalisation, the strategic business units gradually increased the number of their product lines and broadened their scope. This meant that when reaching the global stage the companies had often considerably increased the number of product lines and broadened their scope from a few product segments to a large number of segments. The product lines in the global stage were, however, often focused (highly related) within the strategic business unit. These findings are in line with earlier research related to the growth strategy of Finnish firms by Luostarinen (2001a, 2003) discussed earlier in the theoretical part. According to Luostarinen, companies develop in four stages: (1) unrelated diversification and domestic business, (2) unrelated diversification and internationalisation, (3) full focus and globalisation, and (4) related diversification and globalisation. Also, the findings by Douglas and Craig (1996) that companies diversify in the international stage and then focus and integrate their activities as they move towards the global alignment phase is in line with the pattern found.

Analysis at the corporate level shows that all the case companies had evolved through the first three phases depicted in the growth strategy of Finnish firms by Luostarinen (2001a). It was also apparent that the companies often sought further growth by related diversification. For example Nokia (parent company of NMP and NET, and parent of NK cables until 1996 and Salcomp until 1999) had established a separate joint venture organisation to seek growth in related areas. Recently Nokia also announced that it would establish a strategic business unit called Nokia Enterprise Solutions Group, which would focus on corporate solutions. This can be seen as further diversification into related fields. Also Draka Holding (current parent company of NK Cables) had expanded by diversificating into related fields within cables area.

At the strategic business unit level, similar developments could also be seen with regard to relatedness.[49] Companies had developed diversified product lines at the international stage. They then focused on a few product lines and products in each line when entering global markets. During globalisation, the number of product lines was increased and often the number of products in each line was also increased when reaching the global stage. However, the widening of the product assortment was planned so that global synergies were sought and the product lines were often highly related with regard to product platforms, technology development, production facilities, and customers. The terminal manufacturer NMP had a number of separate product lines targeted at different standards in the mid 80s. In addition to terminal-related product lines, it also had a unit focusing on network equipment and another unit focusing on private mobile radio systems. At the end of the 80s NMP, focused entirely on terminal manufacturing and the two unrelated units were transferred to NET. In the early 90s, the terminal-related product lines were brought together under centralised functional management. As the company globalised further, the number of product lines/units was increased and the scope broadened, first from business users to consumers and then in the late 90s from voice centric telephony to new areas like games, music and imaging. Each of these new fields benefited from common product platforms, technology development, and production. The targeted end user segments differed in these product lines, but the direct customers of NMP, the operators and distribution channel, could be leveraged in all these fields to a great extent.

Salcomp had a large number of product lines at the end of the 80s, ranging from power supplies for industrial solutions to office solutions as well as mobile telephone chargers and various subcontracting activities. It focused on switch mode mobile telephone chargers and entered the global markets with these. Later in the globalisation process it started to expand, first to linear chargers, and later also to

---

[49] When analysing the relatedness of product lines the term diversified is used as synonym to unrelated and the term focused is used as synonym to related. The analogy of product line consistency presented by Kotler (1984, 472) is used. According to Kotler, the consistency of the product assortment refers to how closely related the various product lines are in end use, production requirement, distribution channels, or in some other way.

personal handheld device chargers. Common product platforms, technology development, and production facilities were used across product platforms. Often even the same customers were targeted (e.g. in switch mode chargers and linear chargers product lines).
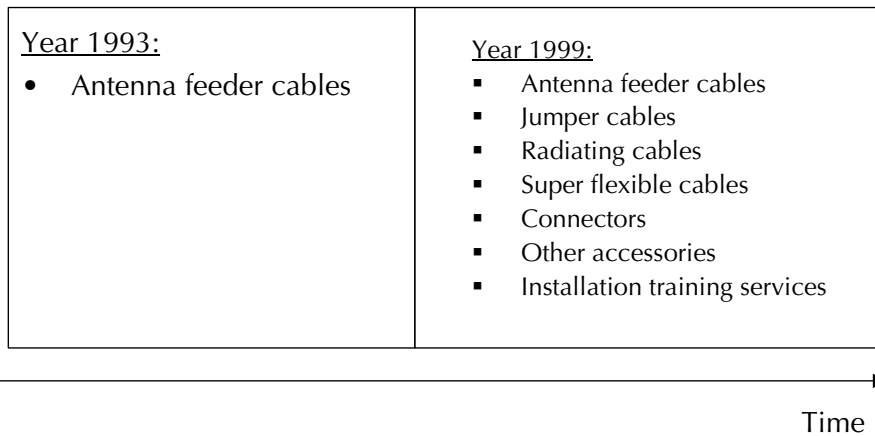
Moreover, NK Cables had a number of product lines by the end of 80s covering areas such as cable products, optical fibres, installation accessories, aluminium profiles and power capacity products. During globalisation, the company focused on telecommunications cables and increasingly on mobile network cables. In 1993, the company established a business unit focusing entirely on mobile networks cables. This has increased the number of product lines considerably, offering jumper cables, radiating cables, super flexible cables, connectors and other accessories in addition to antenna feeder cables. The company used RF cables as the base in a number of products. These were included, for example, as the main component in the antenna line system packages. Perhaps, even more importantly it targeted the whole offering of Mobile Networks Unit to the same customers. NET's global entry was made by focusing on the GSM standard in the early 90s and providing core elements to these systems such as switches, base stations, and transmission equipment. As it globalised it gradually expanded from conventional network- infrastructure-related product lines to providing packet data networks, application servers, multimedia platforms, libraries, content machines and service enabling equipments to mention some areas. In all these areas it benefited from common product platforms, production facilities, and the same operator customers. Also, Tecnomen expanded the number of product lines from three to five when globalisation intensified. Common product platform elements and operator customers were leveraged across product lines at this stage.

It can be concluded from the above discussion that all five cases supported the following development:

- In the international phase, the companies had developed a large number of unrelated strategic businesses, each having a relatively large number of product lines and products in each line. The product lines in a strategic

business unit were often diversified (broad diversified product range in a SBU).

- In the global entry phase, one or a few strategic business units were selected for global markets, each having a small number of product lines and numbers of products in the line. The product lines in a strategic business unit were often highly focused (narrow focused product range in a SBU).

- In the global stage, the companies had penetrated the global markets with an increasing number of related strategic businesses and a large number of product lines and products with global synergies in each business. The product lines were thus highly focused at this stage in a strategic business unit. (broad focused product range in a SBU).

Based on this discussion, the development is illustrated in Figure 36. As discussed earlier, the results support previous research by Craig and Douglas (1996), who contend that companies focus and integrate their activities as they move towards the global market alignment phase. Development at the strategic business unit level is also very similar to that outlined on corporate level for the growth strategy of Finnish firms, as described by Luostarinen (2001a). An interesting finding is that although the companies had expanded the product range during the internationalisation process, they started the globalisation process by selecting a narrow product range and then broadened the product range again during globalisation. The process starts in a certain sense from the beginning when entering the globalisation process with the distinction that instead of expanding with diversified product lines in the international stage, product lines are focused and synergies are used when expanding during globalisation. This can be explained by the huge financial and human resources required for globalisation. Companies can therefore not expand with the full product range developed in the international stage in a strategic business unit. Instead, a few product lines and products in each line are selected for global expansion and the product range is broadened gradually during globalisation. The globalisation of a strategic business unit seems to be so challenging due to required managerial and financial resources that the implication for corporate level strategy is that only one or a few strategic business units may be selected for global entry.

Figure 36. Evolution of product lines as the company globalises[50]

Corporate level: Number of strategic businesses	International stage:	Global entry stage:	Global stage:
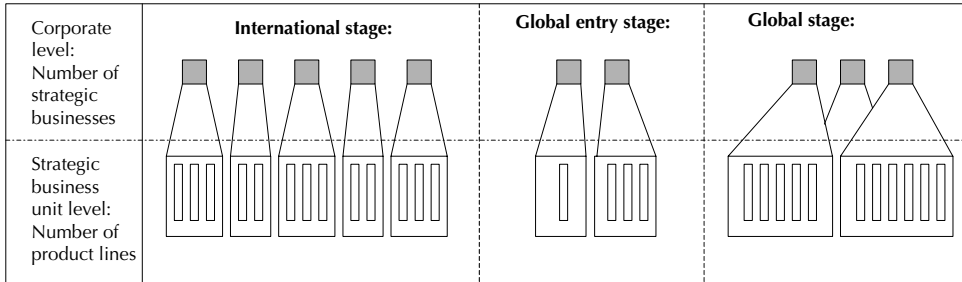
Another interesting area is to review the global coverage of the product lines within the company. NMP had developed from product lines based on standards to a customer-segment-based structure of product lines in the latest phase, which has meant that product lines address global opportunities within their responsibility areas compared with the previous often regionally focused operations (due to diffusion of technologies only to certain areas in the world). NET had operated from the very beginning with a structure of global responsibility, however focusing first on Europe. It was only the expansion of GSM from Europe to other continents and later development towards 3G that has enabled the product lines to operate on a global scale. Salcomp's product lines have all been focused on Europe until globalisation in the 90s, which made them global. It is therefore apparent that the product lines have developed from local or regional responsibilities towards global responsibility areas in the three above-mentioned cases.

However, in two cases the evolution differs. Tecnomen has regionally different strategies for its product lines. For example, its prepaid business started from South America and the focus is still today in that area in contrast to its voice messaging business that operates globally. Prepaid services are highly popular in these markets and this might explain the concentration on this area. Also, from NK Cables it can

---

[50] Illustration of the pattern found in the evolution of the number of product lines. However, the exact number of strategic businesses and product lines in each case varies.

be seen that there are product lines that focus on neighbouring countries, such as many of the fixed networks and installation and industry related product lines. However, the product lines within the mobile networks business unit all have global responsibility / strategies. The growth of the mobile network business has increased the share of product lines with a global focus. Also, NK Cables is seeking to increase the number of product lines with a global mandate. For example, the Optical Ground Wire product line was to take global responsibility. Draka Holding has established a product market committee, in which it decides in which markets and with which products each subsidiary in the group is active. It is expected that this rationalization of the product strategy within the Draka Holding group will lead to further global alignment of product responsibilities. It can be concluded that in all the cases the product lines were either already global or developing in that direction. In two of the cases, however, regionally focused strategies were also used for the product lines.

The evolution of the product nature was also analysed in the cases that will next be examined. Evidence was obtained that products have developed towards more demanding categories as the company shifts from international towards global. This pattern seemed to be in line with earlier research on the internationalisation process and the order of introduction of new product types (See Luostarinen 1979, 96). This development towards more advanced product categories could be seen especially in NMP and NET, but also to some extent in Tecnomen and NK Cables. NMP had started to expand its product offering from physical goods to services. Also, sales of software platforms can be classified to a certain extent as know-how sales, although the pursuit of open standards is also an important motivator.[51] NET had developed from an equipment goods supplier to a system supplier in a relatively early stage. However, the importance of the services and know-how categories were seen to increase along with globalisation.

In two of the cases, namely Tecnomen and NK Cables, development towards more demanding product categories was not so apparent. Prior to the international stage,

---

[51] Some of the interviewees emphasised that licensing of the software platform was related to efforts to create open standards and that sales revenues would be marginal from the licensing of the Nokia series 60 platform.

Tecnomen had reached an advanced stage, in which the products included a combination of physical goods, services and knowledge, and can therefore be categorized as systems. However, the scope and the size of the systems had increased, which can be seen as a development towards more demanding and complex systems. (See also Kosonen 1990, 76) Naturally development towards more advanced product categories could not be seen as the most advanced level had already been reached; therefore the advancement within the systems category became important for the company. NK Cables established in 1997 a Network engineering services unit, which can be seen as an extension from physical goods to the service and systems area. The unit focused on management of large cable projects, but operated mainly in domestic and neighbouring countries. The global markets were entered with fully physical products, such as RF cables, offered by the Mobile Networks unit. However, the Mobile Networks unit's products had developed towards more demanding antenna line systems and also training services had been added, although most of the sales still come from physical goods. One reason for not deploying advanced product categories more aggressively might be that the globalisation degree was still relatively low, 40%, and further development could be expected. It was mentioned in the interviews that during the rapid growth in the 90s it was not possible to expand to fully new product categories due to resource limitations. Another reason might be the role of the company as a component supplier to the network equipment manufacturers and operators. Studies had been carried out in the company regarding forward integration in the value chain, but their current customers had not encouraged such efforts.

In one of the case companies, namely Salcomp, development towards more advanced product categories was not identified. Salcomp had focused on physical goods and had no plans for advancing further to more demanding product categories. It is important to note that although the globalisation degree is high in Salcomp, globalisation has been carried out by following a few major customers into the global markets and therefore the global organisation is rather thin. One reason might also be their position in the value chain as a component supplier to

the terminal manufacturers, although, limited resources due to fast growth in the 90s are a more important explanation.

The discussion of the development of product lines and individual products can be summarised by the identification of four patterns. First, from a large number of strategic business unit one or a few are selected for global expansion. The divested strategic business units may also later become global under new ownership. Second, global markets are entered with a few product lines and the numbers of products in each line and during the globalisation the numbers of both product lines and products increase in the strategic business units. The product lines develop towards highly focused in each strategic business unit (common product platforms, technology development, and production facilities are used across product lines and/or same customers targeted). Third, it was found that the product lines develop from local or regional responsibilities towards increasingly global responsibility areas. Finally, the product nature also seems to develop towards more advanced product categories during the globalisation.

4.2.1.3 Product management processes

Product management processes are important for managing and implementing the product strategy, including the product platforms, product lines, and launching of individual products. Product management processes include for example processes related to compilation of feature and market requirements, product development processes, and product launch processes. Development of the product management processes during globalisation is discussed next.

NMP's product management processes

NMP's product management processes have influenced the management and implementation of product strategy to a great extent. The processes were first introduced in product development at the end of the 80s. The work started with

development and introduction of the concurrent engineering process (CE), which has the following targets: (1) unification of the processes used to develop products globally across all units, (2) a cross functional approach, which includes inputs from all functions, and (3) reduction of overlapping development work, meaning that the products must be developed so that many of the parts and modules can be used in all products globally. This process has been further developed over the years. For example, one important improvement was the establishing of an overall product creation process in 1996 including the research and technology, advanced development, and product engineering processes in addition to the CE process. This change was made to address requirements for shorter product development cycles, and improved co-ordination, standardization and use of economies of scale in different units (see e.g. Laaksonen et al. 1998, 72). When NMP established regional (Europe & Africa, Americas and Asia-Pacific) organisations in 1996, a great deal of work was done to develop the processes further. The design has also become a key component in product development. This is co-ordinated by global design teams[52]. This has meant that same user interfaces and outer designs are used across countries. Also, establishment of the DCU (Digital Convergent Unit) at the end 1990s and the latest changes in 2002, dividing NMP into 9 business units, have meant that requirement management, road mapping, and product launch processes have had to be developed further. It can be concluded that NMP in the 80s had separate ways of working in different divisions situated in different parts of the world. These were unified starting with the introduction of the CE process and subsequent improvements in the process during the 90s. Currently, NMP has globally unified processes in the area of product management.

NET's Product management processes

NET started process development in 1993 based on input from consultants, academics, and encouraging results from NMP. NET's process development framework consisted in 1993 of two core business processes: the product creation

---

[52] Press release of Nokia Mobile Phones dated 30 June, 2003.

process and the customer process. It has since been developed in different phases and become more business driven. (See Kosonen and Engelvuori 1998, 86) Analysis of the challenges related to globalisation and product management shows that the customer input management and product launch related processes are especially important. In NET's business it is essential to obtain input from customers. Earlier, it was enough to check the requirements of few most important customers in Europe. Now NET has to take input from all over the world and consolidate a global product plan, including a schedule for new releases. NET had over 120 customers worldwide in 2002. One senior management representative of NET commented on this as follows:

"Earlier it was enough to check the requirements for the next release with Orange in the UK and Sonofon in Denmark. The priorities were set by collaborating with a few customers. Now the process takes input from all the markets."

Several interviewees emphasised that when the number of customers increases it is especially challenging to cope with the increasing number of requirements from all over the world. It is vital to understand which requirements are generic and can be implemented to all customers and which concern only a few or even only one specific operator. NET has developed a requirement management process to cope with these different requirements and also devised measures for their prioritisation. It is also noteworthy that successful product launches are more and more important and that they occur globally at same time. One of the interviewees at NET commented on this as follows:

"The roll out is more important with mass production. You cannot make mistakes in this phase or it gets very costly…it was different with a few customers."

It can be concluded that NET has developed their product management related processes extensively to cope with the increasingly global environment and these have become more uniformed within the company all over the world.

Salcomp's product management process

At Salcomp, the products are managed so that a product council meets regularly to review vision, strategy, ongoing projects, and road maps. R&D has been centralised to Finland from the very beginning. However, through the purchase of Aspro Technology AG, the company also has an R&D site in China. This has led to a need to co-ordinate globally the activities between the R&D unit in Finland and China. Salcomp's research and development process is illustrated in Figure 37.

Figure 37. Research and development process at Salcomp
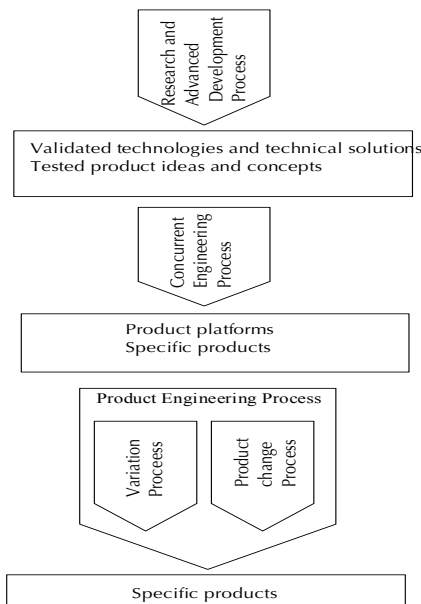
Source: Salcomp Annual Report 2001

In the beginning of the 1990s, products were always developed at Salcomp from the beginning to a customer. Due to the necessity of short product development lead times this is no longer possible. Today, the advanced development process is used to create tested product concepts at an early phase. In these concepts the electronic are tested, but the electronics are not yet placed in any enclosures. Latest development has meant that complete platforms are developed, which are then

marketed to customers. On the basis of customer requirements Salcomp is able to rapidly develop customised solutions using standard platforms as the basis.

NK Cables' product management process

The NK cables Mobile Networks unit's product development and other core competencies related to quality and pricing have been centralised at headquarters in Finland. This is considered essential, as customers are global and customer agreements cover the whole world. It is not possible to offer different qualities in different countries. Headquarters in Finland accepts all new products and accessories that a subsidiary wishes to introduce. This ensures compliance with the strict quality- related-requirements of NK Cables. The different locations around the world may give technical-, product- or installation-related support, but the product management is otherwise largely controlled from headquarters.

Different product management processes have developed in different business units towards a matrix organisation in which the same product management processes are used across business units. Also, highly standardised production processes have been introduced. The processes have been standardised in the mobile networks business unit, but also to certain degree in units serving only neighbouring areas in the MNC structure. This shows that in addition to units using standardised product strategy, units using other product strategies also benefit from more unified processes.

Tecnomen's product management processes

The first stage when processes were developed at Tecnomen was when the ISO certificate was applied in the end of 80s and early 90s. However, it was not until the company had entered the globalisation process that a large part of the product management processes were developed. The culture in the company during the 80s and early 90s was very much to encourage innovation. A large number of ideas were generated, from which a small amount was picked for further development. Those projects that did not prove to be successful were discontinued.

Tecnomen's core processes include the product business process and the customer business process, which were introduced in 1997. The product business process has been further developed during globalisation. The market analysis part, in particular, has been strengthened in the process to include a more detailed analysis of the market requirements around the globe as input to the process. Earlier, the process lacked systematic analysis of product requirements. Different customer requirements were received and then top management were asked to make the necessary decisions. Now the different global requirements are consolidated and then a decision is made based on the process.

A cross case analysis of the evolution of the product management process

The product management processes dealing with product requirement input, product development, and product launch are essential for the globalisation. The emphasis in the analysis was on understanding the change related to standardisation of processes during the passage from the international to the global stage.

It was found that in the international stage companies did not have systematic product processes or they differed in different countries or areas in the world. When the company globalises it becomes essential to link the different functions and sites together with unified processes. In many companies this meant that

product management processes were established and then developed further as the company grew. NMP started this work at the end of the 80s and NET in the early 90s. Tecnomen, NK Cables, and Salcomp introduced these processes on a larger scale in the latter part of the 1990s. It seems that to be able to globalise the company and standardise the product offering, it is essential to have unified product management processes in place. In all these companies, product management processes were established and developed towards a more unified approach during the globalisation.

4.2.2 Standardisation of product strategies

Standardisation of product strategies as the companies move from the international stage to the global is an important issue for globalising internationals in the ICT equipment field. The standardisation alternatives available to the companies and the evolution of the company from the international to the global stage are discussed next.

4.2.2.1 Global product strategy alternatives

In the empirical part of this research it became evident that it is important to divide the standardisation alternatives into two dimensions, (A) standardisation across countries and (B) standardisation across customers[53]. The earlier theoretical discussion focused on standardisation across countries, but the discussions with the management revealed that the customer dimension is also of interest and affects the potential to benefit from standardisation. Based on the interviews, the global product strategy alternatives were enlarged to incorporate the customer dimension. This was considered such an important dimension that it was included in the analysis to provide a more holistic view on the standardisation development. In the theoretical section, three essential global product strategies, localised, modified and

---

[53] The customer means in this context the direct customer to which the product is sold. It may be a channel member or a manufacturer that uses the products in its production. In contrast, when discussing indirect customers the term consumers or end user is used.

standardised, were identified. Now the localised and standardised product strategy have been divided into two sub strategies to better capture the reality. Thus, five strategies are available to globalising internationals: (1a) the local-customer-adapted product strategy, (1b) the local-market-adapted product strategy, (2) the modified product strategy, (3a) the global-customer-standardised product strategy, and (3b) the global-market-standardised product strategy. See Table 7, which depicts the revised global product strategy configuration alternatives.

Table 7. Revised global product strategy configurations

Product strategy / Dimensions	1. Localised product strategy		2. Modified product strategy	3. Standardised product strategy	
	1a. Local customer adapted product strategy	1b. Local market adapted product strategy	2. Modified product strategy	3a.Global customer standardised product strategy	3b. Global market standardised product strategy
Product Platforms	No significant product platforms across customers or countries / regions	No significant product platforms across countries / regions	Global product platforms across countries and customers	Global customer specific product platforms across countries	Global product platforms across countries and customers
Product Lines	Varies based on local customer and country / regional requirements	Varies based on country or regional requirements	May vary slightly based on regional or customer requirements	May include global customer specific variation in product lines across globe.	Same product lines across globe
Individual Products	No standardisation at any product levels across customers or countries	No standardisation at any product levels across countries	Standardised at core level, and adapted on other levels based on country and customer requirements	Designed based on specific global customer requirements. Largely standardised across countries within same global customer.	Products largely standardised across countries and customers at core and tangible level. Increasingly also on augmented level.
Product Management Processes	No standardisation of processes between customers or countries, or no processes established	No standardisation of processes between countries, or no processes established	Increasingly standardised processes across countries and customers	Customer-specific processes in use globaly across countries	Standardised processes in use globaly across countries and customers

Source: Compiled by the author based on research data.

4.2.2.2 The evolution of product strategy alternatives in the case companies

Analysis of the evolution of the products strategies in the case companies revealed that all the case companies had developed towards higher standardisation across countries and customers as they moved from the international stage towards the

global. Figure 38 depicts the evolution of the case companies' global product strategies. In the international stage, a local-market-adapted strategy or a local-customer-adapted strategy had been applied. In the global stage, the companies used either the global-market-standardised product strategy or the modified product strategy. Two patterns can be identified:

(A) Companies that have evolved from a localised to a standardised product strategy.

- NMP developed from a local-market-adapted to a global-market-standardised product strategy.

- NET and NK Cables developed from local-customer-adapted to global-market-standardised product strategies

(B) Companies that have evolved from localised to modified[54].

- Salcomp and Tecnomen have developed from a local-customer-adapted to a modified product strategy.

---

[54] The modified product strategy is based on a globally standardised product platform across countries and customers. However, adaptations are done on tangible and augmented level of the product based on country and customer specific requirements. On a continuum from a fully adapted to a fully standardised strategy it represents the middle alternative, in which benefits from both global integration and national responsiveness are sought.

Figure 38. Global product strategy evolution from international to global in the five case companies
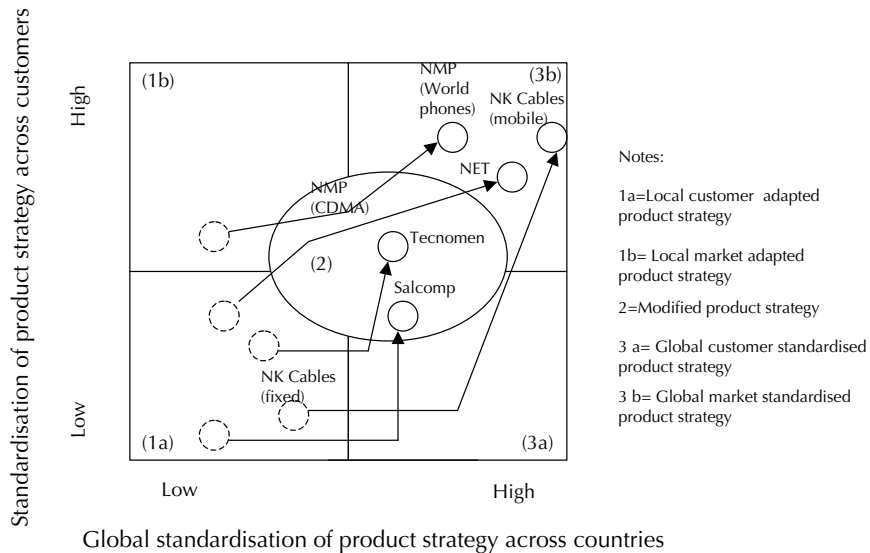
Source: Compiled by the author based on research data.

4.2.2.2.1 From a localised to a standardised product strategy

The development of the global product strategies of those case companies, which changed from a localised to a standardised product strategy are discussed next.

NMP's global product strategy evolution

NMP has developed from a local-market-adapted strategy towards a modified product strategy and more recently towards a global-market-standardised strategy as depicted in Figure 38. The product strategy differed considerably in the three divisions in the 80s, each focusing on its own region. Each division had its own product road mapping, product development, sourcing, manufacturing, and as a result fully different products as discussed earlier. The products did not include common modules or parts across divisions/standards. Also, the company utilised a number or product brands including OEM brands. Moreover, each division focused

on different areas of the world based on which country had adopted their technology standard.

From the end of the 1980s to the early 90s, the company adopted a global functional organisation and introduced a global concurrent engineering (CE) process for developing products. At that point, global product platform thinking was adopted, which meant that common parts and modularity were used in products developed for different parts of the world. Many similar modules and parts were used in for example TDMA and GSM telephones. At this phase, individual products were still adapted on the basis of local requirements. Also, in the early 90s it was decided to use the Nokia brand globally and other brands were gradually phased out.

NMP's latest shift from technology-standard-based product lines towards global-application-based business units in 2002, has also meant that the product lines have become more global. NMP has established a technology unit, which develops common platforms and modules to be used across business units, e.g. application engines, non-cellular engines (W-LAN, FM radio, GPS, BT), and cellular modems (GSM/GPRS/EDGE, CDMA2000, WCDMA). Furthermore, one should note that NMP often offers a very similar product range and categories across the globe, although the size of the segments differs according to local preferences. Lately, the product's customer positioning has also become more unified across the globe. This is especially true in world telephones, which support all three bands (GSM 900, GSM 1800 and GSM 1900). Hence the positioning must be the same across the globe as the product has become almost identical in certain segments. Any price difference would mean that grey exports between countries/regions would emerge. One of the interviewed at NMP commented on the latest change as follows:

"Earlier, the products often looked similar from the outside, but there were differences in the technology across regions…now the same products are in the same product segments across the globe, for example the triple band products. This means that it is not possible to have radically different product positioning across regions anymore."

Many products have since the end of 90s and the beginning of this decade become very similar across countries and customers, for example, GSM world telephones. However, at individual product level, NMP still makes certain smaller adaptation to products based on (A) country or (B) customer[55] requirements. The need to make these types of smaller variants differs somewhat according to product category. If we first look at the country variants, it is evident that although the usage needs and tastes are very similar they differ somewhat in different countries of the globe. Often the colour of the covers of the telephones differs across different regions based on local tastes. Moreover, due to language differences the user interfaces, sales boxes, and user guides must be adapted to fit the different regions. There may also be local legislation related to product requirements, for example product approval. Also, smaller variation are based on the requirements of important customers. The most common customer variants are the operators' co-labels on the transceivers and different factory preinstalled software settings, e.g. GPRS settings. NMP has an internal policy that determines what kind of country and customer variants are made. Product planning starts from the consumer's requirements, although NMP has noticed that these are very similar in same segments across countries. For example teenagers in Finland, the USA, and Asia have very similar needs.

It can be summarised that NMP has evolved from a product strategy that differed considerably between different standards and consequently also between the different areas where they were adopted and started to evolve towards a common platform-based approach. The products are still adapted to different market requirements and also to customer requirements to some extent. Such changes in products are made as late as possible and as easily (e.g. mainly software settings). The latest triple band products supporting GSM 900/1800/1900 are often very similar across regions. To conclude, NMP has shifted from a local-market-adapted product strategy to a modified product strategy, and there are some early signs that the latest GSM products are evolving towards a global-market-standardised product strategy.

---

[55] The customer term is here used to mean direct customers of NMP, like for example operators and other channel members to which NMP sells directly the products. The standardisation across customers under discussion here should not be confused with the end user segments of the products. In fact in question of end users the products are highly differentiated based on global segments.

NET's global product strategy evolution

NET's telecommunication business prior to GSM was highly adapted and in the early 90s this culture was still prevalent in the company. This meant that many product adaptations were made for both customer- and country-specific requirements. For example, extensive R&D work was done to fit the different network elements to national requirements. Also, customer-specific features were developed on the basis of operator requirements. Senior Vice President of Nokia Networks, Mr. Rene Svendsen-Tune comments on the development as follows:

"In these early days, for example, complete R&D was done for certain parts of the transmission system to make it fit to national networks, or to be able to sell a mobile switch to Vodafone, certain special features were developed for them. The introduction of the GSM standard and globalisation has meant that customisation has been shrinking."

An area where adaptations were especially required in the early 90s was the connection of the mobile network to the fixed networks (PSTN networks). Vice President of Nokia Networks, Mr. Petri Pöyhönen, describes the reasons behind these as follows:

"This can be explained by the fact that when telephone techniques were developed during the 40s and 50s, big countries had resources and ambitions to adapt their fixed networks (PSTN) to local needs. The variation between different nations' signalling was not seen at that time as an interoperability risk as the systems were often sourced from national suppliers, which were able to take these differences into consideration."

In the 80s, many of operator's requests for adaptations did not have a clear connection with the actual business requirements behind them. For example, operators had many requirements for tailored services that required software adaptations, but in practice sales came from 5 to 10 services. An important reason

for the shift towards more standardised product strategies is the elimination of the monopoly status of operators in countries and the resulting operator competition. In a competitive situation, the operators must consider the cost and the customers' real needs much more carefully.

Today, a very high proportion of products is similar globally and the customer adapted part is very small. Moreover, the global product platforms are standardised. Still, certain mandatory country-specific requirements exist. For example, products are sometimes modified with respect to frequency or signalling. Also, customer- specific adaptations are made for example in operator-specific prepaid systems. These are, however, minimal and they are made on the surface of the product. The changes often concern software instead of hardware, which makes the implementation easier. Products have therefore become to a large degree standardised across countries and customers. However, in augmented products differences still exist. Standard procedures are in place concerning aftermarket service and warranty terms, but the practise is more fragmented and country operations are given more flexibility to resolve these issues. Consolidation of operators and emergence of global customers are slowly unifying the augmented product part. Also, the product management processes have developed towards unified ones. The initiative taken during the 90s to create common processes in NET has unified the processes used globally.

It can be concluded that in the 80s and the early 90s many both customer and country adaptations were made. Towards the end of 90s and early in this decade the products have become globally very similar and only very small adaptations are made mainly on the surface level. Hence, one may depict the evolution of the product strategy from a local-customer-adapted strategy towards a global-market-standardised strategy as shown in Figure 38.

NK Cables global products' strategy evolution

During the international phase at the end of the 80s and the early 90s NK Cables mainly sold cables in the fixed network, power, automation, and data fields. These cables were often highly adapted to country- and customer-specific requirements. For example, fibre cables were always tailored to customer- and country-specific requirements. Hence, it can be said that a local-customer-adapted strategy was in use. From 1993 onwards, the company has focused more and more on cables for mobile networks such as RF cables and jumpers. The company closely followed the requirements set by its global customers and it therefore followed a global-customer-standardised product strategy. Sales to Nokia increased to over half of the total in the mobile networks cables area. These products have further evolved towards a high degree of standardisation across countries and customers during the 90s. Also, in the fixed network field it is expected that products will become more similar as the operators consolidate and the ownership structure changes from local operators to new owners with no telecommunications background. It is also important to note that as the proportion of mobile network cables in total sales has been increasing, the total product assortment of NK Cables has become more standardised[56]. The development in the mobile network business unit responsible for the RF and jumper cables is discussed next in more detail.

Still, in the mid 90s, global customers required that their brand name and codes be printed on the cables. Often Draka NK Cable's name was not visible at all. The customers of NK Cables wanted at that time to give the impression to their customers that they had produced the whole system including also the cables. Hence, it was important to have the customer brand on the cables. Moreover, special requirements related to the technical specification were also presented by global customers at that time. In the US, some customers earlier required colour stripes on the cables to identify their cables. Currently the customers do not see any benefits from this type of adaptations and all customers accept fully standard deliveries to a great extent. Also, it should be noted that the existence of a de-facto

---

[56] As can be seen in this case, strategic business units may simultaneously use more than one product strategy standardisation alternative during the transformation stage towards global status.

technology standard for RF cables has impacted on the development towards highly standardised product strategies.

Analysis of the current product strategy of Mobile Networks unit first shows that the product structure is the same worldwide, as are the product lines. The only apparent difference is that certain customers like to order only antenna feeder cables while others require the whole antenna line, including also jumpers and other accessories. This is due to local country conditions. In developing countries like Brazil delivery of the whole antenna line is more often required than in developed countries. Also, the operator type matters. Established operators such as Vodafone have a high level technical knowledge themselves and may therefore decide to purchase only parts of the antenna line from NK Cables and source the rest elsewhere, while new operators prefer turnkey deliveries. Even when analysing the products at individual level one can see that there are currently no differences in these across customers or countries. This is driven by the worldwide de-facto standard. Moreover, as discussed above, customer brands are no longer printed on cables. Also, the company recently decided to unify the large number of different sub brands internally, so that all product lines use the "NK Cables" brand on their products. Altogether, the products can currently be produced to stock and then delivered according to orders. Only in some rare cases, for environmental reasons, the cables may need to be coloured grey or white to be less visible.

It can be summarised that during the international phase, NK Cables mainly sold fixed network, power, and automation and data cables. These cables are usually highly adapted to country- and customer-specific requirements and therefore a local-adapted-product strategy was applied. A global mandate was given to the Mobile Networks unit established in 1993 to capture the growing global demand for mobile network cables, which first developed to a global-customer-standardised product strategy by the mid 90s, following the requirements set by its global customers closely and adapting the product based on their needs, and then shifted to a global-market-standardised strategy with a fully standardised product strategy across both markets and customer.

4.2.2.2.2 From a localised to a modified product strategy

The pattern of those cases that evolved from a localised to a modified product strategy are discussed next.

Tecnomen's global product strategy evolution

The difference in 2002 compared to the 80s and early 90s is that the products have become more standard in Tecnomen. The company has evolved from a local-customer-adapted product strategy to a global-customer-standardised product strategy and then during the early 90s to a modified product strategy.

The product strategy was based to a great extent on a local-customer-adapted strategy in the early 80s; the products were adapted on all product levels to local customer needs. The company delivered custom designed control systems for automation projects at that time. An important customer was Tamglass, to which customised automation and control systems for glass furnaces were supplied. The company then evolved into a global-customer-standardised product strategy as Tamglass was rapidly expanding into global markets. This meant that products were indirectly supplied to a large number of countries (around 40 countries). When entering the telecommunications field, the company often first developed a highly customised product (paging, voice mail etc.) for a particular customer, but then shifted rather quickly to the modified product strategy, which utilised global product platforms across customers and markets.

In the early 90s, modifications were made to products, for example in question of user interfaces and network interfaces. A particular problem was signalling, which differed by country and customer. Due to the emergence of technical standards, signalling-related adaptation requirements have decreased. The company had at that time taken into use global platforms across countries and customers, thereby making these adaptations relatively easy. This also allowed them to keep the main part of the

product as standard as possible. The CEO and President of Tecnomen Vesa Helkkula commented on the development as follows:

"The products have become more standard...they are not as customised as in the early 90s. In those days, an own version had to be produced to everyone."

Today, the basic product platforms are very similar all over the world and across customers. The basis for the messaging products is the Tecnomen eZoner platform. However, adaptations are still necessary on the surface levels of the individual products due to both customer- and country-specific requirements. For country-specific requirements there are still differences in technology standards and languages, which requires minor modifications to the products. For example, the Chinese language requires Unicode support, which has meant smaller changes in the products. Also, CDMA and TDMA networks require different interfaces. The products are also modified on the basis of customer requirements. The end user interface is almost always adapted on the basis of operator requirements. Moreover, new features are also developed on the basis of customer requests. For example, recently a missed call notification was implemented for an Asian customer. Also, each system has normally to be integrated with existing systems in the customers network. An interviewee commented on the currently required modifications to the products as follows:

"The basic implementation is the same all over the world, but there are differences in the services each operator wants to launch on top of the platform…. Actually, the requirements differ from very small issues to large ones."

Competence centres that can do minor product development and give technical support have been established in Malaysia (2000) and Brazil (1999). In these competence centres modifications to the tangible level of the product are made efficiently on the basis of customer and market needs.

Product management processes have become similar worldwide. The main product development work is done at the R&D sites in Ireland and Finland. Also, the

product management processes now handle requests for adaptations more systematically. The CEO and President of Tecnomen, Vesa Helkkula, commented on this as follows:

"Earlier the co-ordination in making adaptations was not good, which clearly hindered the growth of Tecnomen. Now we first try to look whether similar requirements have been received from elsewhere… Also, when adaptations are made today the decisions are taken according to established processes."

Analysis of the product lines shows that some operate globally, like the multimedia messaging product line, while others have a regional emphasis, for example prepaid. Hence, the product lines operate partly on different target markets.

Based on the discussion, one can see that Tecnomen has evolved from a local-customer-adapted product strategy in the early 80s to a global-customer-standardised product strategy in the mid 80s and then further shifted at an early stage to a modified product strategy already in early 90s, in which global product platforms are used across countries and customers, but modifications to individual products are made on the basis of customer- and country-specific requirements according to a systematic process. Also, the product lines concentrate on somewhat different areas in the world. Minor adaptation of the products to customer requirements as well closeness to customers is part of Tecnomen's key strategies to differentiate itself from its competitors.

Salcomp's global product strategy evolution

Salcomp's product strategy has evolved first from a local-customer-adapted product strategy, in which highly adapted products were made for local customers, to a global-customer-standardised product strategy, in which the products were fully designed based on global customers' product requirements. The company followed their main customers, like Nokia and Ericsson, to the global markets. Although the proportion of sales to Nokia has been decreasing it is still significant. Thereafter, at

the end 90s and early in this decade it has started to evolve towards a modified product strategy based on global product platforms across countries and customers.

Today the platforms are to a great extent standardised across countries and customers globally. Some local requirements may exist, for example, in Brazil there are strict requirements for table stands and in the USA and Japan requirements for a different type of solution for the pins. These are, however, exceptions and the electrical solution is similar across both countries and customers. Also, the required power of the chargers is becoming very similar all over the world.

Analysis of the major differences across countries in individual products shows that the products differs across countries with respect to mains plugs and required safety approvals. The following countries/areas have their own plugs: Main Europe, the UK, the USA, China, Japan, Australia, Argentina, India, Taiwan, and Korea. Salcomp's products are also always modified to specific customer requirements. The big change is that earlier the products were designed throughout from customer specifications. Today, the approach is very different, as the company has developed global platforms that are offered to customers as the basis of the product. These are then adapted based on the mobile telephone manufacturer's requirements. For OEM products, the appearance of the product (enclosure) and electronics and connectors are adapted to customer requirements. The large mobile telephone manufacturers like Nokia, Motorola, and Ericsson often require compatibility with their own design. On the other hand, some smaller companies do not see their own design as so important and they accept Salcomp's standard design. However, even in these cases the electronics are adapted to customer requirements by adjusting the standard solution to customer requirements. The need to adapt the electronics in the chargers relates to the different power management systems in different manufacturers' mobile telephones. The safety related regulation, ISN norms, requires that the mobile telephone and the charger are approved together, which makes developing of fully standardised products across customers impossible.

It can be concluded that Salcomp first shifted from a local-customer-adapted products strategy to a global-customer-standardised product strategy, in which products have been fully designed on the basis of major mobile manufacturers' needs. The products have thus spread to the worldwide markets. In the end 90s, Salcomp started to develop complete platforms, which were offered to customers. This marks a change in the product strategy to a modified product strategy, in which global product platforms are used across customers and countries. This enables fast customer- and country-specific adaptations, which will also need to exist in the future due to customer requirements on specific cable connectors and brands and also because of norms requiring that the telephone and the charger are always approved together.

4.2.2.3 Evolution of products strategies from international to global

It was found that as the companies have moved from international to global stage the product strategies have either evolved from localised to standardised or then from localised to modified. In addition to standardisation across countries, also standardisation across customers is of importance in understanding the evolution. See Figure 39 for an illustration of this evolution.

Figure 39. The product strategy evolution of globalising internationals

Global Standardisation of Product Strategy Across Countries

Standardisation of product strategy across customers

(1a)

A. Development towards standardised

(3b)

High

International stage

Global stage

(2)

Low

(1b)

B. Development towards modified

(3a)

Low   High

Notes:

1 a= Local market adapted product strategy

1 b=Local customer adapted product strategy

2=Modified product strategy

3 a= Global customer standardised product strategy

3 b= Global market standardised product strategy

Source: Compiled by the author based on research data.

The finding that product strategy is becoming more standardised across countries and customers during globalisation is important. The pattern found is in line with earlier research which has shown that global companies are expected to use more integrated strategies across countries in the global stage and products are becoming increasingly standardized (See e.g. Yip 1992, Douglas and Craig 1989). Also, it has been claimed that standardisation of product strategies is increasingly more important for companies (See e.g. Sorenson and Wiechmann 1975, Walters 1986, Boddewyn et al. 1986, and Levitt 1983). This is, however, the subject of a lively debate and there are other authors who have found that standardisation of products is not common (See Keillor et al. 2001). However, one should note that according to the findings of this research, global companies may use either a modified product strategy or a standardised product strategy in the global stage. The former allows for adaptations on the tangible and augmented product level, but still call for a standardised product core (i.e. product platform). There are a number of both external and internal factors that then affect, which strategy is most suitable for the company. These will be reviewed later in this work. A new interesting result is that

in addition to understanding standardisation versus adaptation across countries, there should also be analysis across customers. Also, product standardisation should be understood across four dimensions, which are product platforms, product lines, individual products, and product management processes.

4.2.3 Summary of the evolution of product strategies

Analysis of the evolution of the product strategies in the case companies revealed following main patterns:

A. One or a few strategic business units (SBU) with the highest global growth potential were selected for globalisation from a large number of unrelated businesses in the international stage. Also, divested strategic business units may evolve towards global status under new ownership.

B. The product platforms have developed from local to global platforms with increasing modularity. In addition to vertical co-operation, horizontal co-operation also takes place increasingly in products in the value networks.

C. Along the advancement of globalisation the number of product lines and products in each line increases. The product lines are highly focused benefiting from synergies across product lines due to common product platforms, technology development, production facilities and/or customers.

D. As the company globalises, it will initially select a product category from which it has experience and then expand to more advanced product categories during globalisation. In addition to goods, also services, know-how and systems will be used increasingly.

E. The standardisation of product strategy evolves from localised towards modified or standardised alternatives during globalisation.

F. Also, it became evident that the importance of the different product strategy dimensions shifts during globalisation. The importance of product platforms increases towards the global stage in the product strategy compared with the other dimensions.

See Figure 40, which depicts the evolution of the product strategies from the international to the global stage. The table also depicts the product strategy used during globalisation.

Figure 40. Evolution of product strategies of globalising internationals

	1. INTERNATIONAL STAGE	2. GLOBALISATION	3. GLOBAL STAGE
Portfiolio of strategic business units	Many unrelated strategic business units	Focus on one or a few strategic business units	Increasing number of related strategic business units
Product platforms in a SBU	Local platforms and vertical co-operation in products	Towards global platforms with increasing modularity. In addition to vertical also increasingly horizontal co-operation	Global platforms utilising modularity to a great extent. In addition to vertical, also horizontal co-operation in products
Product lines in a SBU	Diversified international product lines	A few international product lines and products in each line selected for global entry and then the number is expanded during globalisation while maintaining focus	A large number of focused global product lines and products in each line
Individual products in a SBU	Less advanced product categories, however varies based on level of international penetration	A product category from which existing experience is first selected and then expanded to more advanced products during globalisation	Advanced product categories
Standardisation in a SBU	Localised product strategy	Increasingly modified or standardised product strategy	Modified or standardised product strategy

Globalising Internationals

Source: Compiled by the author based on research data.

An important finding of this study concerns evolution in the number of product lines and categories and standardisation of the product strategies across countries and customers. It is apparent that as the strategic business unit evolves towards global status, both the standardisation degree of the product strategy across countries and customers and the number of product lines / product categories increase.

4.3 Product strategy selection

This chapter examines the motives and reasons for global product strategy selection and development on the basis of the five case study companies as interpreted from the management interviews and other evidence gathered. Pattern matching and explanation building techniques will be used as stipulated earlier. The examination will be based on the theoretical framework and working propositions developed earlier.   The examination will proceed as follows: 1. macro and meso level variables, 2. micro level variables, and 3. micro and millimicro variables (see Figure 41).[57]

Figure 41. Structure for the analysis of the motives and reasons for global product strategy selections and their development

```
┌─────────────────────────────────────────────┐
│        1. MACRO AND MESO LEVEL              │
│           -Macro environment                │
│              -ICT industry                  │
└─────────────────────────────────────────────┘

┌─────────────────────────────────────────────┐
│              2. MICRO LEVEL                 │
│    -Corporate and business level strategy   │
│  -Strategic levers and resources / capabilities │
│                                             │
└─────────────────────────────────────────────┘

┌─────────────────────────────────────────────┐
│       3. MICRO AND MILLIMICRO LEVEL         │
│            - Decision making                │
│                                             │
└─────────────────────────────────────────────┘
```

Source: The categorization of variables into macro, meso, micro, and milli-micro level variables has been developed by Luostarinen (1970, 25).

---

[57] In this work the macro and meso level are analysed in same section due to the fact that some variables can be seen on both levels. The decision-making related factors are categorised under micro and milli-micro, due to the fact that these variables may concern individual decision-maker, but also the organization.

The analysis is conducted so that (A) the cases that have proceeded to the standardised product strategy (NMP, NET, NK Cables) are examined as a group and (B) the cases that have proceeded towards a modified product strategy (Salcomp, Tecnomen) are examined as another group when feasible. Furthermore, the deviation related to customer follower versus independent globalisation strategies is examined.

4.3.1 Macro and meso level variables

4.3.1.1 The home market push, target market pull, and global enablers

The macro and ICT industry factors that influence the selected product strategy will be examined next.

Home market push, target market pull, and general global enablers are examined first. The importance of the domestic market had decreased in all case companies. For cases that evolved to the standardised strategy, NMP, NET and NK Cables, the domestic market has come to represent a very small part of the total sales and the companies have had to seek global markets for their products. For **NMP,** domestic sales diminished from 32 percent in 1986 to 2 percent in 1998. In **NET** domestic sales were 75 percent in 1988 and 5 percent in 1998. The proportion of Nokia's total domestic sales further decreased at the beginning of the current decade and was only 1.2 percent in 2002[58]. (Nokia annual reports 1996 and Nokia Form 20-F 2002) For **NK Cables** the pressure to globalise is great in the mobile network business unit, whose sales in Finland represented 50% at the beginning of the 90s, but only approximately 10% of net sales at beginning of this decade, according to company estimates. Moreover, sales outside Europe (globalisation degree) had increased to over 50% or close to those in these case companies (NMP 52%, NET 49%, NK Cables 40%). (Interviews and annual reports of companies)

---

[58] Since 1998 Nokia has no longer published sales figures for NMP and NET sales separately in Finland. Only group-level sales are available per country in the annual report.

Examination of the cases which had evolved to the modified strategy (Tecnomen and Salcomp) shows that the pressure to globalise has been also strong due to the small size of the home country. The proportion of the domestic market had declined from 14% in 1993 to 5% in 2001 for **Tecnomen**. For **Salcomp,** the proportion of domestic sales had decreased from 67% in 1990 to around 7% in 2002. (interviews, annual reports of companies). The proportion of sales from outside Europe (globalisation degree) had increased from 10% or less in both companies to 52 percent and 68 percent respectively. It can be concluded that all the cases had developed towards more standardised product strategies as the globalisation degree increased. Many interviewees also confirmed that it was essential to be able to spread the large R&D cost among as many countries as possible. Below are comments from interviewees:

"To succeed in this type of high tech product, in a niche area, you need to have global thinking to be able to grow, considering the small size of Finland."

"Already in early phase it was realised at NET that the domestic and Russian markets are not big enough"

"You can only be in this business (currently) if you are global and have a high market share"

"The volume requirement is millions per year if these new areas are to be interesting"

The total telecommunications market revenue increased from 523 billion US dollars in 1991 to an estimated 1020 billion dollars in 2002. Out of this the telecommunications equipment market revenues increased from 120 billion US dollars in 1991 to 290 billion US dollars in 2000. In 2001, the telecommunications equipment market decreased to 264 billion USD, but it was estimated to have increased in 2002 to 275 billion US dollars. (International Telecommunication Union 2003). See Figure 42.

Figure 42. World telecommunications market revenue development
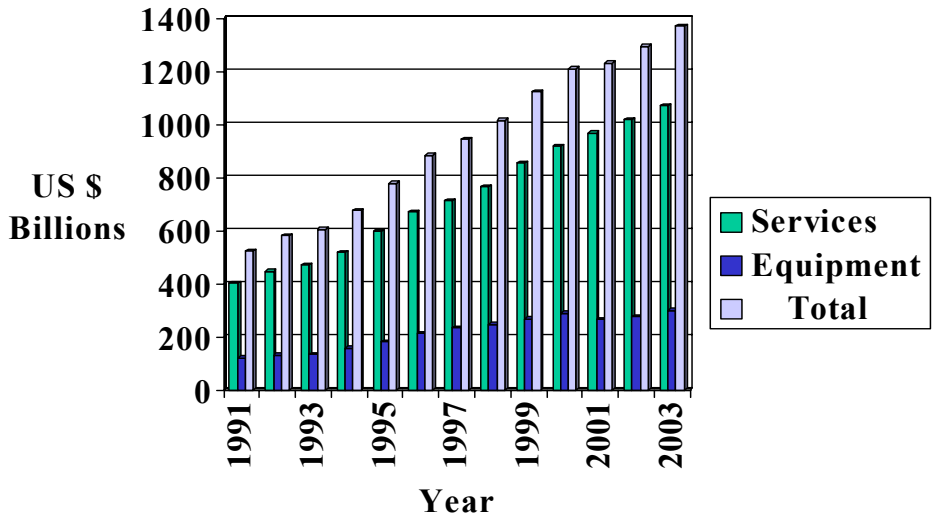
Source: Compiled by the author based on information from the International Telecommunication Union, 2003. Note: The year 2002 is still estimation and year 2003 is forecast.

Figure 43 shows the breakdown of the ICT market in 2001 by product and major world region and Finland. For ICT equipment Europe represents 29.7 percent of the world markets, while the US represents 28.4 percent, Japan 15.3 percent and rest of the world 26.5 percent. The share of Finland is only 0.5 percent. Hence, it can be concluded that the market pull to globalise is very large for Finnish companies as it is a must for Finnish ICT equipment manufacturers to expand to the global markets to survive.

Figure 43. ICT markets by product category and region
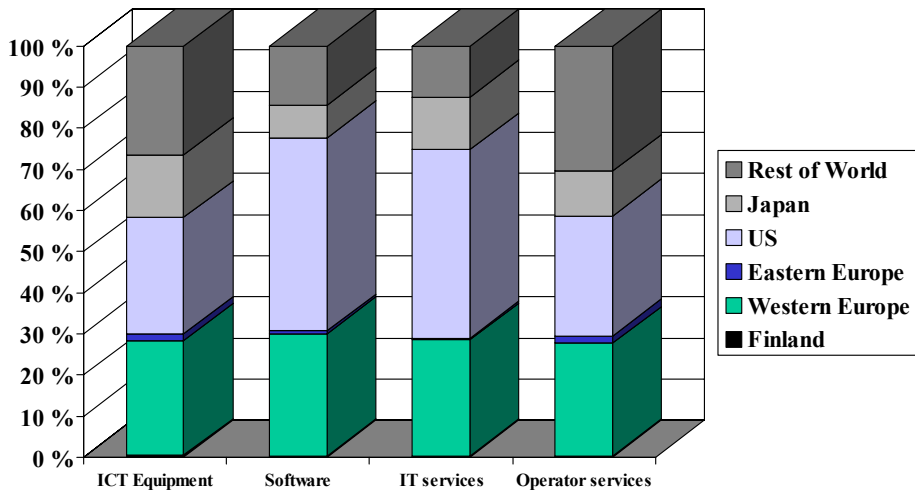
Source: Compiled by the author based on information from the European Information Technology Observatory 2002.

The openness of markets is an important factor to consider in this context. The GATT, EFTA, EU and WTO agreements have opened up the markets for globalising internationals. (Hansén 1981, 1999) The European integration development removed first the trade barriers within Europe for Finnish companies and later also the barriers between regions have decreases as a result of progress in GATT and WTO. These agreements have lowered the ICT equipment trade barriers considerably (Paija 2001, 43). The latest progress in WTO was made when the ministerial declaration on trade in information technology products (ITA) was accepted in 1996 covering 57 WTO members that agreed to reduce the tariffs of telecommunications equipments to zero by beginning of this decade in most countries (WTO 2002, 60). The trade liberalisation has had a significant effect on trade in telecommunication equipments. For example from 1990 to 1998 the value of OECD exports grew by a multiple of 2.5 in telecommunications equipment (Paija 2001, 43). The liberalisation of trade opened up a global market for Finnish

ICT equipment manufacturers to which often increasingly standardised products can be delivered.

The empirical analysis confirmed that that trade-related restrictions has had an impact on the establishment of foreign operations abroad. Many of the managers interviewed cited free-trade restrictions, e.g. import duties, and domestic content requirements, as a reason for establishing a factory in a foreign country or postponing entry of a specific market in the international stage. This was one of the main reasons why all the case companies had established a factory in China. Also other factors like for example closeness to customers have forced the ICT companies to establish factories in the major regions in the world. An interesting finding was that the increased communication across countries in companies was also seen as one factor, that has increased the use of more standardised product strategies.

It can be concluded that the importance of the domestic market as a push force has decreased while the importance of foreign markets as a pull factor has increased. Also, the communication across countries has increased. This has permitted the development of more standardised product strategies across countries.

4.3.1.2 ICT industry globalisation drivers and technology life cycle development

4.3.1.2.1 Diffusion of technology standards and the emergence of a dominant design

One of the most important factor affecting product strategy has been the diffusion of global technology standards. The telecommunications standard environment has moved from a highly fragmented one to a more unified environment with a few important standards that dominate.

In 1986, there were seven mobile telecommunications standards in the world. As digital technology has advanced, there have also been a number of competing standards, of which GSM, TDMA, and CDMA have been the most important.

However, towards the end of the 90s, GSM has gained a dominant position in the world with almost 450 million users by beginning of the 2001. The evolution to 3G is currently underway. It will further unify the global market with respect to standards. In 3G, there are two main competing standards, WCDMA and CDMA 2000. See Figure 44.

Figure 44. Number of customers per mobile technology standard

Millions of customers, Feb 2001
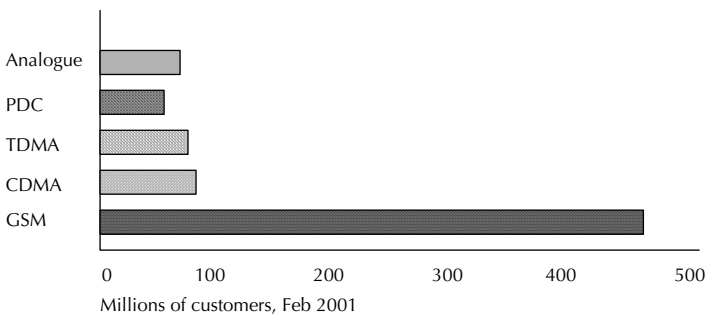
Source: Original source EMC, published in Nokia White Paper, Opening a New Road to 3G Evolution

There are still some differences in mobile telephone subscriber penetration level between developed countries and developing countries. The ratio of digital standards to analogue ones is rather similar across the world, except in the Americas, where the share of digital standards is still relatively low. See Figure 45.

Figure 45. Cellular mobile subscribers per 100 inhabitants and share of digital standards in 2001
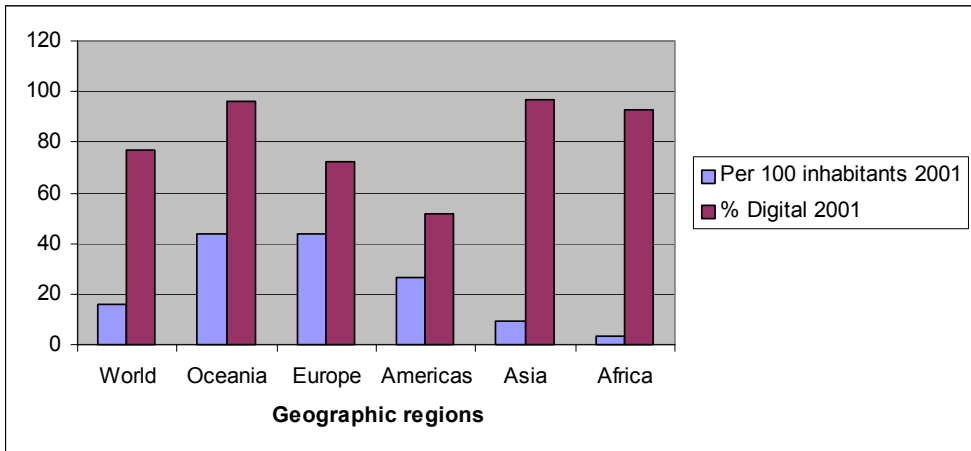
Source: Compiled by the author on the basis of statistics provided by the International Telecommunication Union, 2002

The cases which have evolved to a standardised strategy (NMP, NET, NK Cables) are analysed first. For **NMP,** the fragmented standard situation in the world in the 80s meant that products had to be adapted to these different standards. The spread of the GSM standard in Europe, but also in many Asian countries and lately also in North America and South America has meant that NMP has been able to deliver GSM products to a larger area. Increasingly, also global product platforms and multimode/band engines are used. The spread of the GSM standard has meant that GSM telephones supporting GSM 900, GSM 1800, and GSM 1900 can now be delivered in Europe and also in a large number of countries in Asia, North and South America. In the mid-90s NMP's mobile telephones looked rather similar from outside in the same product category whether they were sold in the US or Europe, but the technology inside could be different. Nowadays, the telephones are also becoming very similar inside. In for example world mobile telephones (Tri band phones), the technology inside is the same because the GSM engines support many bands.

NET selected to focus first on NMT and later on GSM. During the analogue phase in mobile networks there were a number of country- or region specific-standards in the world. In the Nordic countries, NMT was introduced in 1981. At that time bigger countries saw that it was even possible to create mobile network standards of their own. For example Germany and France had their own systems. In big countries this was related to national pride and to protection of their markets. This meant that across different analogue telecommunications standards the mobile networks were very different. For NET the diffusion of the GSM standards has meant growth in the accessible market. For example the recent selection by Brazil of GSM opened up the market for NET in that country. According to their own estimate, NET has achieved a market share of over 25 percent in GSM networks, which represent 15-20 percent of the total mobile infrastructure market (Nokia Form 20-F 2002). The GSM standard (introduced in 1991), meant that the products were very similar from the beginning. One may therefore conclude that different telecommunications standards set by national authorities greatly affected NET's products strategy. The spread of GSM made it possible for NET to develop products for global markets. Senior Vice President of Nokia Networks, Mr. Rene Svendsen-Tune, who is responsible for global sales of mobile networks, commented on the global expansion of NET as follows:

"NET was 10 years ago in the NMT and transmission business. GSM coming from Europe changed the business. During the GSM era NET has grown rapidly and been most successful…NET has expanded into global markets."

For **NK Cables** the most important factor affecting the similarity of RF cables across countries and customers worldwide is the de-facto standard for RF cables established by the American Andrew Company. It is based on the MIL standard. This company was able to establish their cable specifications as standards for the market due to their strong market position. Together with Alcatel they had an oligopoly in the market. In 2002, Andrew's market share was still around 50 percent. The Vice President of Mobile Networks at NK Cables, Kaj Söderling, describes the position of the standard as follows:

"This is a de-facto type of standard, which derives from a situation in which the market leader has more than 50% of the markets…around the world wherever these types of product were needed Andrew was there. The customers always asked whether we have products that are similar to what Andrew offers."

Analysis of the cases that had evolved to a modified product strategy, Salcomp and Tecnomen, reveals that the standards environment has been somewhat different. **Salcomp**'s main field today is the manufacturing of chargers for mobile telephones. Although safety related approvals are needed, the chargers are not produced according to a globally agreed standard or specification. Quite the contrary, the chargers are produced on the basis of a specification defined partly by the customers. **Tecnomen** is active in standardisation work in 3GPP and other forums in its industry. However, adaptations are always made to a certain extent to customer needs. This is because their products are integrated closely with customers' networks.

Based on this discussion, it was apparent that in the technology environment of the five cases, the technology dominance had become greater. In the environment of NMP, NET, and Tecnomen it was evident that the dominance of GSM technology and its evolution towards 3G standards affected more similar products across countries. However, due to requirements to close integration with customer's existing network equipment all interfaces were not fully standardised in question of Tecnomen's products. For NK Cables, the de-facto standard established by the Andrew Corporation had taken a dominating role and products were becoming commodity products. In one of the cases, namely Salcomp, specifications were mainly agreed in co-operation with the customers, while two basic technologies had taken the dominating role.

4.3.1.2.2 Stage of the technology life cycle and competition

The stage of the technology life cycle was found to have an impact on the standardisation of product strategies. In the early phase of the technology life cycle, the companies adapt the products to meet the key customers' requirements, but as

the companies progress to the growth period and the volumes increase, standardisation of products becomes more important. One interviewee commented on this development as follows:

"In the beginning of the technology life cycle, more customer adaptations are made. The product becomes more standard when it moves forward on the life cycle. However, in the IT sector, the technology standards have been set in any case… which set certain limits to adaptation in the early phase as well. Free experimenting and innovation is therefore not as great as in some other fields."

Two interesting empirical findings were resulted from further analysis of the stage of the technology life cycle and competition. First, as the technology matured it was apparent that companies were striving to find new growth opportunities by broadening the product range. When the growth started to slow down in the mobile telephone industry from 2000 onwards, NMP started to develop its product assortment to meet a larger number of different end user requirements in new applications and to decrease the product life cycle of product models to be able to continue growing. Also, Salcomp had looked for new growth opportunities in related segments due to the slower growth. NK Cables had expanded further in the value chain by starting to offer a wide range of accessories for the cables. NET had broadened the product range with new service enabling servers to be able to continue growing. It can be summarised that as the companies either reach the maturity stage or are approaching that stage, new growth is sought by broadening the product range.

The other finding relates to the more intense competition that arises as the product technology life cycle matures. The latest development in the ICT industry has meant that the global competition has increased in both vertical business and also in the horizontal sense. This has increased the importance of horizontal co-operation in the value networks in addition to the conventional vertical direction. In products, it has meant that competitors co-operate in a number of fields such as creating standards, selling platforms parts to each other, and also developing products together. This development was evident in NMP, NET and Tecnomen.

This was not the case with NK Cables and Salcomp probably in part because the types of components sold by these companies are difficult to sell separately, as was mentioned in the interviews. But it is also expected that the stage of globalisation has an impact. The globalisation degree of NK Cables had reached 40 percent by the beginning of this decade, but was still considerably less than the other cases. Salcomp's globalisation degree was high but globalisation had been based on following the customer, which meant that the global organisation was very thin. It can be seen therefore, that the importance of horizontal co-operation seemed to increase during globalisation. Due to the fact that an understanding of the globalisation process is also important in this connection, both the broadening of the product range and the increasing horizontal co-operation will be explored further when examining propositions 4-6 dealing with the transition from the international to the global stage.

4.3.1.2.3 Deregulation and liberalisation of competition

Deregulation and liberalisation of competition has opened up possibilities for standardised products. Privatisation of the incumbent operators and the new private mobile operators created through licensing has opened up competition in the telecommunications sector. Finland was among the first countries to start to liberalise the telecommunication sector from the mid 80s onwards (OECD 2000, 57). The operator competition was opened up thereafter in many other European countries as well. An overwhelming majority of the countries in the world allows competition today in the mobile sector (78%), internet sector (86%), but less in local fixed telephones services (43%) (ITU 2002). Opening up of the competition was also very important for NET. One senior manager at NET commented as follows:

"When trade to Soviet Union collapsed, the markets opened up in Europe, which had been extremely protectionist."

Also, NMP faced many closed markets in the 80s. In these markets NMP often made an agreement with a local importer or partner, which had good relations with the license holder and could support business activities. The first free markets were the Nordic countries, the UK and the USA and gradually the markets opened up, Japan being one of the last ones of the bigger countries to open the competition for terminals.

Also, the cable market for NK Cables was very closed in the 80s and early 90s in Europe. Hence, some cable producers made direct investments in various European countries to obtain orders from local government owned companies. This made it difficult to penetrate to Europe. In Asia, the market was completely different, and this encouraged NK Cables to expand to that area. Foreign companies were encouraged by favourable customs regulations to export goods to Asian countries, as local experience in the cables area was lacking. During the 90s, the European market opened up as a result of liberalisation of the competition.

One of the impacts of the more competitive environment was a decrease in requests from operators for product adaptations. The operator customers had to carefully consider in the new environment whether development of operator-specific features was economically justified. One of the interviewees commented on this as follows:

"The reasons for the change is the disappearance of the monopoly operators and the resulting increased competition. Earlier the operators could specify almost anything and they did not have to care about cost. When the market opened up and competition started, they had to be competitive and customer oriented."

4.3.1.2.4 Homogenisation of customer needs and emergence of global segments

Homogenisation of customer needs has affected the products strategies. Analysis of the homogenisation of customer needs for telecommunication equipment shows that this development differs somewhat in the two groups. Customer needs have

become more similar in the cases that had developed towards standardised strategy. Below are comments by interviewees on the similarity of global consumer needs.

"The basic needs of consumers are similar, for example communication in mobile telephones. There are differences mainly about how the products are used and to some extent about consumers' taste."

"The products have become globally similar. ..the values of consumers are very similar in relevant product segments globally. A teenager in Finland, the USA, or Asia has very similar needs. The main differences can be found in languages, which place requirements on UI (user interface). Differences in taste mainly affect the colours of the phones."

However, in cases that had developed towards a modified strategy, there were still relatively big differences between different customer requirements. It is apparent that requirement for customer adaptations in particular is much stronger. Salcomp always adapts its chargers on the basis of customer requirements. Introduction of product platforms has decreased the need to design the product from the beginning from customer specifications, but extensive adaptations are still made in the mechanics, connectors, and some times in the output power as well. There have been attempts to standardise for example the connectors of the mobile telephones, but the mobile telephone manufacturers have not been able to agree on this, according to Salcomp. Hence, each charger differs considerably depending on the customer. Tecnomen also make customer adaptations in respect to the different requirements of customers and this is an essential part of their business. The CEO and President of Tecnomen Vesa Helkkula commented on this as follows:

" All operators networks are in some way different and therefore adaptations are needed. Tecnomen's products go very deeply into the operators networks… a large number of interfaces needs to work."

The emergence of a number of global end user segments has also affected on the development of the business unit's product range from narrow to broad. NMP for example, mainly targeted business users at the end of 80s, but the emergence of a global segmented market offered an opportunity to broaden the product range to meet the requirements of different global segments, such as first time buyers with the basic product category, business users with the classic category, the style conscious with the fashion category and also new application-based segments like imaging.   Hence, an important finding is that as the market becomes globally more segmented, it can be expected that both the number of product lines and the number of products in the lines are increasing. Also, similar development could be seen in other case companies. For example Salcomp, has developed its product assortment from mobile telephones towards new global consumer segments such as MP3 players and GPS navigation instruments.

4.3.1.2.5 Globalisation of customers

Globalisation of customers has had an impact on standardisation of product strategies across countries. In the companies interviewed this appeared to have made the products more similar. In the mobile telephones business, this means that the same features and functionalities are required in the telephones delivered to the same operator groups. This is important as global operators prefer to launch new services like MMS in a number of countries simultaneously. In NET, globalisation of the operators has meant that similar products can be delivered to affiliates of a particular major operator.   One interviewee commented on this development as follows:

"Globalisation of operators has led to a situation that they buy the same products for their operations around the world as part of rationalization. Also, the buying power has gone up of large operators as they buy on behalf of 10 to 15 affiliates instead of one by one as in earlier times."

In Salcomp, the products are adapted to mobile manufacturer requirements for many items, e.g. enclosure, brand, connector, and performance. This has meant

that as the customers have shifted from local to global status the products have also become more similar across countries, although differences still exist both across countries and customers. In NK Cables, the globalisation of customers was expected to make the products more similar in the future. In the mobile networks business unit, however, this was not expected to have any significant impact, which can be understood due to the already highly standardised products across countries. In Tecnomen, this same phenomenon was noted. The CEO and President of Tecnomen, Vesa Helkkula, commented on this impact as follows:

"Those operators who have consolidated want to standardise the platforms they are using worldwide, because the purchasing process is easier for them."

4.3.1.2.6 Examination of the propositions

WPR 1. The stronger the target market pull, the domestic market push, and the macro and industry level globalisation drivers, the greater the use of more standardised product strategy alternatives compared with adapted ones across countries.

Based on the empirical examination, it can be concluded of macro environment factors that the small size and openness of the home market is pushing the companies to globalise and on the other hand the large global markets and openness of these are pulling. It should be noted that for globalising internationals the importance of pull factors seems to be greater than push factors. The base market for these companies is already Europe and thus the home market is less important. The finding that these macro factors have a major role in globalisation is supported by earlier research (see e.g. Luostarinen et al. 1994, 171; Hansén 1999). These factors were also found to have affected evolution towards more standardized product strategies. The global expansion is obviously a prerequisite for application of globally standardized product strategies in the first place. Moreover, it is no longer possible to plan products for only a few markets in the ICT field when the target markets have opened up for competition and have

become global and the home market is representing a very small portion of sales. The huge R&D cost must be spread over a large number of markets to be competitive, which requires standardization of products. Factors specific to the ICT industry proved to be especially important here. The spread of technology standards had a major impact on the possibility of applying more standardized product strategies. This factor seems to have been stronger especially for the cases that had shifted from the localised to the standardized product strategy. This development has also affected the cases that had shifted to the modified strategy. However, the importance of technical standards seems to be considerably less. Also, liberalisation and deregulation of competition around the globe has provided opportunities for ICT companies to globalise their operations but it has also decreased the requirements for adaptations. The homogenization of customer requirements and the emergence of global customers apparently led to more standardized product strategies.

Based on the discussion, it can be concluded that the proposition was **strongly supported.** The macro and industry level drivers had an important impact on use of more standardised product strategies and the impact was found to be as stipulated in the proposition, that is, the stronger the macro and industry level globalisation drivers the higher the use of more standardised product strategy alternatives compared with adapted one across countries. In particular, four factors arise that have had a major impact. These are homogenisation of customer needs worldwide, deregulation of competition, spread of technology standards, and the emergence of global customers. The proposition will stay as originally stipulated:

PR 1: The stronger the target market pull, the domestic market push, and the macro and industry level globalisation drivers, the greater the use of more standardised product strategy alternatives compared with adapted ones across countries.

It is next turned to examine the working proposition 2, which was postulated as follows:

"WPR 2: The greater the dominance of one or a few technologies and the similarity of stages across countries, the greater the use of more standardised product strategies compared with adapted ones."

The discussion shows that in the technology environment of the five cases, the technology dominance had become greater. In the environment of NMP, NET, and Tecnomen it was evident that the dominance of GSM technology and its evolution towards 3G standards had led to more similar products across countries. However, due to requirements for deep integration into existing network equipment, all interfaces were not fully standardised in Tecnomen's products. In question of NK Cables, the de-facto standard established by the Andrew Corporation had taken a dominating role in the markets and RF products were becoming commodity. In one of the cases, namely Salcomp, two basic technologies had taken a dominating role, namely linear and switch mode technology, but the detailed specifications were mainly agreed in co-operation with the customers.

The dominance of technology standards was especially great in the environment of the cases that had developed towards the standardised product strategy, namely NMP, NET and NK Cables. In the cases that had evolved to the modified strategy, the dominance of technology was not so great. The specifications of mobile chargers (Salcomp) are set by the customers to a large degree, which makes it difficult to standardise the products fully across customers. Also, the mains plugs differs in different countries, depending on local safety regulations. Hence, the modified product strategy is used by Salcomp. Tecnomen operate in the field of mobile network equipment manufacturing. In contrast to NET, it does not deliver total networks, but certain solutions or components for mobile networks. This requires a high level of integration with customers' existing network environment, often including interfaces that are not defined in the technology standards. Hence, this calls for customer-specific adaptations in Tecnomen's products. Moreover, certain country-specific adaptations are also necessary due for example to differences in technology standards.

Analysis of the similarity of technology life cycle stages across countries shows that the countries have become more similar due to faster diffusion of technology across

the globe. During the analogue phase in mobile telecommunication, the technologies were fragmented in the world. Also, the diffusion of GSM happened in stages, so that it was first adopted in Europe then in Asia, and now in the Americas. This process has taken approximately 10 years. The newer standards are adapted at a much faster speed, e.g. MMS and WCDMA. MMS was launched by more than 100 operators globally by the end of 2002 according to Nokia (Konola 2003). This can be considered to be relatively fast as the first MMS specifications were agreed at the end of the 1990s. This examination shows that the differences in the technology life cycles across countries have decreased, although certain differences still exist. This development towards faster technology diffusion across the world was reported by many of the case companies. One of the interviewees commented on the spread of new products as follows:

"There is no longer a sequence in which a new product is developed in a certain place, and then transferred in stages to different areas of the world, so that it penetrates the world in 10 years' time. The products spread throughout the world in weeks rather than years."

It can be concluded that the product technology life cycles have become more similar across the world as the technologies spread fast globally and the dominance of technology[59] has become greater in the environment of the case companies. This has made the product strategies more similar across countries. It was further evident that the technology dominance and similarity of stages were especially high in the cases that had developed towards standardised strategy (NMP, NET, NK Cables). For those using the modified strategy (Salcomp, Tecnomen), the technology dominance and the similarity of stages had not developed as far. Moreover, it was found that the further the company is on the technology life cycle the more standardised the product strategy is expected to be. Based on this examination it can be concluded that the proposition was **supported.** The proposition will stay as originally postulated:

---

[59] The dominance of technology in this connection refers to the establishment of a dominant design, a certain technology standard that is used across the countries.

The greater the dominance of one or a few technologies and the similarity of stages across countries, the greater the use of more standardised product strategies compared with adapted ones.

However, an important empirical finding is that as the companies proceeded towards the mature stage and the global segments increased, the product range was often broadened as the companies sought to enable growth. The importance of horizontal co-operation also increased. As this development was apparently affected by the globalisation of the company it will also be explored further when discussing propositions 4-6.

4.3.1.3 Disruptive technology discontinuities

Next the development of global products will be discussed in terms of technological discontinuities. First the development of the case companies will be discussed and then the proposition will be examined.

4.3.1.3.1 Development of technological discontinuities in the cases

At **NMP,** the biggest technological discontinuity relates to the change from analogue technology standards (1st generation), such as NMT, AMPS, TACS, to digital technology standards (2nd generation), such as GSM, TDMA and CDMA. Also, an ongoing discontinuity is the change towards packet-based data and multimedia and the new 3G standards (e.g. WCDMA). In the first generation, Motorola had a global lead in the mobile telephone markets. Also, the Japanese companies had a strong position. The introduction of the new second generation standards created a disruptive technological discontinuity and only those companies that were able to invest early enough in this technology were able to take leading positions in the new markets (See also Christensen 2000, 113). Moreover, the purpose of for example GSM was to become a global standard,

which meant that those companies able to develop successful products would also be eventually able to market those products on worldwide markets. In the second generation market, NMP was able to capture the global lead as both the US-based Motorola and manufacturers in Japan and Korea lost their positions. Important reasons to NMP's success are that it was able to understand the speed of the change in digital technologies, the importance of product standardisation across the emerging new digital technology standards and the importance of segmentation (e.g. emerging consumer markets). Motorola, the industry leader in the first generation, was captured by the slowly moving American market as it shifted from AMPS to TDMA. It was not able to convert to digital standards fast enough. Now, the third generation may become a new discontinuity. Its impact is not evident yet, but it clearly offers an opportunity to players from other industries and challenger positions to enter the market.

The most important recent technological discontinuities in **NET** are the GSM and 3G standards. Also, the ATM- and IP-based technologies have had an impact on the products. NET has been able to use the technological discontinuities better than the competitors. The choice of GSM provided them with an opportunity to expand to become a global player as the GSM standard spread all over the world. NET has also been able to sustain its position when entering 3G. The introduction of 3G seems to be closer to a sustainable discontinuity than to a disruptive from NET's perspective, as it has been able to use a great deal of its technological competences acquired in GSM era. One of the interviewees comments on this as follows:

"One of Nokia Networks' keys to success has been the ability to take advantage of technological discontinuities better and faster than the others. In for example 3G, it is mainly Nokia and Ericsson who have been successful. The reason being that 3G requires such a big investment as well as an understanding of what has been done in GSM."

In the mobile charger area, an important technological discontinuity relates to the competition between chargers based on switch mode technology compared with linear technology. **Salcomp** was able to acquire a position as global market leader

in the switch mode charger markets at an early stage. The battery types used affect which technology is the most competitive. Increased use of lithium-ion batteries in mobile telephones from the mid-90s onwards has meant that the proportion of switch mode chargers has decreased from around 80% of the global markets in the early 90s to 30% last year.[60]   This led Salcomp to purchase the linear charger manufacturer Aspro in 2003 and has therefore meant a major change in their product strategy.

In the messaging business when the voice mail and short messaging service centres (SMSC) were introduced to the markets in the early 90s, **Tecnomen** did not yet realise the potential and other competitors like CMG, Logica, and Comverse were able to take advantage of these new markets. One of the interviewees at Tecnomen commented on the reasons for this as follows:

"The reason relates to the facts that Tecnomen was in part not able to standardise the products enough, but also to a large extent to the missing sales channels."

However, Tecnomen has recently been able to benefit from the technology discontinuity related to the shift from SMS towards the Multimedia messaging (MMS) used in 3G services. They have been among the first to bring MMSC products on the market and they have reached the number four position in MMSCs sold worldwide based on their statistics. They have also been able to establish a number of partner agreements with global network manufacturers, which have opened up a new sales channel.   See Figure 46.

---

[60] Estimate provided by Salcomp in the interview.

Figure 46. Number of MMSC deals
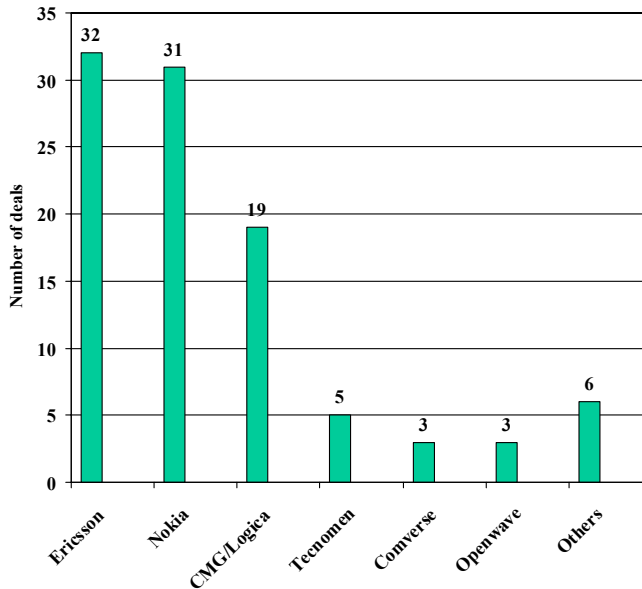
Source: Tecnomen 2003

The cable producers faced a disruptive technological discontinuity when the demand for cable TVs collapsed and the need for cables for base stations in the mobile networks emerged at the end of the 80s. For example Ericsson, with a long tradition in the cable industry, was not able to make this change as the old cable TV customers disappeared. However, **NK Cables,** from a challenger position, was able to recognize the new opportunity, use old machines for this new purpose, and hence become a global player in this area. NK Cables estimates that they have been able to capture a worldwide market share of around 10 percent in the antenna feeder cables business. The possible future technology discontinuities include the transfer of the base stations to the top of the mast, which would make the feeder cable unnecessary. Another discontinuity could be foreseen by the gradual replacement of the feeder coaxial cable by fibre optic. Also, the US-based Andrew Corporation used this disruptive technology discontinuity and expanded to the RF cables business with the Heliax branded cables, reaching a global leadership of around 50 percent. Their original background was in radio technology and they can therefore be seen as a new entrant to the cables business.

4.3.1.3.2 Examination of the proposition

The working proposition 3 is now examined based on the above findings. See the proposition as postulated earlier:

WPR 3: Industry leaders seldom sustain their leadership when facing disruptive technology discontinuities requiring a change of strategy from international towards global. The new global leaders are likely to come from other industries or challenger positions in current industry.

In the mobile telephone markets, Motorola lost the global leadership, when **NMP** from a challenger position, was able to take advantage of the technology disruptive discontinuity posed by the introduction of GSM (See also Christensen 2000, 113). NMP was able to benefit from increased standardisation of its product strategy, while Motorola was captured by their existing customers in USA. Also, **NET** was also able to use the disruptive technology discontinuity related to the introduction of GSM to its advantage by focusing on the GSM standards and its evolution globally, and by developing highly standardised products for these markets. NET has been able to achieve a leading global market share in GSM networks, which in 2002 was over 25 percent, while the position of the industry leaders eroded (e.g. Lucent and Nortel). Also, **Tecnomen** was able to enter the MMSC market from a challenger position and gain a significant global market share. **Salcomp** was also able to gain in the charger business a leading position in the world, although they had no earlier references in that area. Moreover, **NK Cables** was able to reach a globally strong position in RF cables globally, while industry leaders like Ericsson did not manage to take the opportunity. It may be that Ericsson did not realize the size of the emerging new market. Based on this discussion it can be seen that working proposition 3 was **strongly supported** in this research. The proposition will stay as originally proposed.

PR 3: Industry leaders seldom sustain their leadership when facing disruptive technology discontinuities requiring a change of strategy from international towards global. The new global leaders are likely to come from other industries or challenger positions in current industry.

4.3.2 Micro level variables

4.3.2.1 Corporate business portfolio and strategic intent

The analysis at the corporate level in section 4.2.1.2.6 shows that globalising internationals are selecting from a large number of unrelated strategic business units one or a few strategic business units for globalisation. It was also apparent that companies often seek further growth by related diversification as globalisation matures. (see also Luostarinen 2001a, 2003) It seems that the strategic business unit(s) with the highest global growth potential and expected globalisation benefits are often selected for globalisation. For example Nokia analysed, which of the 12 business areas would provide global growth potential and profitability in the future and decided to focus on telecommunication in the beginning of 90s. Out of the cases under investigation in this study NMP, NET, Salcomp and NK Cables were all part of Nokia until the mid 90s. NK Cables was sold to NKF in Netherlands in 1996 (which became later part of Draka Holding) and Salcomp to EQT in Sweden in 1999. Also, Kyro decided to focus strongly in the mid 90s. It selected the technology businesses (inclusive Tecnomen) and divested its forest industry related businesses from its portfolio during the mid 90s. In beginning of this decade it decided to also list Tecnomen as a separate company at the Helsinki Stock Exchange. As noted earlier divested strategic business may also become global under new ownership, as was the case in the divested companies investigated in this study. The detailed examination of the reason for business portfolio selection is outside the scope of this study.

Through the vision / strategic intent the corporate level management communicates to the strategic business units long-term targets for developing businesses and broad guidelines for product strategies. For example Nokia described in 1992 the vision as

consisting of four elements: telecom, global, focused and high added value. The businesses not in line with this vision were divested during the 90s and the company focused almost entirely on mobile telephones and network equipment by the end of 90s. In 2001 Nokia's strategic intent at corporate level was as following:

"Nokia, the trusted brand, creates personalized communication technology that enables people to shape their own mobile world" (Ala-Pietilä 2001).

For each strategic business unit an own strategic intent is often then developed together with the management of the unit. NMP's strategic intent in 2001 was the following:

"Our strategic intent is to strengthen and expand our leadership in mobile phones to branded personal mobile products and services through innovation, speed and quality" (Alahuhta 2001).

Kyro (parent company of Tecnomen until 2001) stated as its vision / target during the strong global expansion period as follows (Kyro Annual report 1998):

"The business domain for the new Kyro consists of selected technology businesses in which we are among the leading suppliers in the world."

It is important to examine the availability of resources and its impact. The globalisation of a strategic business unit is so demanding in respect of required managerial and financial resources that the implication for corporate level management is that only one or a few strategic business units may be selected for global entry. Moreover, it should be noted that as total sales is derived increasingly from one or a few strategic businesses during globalisation the importance of strategic business unit level decision-making seems to be increasing. As a result, the corporate and strategic business unit decision-making also becomes highly interlinked.

Both managerial and financial resources are allocated to the units that are selected for global expansion. The resource commitments at the corporate level are a prerequisite that the strategic business units may develop a wider product assortment and more advanced products as globalisation proceeds. The impact of

resource commitments on the product strategies will be explored closer when examining the decision-making related variables and proposition 9 in section 4.3.3.

Next globalisation related factors (corporate / business level) impact on product strategies will be examined.

4.3.2.2 Geographical market expansion, management orientation, and market development

It was found in the theoretical discussion that two issues in the evolution of market strategy are especially important in question of product strategies of ICT companies. First, the impact of the geographical market expansion outside the home continent and second the impact of the change in the market development from international entry and penetration to global market alignment phase on product strategies. In the empirical part it was, however, discovered that as the company expands and market develops outside the home continent its management orientation also changes and therefore the analyses were extended to include also this development. The impact of these factors on the selected product strategy will be discussed next on the basis of the empirical findings.

4.3.2.2.1 Geographical market expansion

Geographical market expansion was measured in this study by globalisation degree (percentage of sales outside Europe), number of countries, and expansion speed. These are now each reviewed to understand developments and their relation with product strategy.

Figure 47 shows the relationship between globalisation degree and standardisation of product strategies across countries and customers. It is evident that as the globalisation degree of the case companies increased, the case companies have used a more standardised product strategy alternative across countries and customers.

Figure 47. Globalisation and product standardisation degrees

Standardisation degree across countries and customers
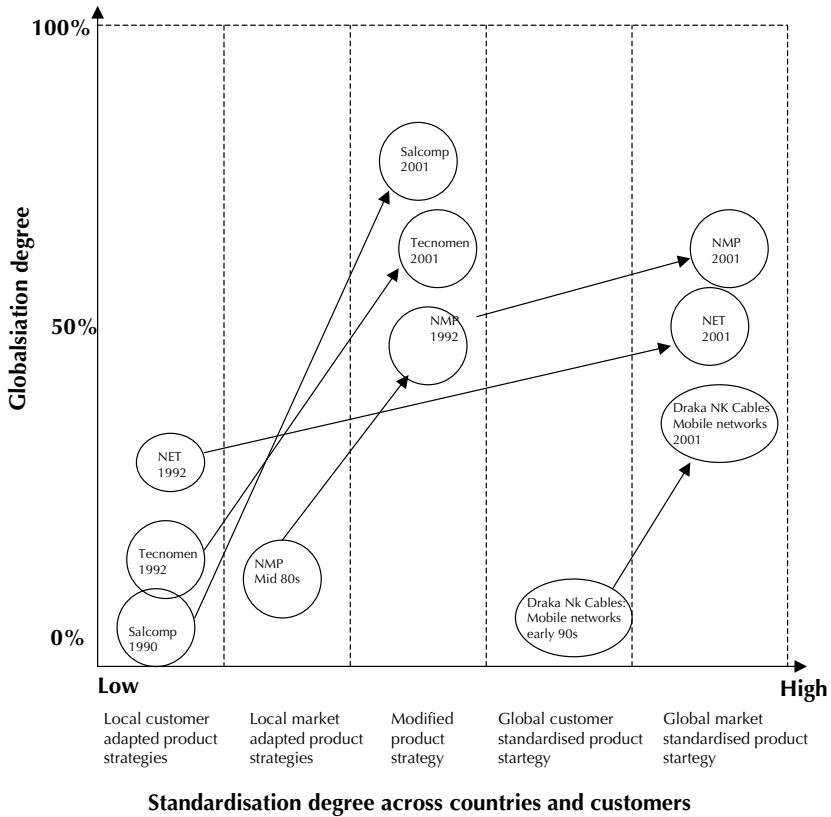
Source: Compiled by the author based on the research data.

Analysis of the two product strategy patterns (towards standardised & towards modified product strategy) revealed that all cases had developed towards a more standardised product strategy as the globalisation degree increased. Surprisingly, the cases that used the modified product strategy had even higher globalisation degrees than those using the standardised strategy. The reason for this may lie in the globalisation path of the cases using the modified product strategy; they had used global customers as channels in reaching global markets. This is a fast approach reaching global markets. This was commented on by one of the interviewees as follows:

"Due to the fact that a large part of our sales has gone to Nokia our high sales outside Europe gives a somewhat distorted view of our global stage. The sales organisation has been extremely thin due to this business approach."

The speed of the global market expansion and the diversification of the expansion varied in the case companies. The global expansion of NMP was rapid at the end of 80s and early 90s, but towards the end of 90s it slowed down. It has diversified to large number of countries. By 1992 mobile telephones were sold in 60 countries, by 1993 in 90 countries, and by 1995 in 120 countries and by 2002 in over 130 countries. NET has also diversified to a large number of countries, although due to the emphasis on GSM and WCDMA, there are fewer of countries and the focus is more in Europe and Asia. The expansion was especially fast during the 90s. On the basis of the development of NET's public customer references it can be seen that the number of countries to where network deals have been made developed from around 10 countries per year in the early 90s to close to 40 countries per year in the beginning of this decade. Altogether they have informed about network deals to 72 countries during the period 1990 – 2002.[61] Tecnomen operates in considerably fewer countries than the previous to cases. In the mid 80s it was selling to five countries directly, but had also substantial indirect sales via Tamgless. The number has thereafter increased gradually and by 2002 it had already delivered its systems over 40 countries in total. By 2002 it had established sales offices in 11 countries. Salcomp's products are sold to major mobile telephone manufacturers, such as Nokia and Ericsson. The chargers are distributed via the mobile telephone manufacturers as part of their products to a large number of countries although its own organisation abroad is quite small. By 2002 it had established offices in addition to Finland in Brazil, China, and the USA. NK Draka Cables currently has subsidiaries or sales offices in seven countries abroad and sales to a relatively large number of countries.

In all cases, the increase of foreign countries seemed to relate to a higher degree of standardisation of product strategy. When the geographical expansion is fast the companies have to decide how many new countries to include and in what order.

---

[61] Based on Nokia Networks' public deals informed on www.nokia.com.

This is easier if the product is more standardised. Also, in the global stage the target is to develop very similar products and as few adaptations as possible. One of the interviewees commented on this as follows:

"The roll out is more important when you have mass production. You cannot make mistakes in this or it gets very costly. The procedural parts and quality requirements have risen in importance. It must be possible to install the product with many fewer people and faster…also the product may not be adapted that much anymore"

Examination of the cases that all have evolved towards a highly standardised product strategy showed that NMP and NET had used a *market diversification alternative (*See Luostarinen 2000a) targeting fast growth in the numbers of countries covered. NK Draka cables had selected a *market centralised diversification alternative* that implied diversifying to selected areas of the world, while concentrating in these areas on a limited number of countries. This can be understood on the basis of NK Cables' high sales to certain global customers, including for example Nokia, through which its products were distributed to the global markets. Examination of the cases using the modified strategy revealed that these companies all used the market centralised diversification alternative. They diversified to selected areas of the world, but concentrated in these areas on a limited number of countries. It is interesting to note that NMP and NET globalised more independently while NK cables, Salcomp and Tecnomen utilised at least partly a customer follower strategy in globalisation. The latter approach enables presence in a smaller number of countries as products are distributed through often global customers.   The importance of the total number of customers was also emphasised in the interviews. One of the interviewees from Tecnomen commented on this as follows:

"As we grew and expanded globally we have had to define our priorities again. For certain customers we do customisations and to others we do not do that in practice at all. This relates indirectly to the growth of countries, but directly to the fact that we have obtained more customers. This has forced us to standardise the product more."

This leads to the conclusion that in addition to understanding the geographical expansion it is also important to understand the management orientation and the global market strategy development phases. These will be reviewed next.

4.3.2.2.2 Management orientation and global market development phases

The development of management orientation (See also Perlmutter 1969) and market strategy evolution from the international entry and penetration phases to global market alignment phase (See also Craig and Douglas 1996) and its impact on product strategy is reviewed next in the five case companies. First the three cases that have shifted to the global market standardised product strategy are analysed and then the two cases that have shifted towards the modified product strategy.

When **NMP** penetrated the international markets in the 80s, it was divided into three units, NMT, Euro and USA, each focusing on a particular technology standard prevailing in a certain area of the world. The products were manufactured to meet the requirements of these specific market areas. These different units were highly independent. Each unit had their own product development and the products were completely different. The management orientation was polycentric. In this stage, the main emphasis was on penetrating the international markets deeper and products were highly adapted on the basis of different market requirements.

At the beginning of the 90s, a global functional organisation was established in NMP with global heads in sales and marketing, research and development, production, sourcing, and other staff functions. This meant a closer integration of the different units globally and a start of global alignment of operations in different countries. Further, in the mid 90s, a regional organisation was established in which the world was divided into (A) the Americas, (B) Europe, Africa and the Gulf, (C) APAC, and (D) Japan. This can be seen as a change towards a regio-centric organisation. The regions were assigned responsibility for manufacturing, logistics, sales, service, and support functions. The product creation remained centralised under a global functional head, which has enabled a global view in the development of products. Starting from the early 90s, the company has sought for

integration benefits on global level by using common platforms and elements in the products, but still adapting the products to the different regions.

Further in 1999, NMP established two main business units Cellular Mobile Telephones (CMT) and Digital Converge Unit responsible of respective products. Moreover, in 2002 NMP was further split into nine business units / product lines based on application areas. These units were given worldwide responsibility and the management orientation developed towards geocentric seeking global integration benefits and synergies, but also heterarchic where each unit contributes to the whole. During the 90s, the company built a large network of R&D units located all over the world, and manufacturing has been established on all continents.

The global alignment of markets had a pivotal role during the 90s in NMP. In product strategy, it has meant that common product platforms are used worldwide and products have become highly standardised, especially in those categories supporting the GSM across the world (e.g. tri banders). (Interviews, Nokia Annual Reports) See Figure 48 for an illustration of the development of the management orientation, market strategy and selected product strategy in NMP and the other case companies.

Figure 48. Globalisation of case companies and selected global product strategy

Stage:	INTERNATIONAL STAGE		GLOBAL STAGE	
Management orientation:	Ethnocentric	Polycentric	Regiocentric	Geocentric - Heterarchic
Market development phases	International entry and penetration		Global market alignment	
NMP	Domestic product	Local market adapted product strategy in 80s	Modified product strategy in 90s (+ CDMA/TDMA)	Global market standardised product strategy from 2000 (Triple banders)
NET	Domestic product	Local customer adapted product strategy in 80s	Modified product strategy in early 90s	Global market standardised product strategy from mid 90s
Tecnomen	Domestic product	Local customer adapted product strategy in early 80s Global customer standardised product strategy in mid 80s	Modified product strategy during 90s	
Salcomp	Domestic product	Local customer adapted product strategy end 80s	Global customer standardised product strategy Modified product strategy from mid 90s	
NK Cables	Domestic product	Local customer adapted product strategy in 80s (Fixed networks BU)	Global customer standardised product strategy from mid 90s (Mobile networks BU)	Global market standardised product strategy from 2000 (Mobile networks BU)

(left vertical axis label: Global product strategy)

Globalising internationals
(Focus of study)

Source: Compiled by the author based on the research data. The categorisation of the management orientation has been adapted from Perlmutter (1969) and Hedlund (1985). The global market development phases has been adapted from Craig and Douglas (1996).

NET was divided in the early 90s into cellular systems, switching systems, transmission systems and special systems. The international stage began with exporting. Then NET gradually established sales offices in a number of countries. It sought local responsiveness by giving relatively high autonomy to local sales offices, although it kept the major product-related decision for the product line at the headquarters in the early 90s. The management orientation can be characterised as ethnocentric / polycentric.

NET further developed an area management organisation during the 90s. At the beginning of the 90s it introduced a new international mode of operations, which included a uniform company-wide area and account management. The areas were (A) Finland, (B) CIS, (C) Scandinavia & Baltic countries, (D) United Kingdom, (E) Germany, (F) Europe A, Europe B, Europe C, (G) Asia, (H) Northern Africa & the

Middle East, (I) Australia & New Zealand. The decisions concerning the target countries and customers were to be made in co-operation with the area and global divisions, while product development decisions were made by the global division and the respective product lines. Later in 1997, regional heads were assigned to each important continent on Nokia corporation level. The management orientation has developed towards the regio-centric, although the division into regions was not so structured as for example in NMP. From the mid-90s towards the end of the 90s, the company experienced rapid growth and its resources were extremely limited in many areas in R&D. During this period NET started to seek global integration benefits and synergies from operating on a global scale and to align its activities on global level. In products, this meant development of truly global products that were often similar across countries. Further, at the beginning of this decade, operators started to consolidate and become global. This required a change towards a global customer focused sales approach in which the importance of sales subsidiaries is less. An interviewee at NET described the development as follows:

"From 1990 to 1996 the organisation was characterised by global business units and product lines responsible for developing the products, and then local country organisations responsible mainly for support and sales in a particular country. From 1997 to 1999 the company sought global integration benefits, competence transfer, and linking customers closer to the business units. From 2000 onwards a model has emerged in which the main sales dimension is not the local countries anymore, but instead the operator customer base."

It may be concluded that NET has developed from a ethno / polycentric management orientation via regio-centric to a geocentric one during the 90s. This has also meant that the market strategy has changed towards a global market alignment and the products have become highly standardised across countries and customers.

NK Cables has been part of a number of large corporations. As part of Nokia, it diversified into a number of cable-related fields during the 70s and 80s with the main emphasis still on the domestic market. In 1987, it had a diversified product

portfolio including a larger number of cable products, installation accessories, aluminium profiles, and power capacity products. NK Cables entered the international markets to a greater extent in the 80s and the early 90s when it was part of Nokia. The management orientation was ethnocentric to a large degree. In 1990 Nokia Cables, Nokia aluminium, Nokia Cable harnesses, Nokia Capacitors, and Nokia Maillefer were restructured into independent companies within Nokia Cables and the machinery division. In 1990, Nokia bought a majority holding in NKF cables of Netherlands, in an effort to enter to West European cable markets. This meant that Nokia had two cable companies operating independently in the international markets. NK Cables had established a presence in northern Europe and Asia, while NKF had a strong market position in central Europe. The companies also operated in the same markets. The management orientation was rather polycentric. The products were at that time often highly adapted to local customers, who often ordered from domestic sources.

NK Cables and NKF had overlapping organisations, products, and markets in the beginning of the 90s and therefore division of the markets between the companies was discussed. Later, the markets were divided on the basis of a decision by top management. Also, the company was structured according to regions. In 1994, Nokia Cable industry's operative structure consisted of the Nordic region (largely operations related to NK cables) including the Fibres, Tele, Power, Installation and Other activities business units, and then the Central region (largely operations related to NKF) including the Tele, Power and Projects business units. The management orientation shifted towards the regio- centric at this stage. Each region had products that were entirely its own.

During 1995, Nokia Cables shares were first sold to the NKF holding and later in 1996 NKF Holding was divested from Nokia's portfolio. This meant that the operational structure of the whole NKF group was converted into three business groups consisting of Power cables, Telecom, and Projects. Further, in 1999, NKF holding (including NK Cables) was bought by Draka, which is a holding company with 60 operating companies in 25 countries in Europe, North and South America, and Asia. These changes in the organisation have meant that the management

orientation has shifted towards a geocentric / heterarchical orientation, in which global responsibilities are assigned to certain units, while others are assigned local responsibilities. For NK Cables, this has meant that some business units operate only in neighbouring countries, while others are given global mandates to manufacture, develop and market products. A product market committee was established to decide the countries in which each unit should operate and which units will operate on global basis. The mobile networks business unit producing RF cables and accessories for base stations were assigned a global mandate within the corporation. Their products have become fully standardised across countries and customers.

It can be concluded that the management orientation and market strategy have shifted towards the global in NK Cables. As a consequence, the product strategy has changed from a local customer adapted product strategy towards a global market standardised product strategy applied especially in the mobile networks business unit having a global mandate.

Salcomp, the case evolving towards a modified product strategy, entered the international markets by exporting in the beginning of the 80s. The main focus was still on the domestic customers and plans for developing the foreign markets were made at headquarters. The management orientation was largely ethnocentric. The company received a number of international OEM customers, each of which required different types of products. Therefore, the product portfolio became diversified and the company was active in the subcontracting of modules and the production of TV / satellite tuners and power supplies for a wide variety of applications. The company focused on chargers for mobile telephones in the early 90s and obtained both Nokia and Ericsson as customers and gradually a number of other mobile telephone manufactures as well. As these companies globalised, Salcomp's products were distributed globally. This meant that the products were relatively standardised across countries, but much less across customers.

In 1997, regional sales offices were established in the USA and in China to be able to serve customers in the fast growing markets more effectively. Also, towards the

end of the 90s, foreign production was established in China, Mexico, and Brazil by making contract manufacturing agreements. The purpose was to be able to increase the speed and flexibility of logistics for the customers on these continents. The company also penetrated the linear charger markets through the acquisition of Aspro in the beginning of 2002 with operations in Switzerland and China. These changes shifted the management orientation towards the polycentric / regiocentric. The company also started to strive for integration benefits on the regional and global level. Salcomp was able to develop global product platforms to be used across countries during the 90s.

Global alignment of the activities of Aspro and Salcomp was started at the end of 2002. It was expected that separate headquarters for Aspro in Switzerland would be closed down. Common processes were also implemented across the two companies. Global alignment has also meant that a few years ago the company also started to develop product platforms that are similar not only across countries, but also across customers. Altogether, it can be concluded that Salcomp has shifted from a local-customer-adapted product strategy in the 80s to a global-customer-standardised product strategy and further to a modified product strategy a few years ago. Also, common processes have been developed for R&D product development. These have been introduced in the 90s.

Tecnomen entered the international markets by exporting during the early 80s. At that point, the main focus was still on the domestic customers. However, products were distributed abroad via their biggest customer Tamglass. At that time products were customised for the local customer needs. The successful internationalisation of Tamglass meant that Tecnomen's products were already in the mid 80s distributed indirectly through Tamglass to a large number of foreign countries and the company shifted to a global customer standardised product strategy. The management orientation while the company entered the international market can be characterized as ethnocentric. During the end 80s and 90s, the company established sales subsidiaries in many foreign countries as it penetrated deeper into these markets. Also, competence centres were established in the most important

markets in the end of 90s. Although the company was managed from headquarters, subsidiaries also had an opportunity to make product decisions to a certain degree, which meant that the management orientation was also polycentric to some extent. For example, the competence centres had the right to do minor product adaptations and R&D work, while releases of totally new versions were mainly handled at R&D sites in Finland and Ireland. Also persons from the foreign countries were increasingly selected to run the sales subsidiaries. In 1999, a new area-based organisation was introduced in Tecnomen, in which the globe was divided into four regions (a) Europe, (b) East and South East Asia, (c) Middle east and Africa, and (d) the Americas. This marked a change towards a regionally integrated approach as strategies were made for different regions in the world.

In product strategy, the company shifted during the early 90s from global customer standardised product strategy to modified products that use global product platforms and modularity. The products are adapted on the basis of both customer and country requirements, however the differences between customers are greater than those between countries. Also, during the 90s a unified product management process was introduced. This meant that the global customer requirements can be handled efficiently in similar manner across the world.

Two new empirical findings were obtained by analysing the development of the product strategy of case companies. First of all, the case companies entered the global markets with a narrow product range. Often, only one or two product lines were selected for global entry with a very limited number of individual products. However, as the companies expanded further towards the global stage they increased the number or product lines / product categories and often the individual products in the lines as well. The use of global product platforms facilitated the development of a number of product lines as well as products. Secondly, co-operation with horizontal value network partners increased considerably in the global stage, especially for NMP, NET, and Tecnomen. It can be seen that when the company is in the international entry and penetration phase it is important to co-operate backward in the vertical value chain with suppliers and forward with customers and channel. However, when entering the global alignment phase, the

importance of co-operating with the global value network members horizontally becomes increasingly important. NMP, NET, and Tecnomen all participated actively in standardisation forums. This resulted in open standards and more structured architectures and interfaces with different products. Increasingly new technologies and standards are created together with industry members. For example, the Open Mobile Alliance (OMA) has been established to create open standards for the mobile industry. Another example is Symbian, which was initially established by Nokia, Ericsson, Motorola, and Psion to develop a common operating system for wireless devices. Also, NMP and NET had started to sell platform elements to their competitors. For example, Nokia only recently announced that it has licensed the series 60 software platform to a number of mobile telephone manufacturers, including Matsushita, Samsung, Sendoa, and Siemens. An interviewee described the increasing co-operation with horizontal value network members as follows:

"The horizontalisation can be seen as the next stage in globalisation. The business will not only be vertical as it has been until now. It will also become more and more horizontal. NET has realized that to be able to get full benefits out of technologies they can be sold to competitors."

As a summary, it can be concluded that the management orientation of NMP, NET, and NK Cables has evolved from the ethnocentric to the polycentric and further via the regio-centric to the geocentric. In these companies heterarchical characteristics are also evident as they often had many centres, subsidiaries were given increased freedom, and there was a mix of centres having different roles, to mention some findings supporting this view. The change in the management orientation has also meant that the market strategy of the companies has shifted from international entry and penetration to global market alignment. This has further triggered change in the product strategies, which have evolved from localised product strategies towards standardised product strategies. While in Salcomp and Tecnomen, the management orientation has evolved from the ethnocentric to the polycentric and further to the regiocentric, although the geocentric or heterarchical management orientations have not been reached. In market strategies, these companies have

recently also entered the global alignment phase. They are, however, still at the very beginning of that phase. This has affected the product strategies of the dissimilar cases so that they have evolved from localised product strategies to modified product strategies. An interesting new finding was the discovery that the global markets are entered with a narrow product range, which is then gradually increased as the company progresses towards the global stage. Also, the finding that the co-operation with horizontal value chain members increases along with globalisation was important.

4.3.2.2.3 Examination of the propositions

Propositions 4-6 discussing the core globalisation strategy, geographical market expansion and global market development phases are examined next. These were originally postulated as follows:

WPR 4: A company applying a multi-domestic strategy is expected to favour a localised product strategy, a company applying a transnational strategy is expected to favour a modified product strategy, and a company applying a pure global strategy is expected to favour a standardised product strategy.

WPR 5: As the company expands geographically from international to global markets, and the faster and the more geographically diversified the expansion, the more standardised the product strategies.

WPR 6: As the company moves from the international market (entries or penetrations) phases to the global market alignment phase, the more standardised product strategy alternatives and product management processes will be applied.

Based on the analyses of the case companies, it was found that as the globalisation degree increases the company moves towards more standardised product strategies across countries, but also across customers, which can be seen as an important empirical finding. The analyses related to how diversified the company was in market presence (i.e. number of countries) or expansion speed did seem to support the assumption that the more diversified and the higher the speed of the expansion

of the company the more standardised product strategies would be used. Therefore, working proposal 5 was **supported.** However, it is important to note that some of the managers interviewed stated that the impact of the number of countries may be indirect as other factors such as the number of customers and the technology standards in the countries drive the change in the product strategies even more strongly.

When analysing the proposition related to the impact of core globalisation strategies (Pure global strategy, transnational strategy and multidomestic strategy) on product strategy (WPR4) it was found that corporates had pursued these types of strategies during the different phases of globalisation, but often these were not explicitly stated as the globalisation strategy. The companies decide upon the target (as part of vision or strategic intent) to become global and then the specific avenues to reach this goal emerge. They are not deliberately chosen (See also Mintzberg and Waters 1985). The core globalisation strategy seemed to emerge as the result of numerous actions that the corporate had taken in the international markets. During the 80s, Nokia had grown through acquisitions in a number of countries, and hence, it was seen as a multidomestic company at that time. It has then further evolved to become transnational, and the latest development shows that it pursues a pure global strategy as it has been aligning its businesses and seeking increasingly global integration benefits. When analysing the impact of this on the product strategy of the various businesses (NMP, NET, Salcomp, NK Cables) over time it can be seen that as expected, the product strategy has become more standardised in the different businesses. Kyro had a number of businesses in the 80s and early 90s, and hence pursued a multi-domestic strategy. Later, the company separated Tecnomen from the Group and it is evident that Tecnomen has become increasingly transnational as it strives to benefit from both national responsiveness and global integration (See Prahalad and Doz 1987, 24; Bartlett and Ghoshal 1987a and 1987b). This is in line with the finding that the product strategy has shifted towards a modified one. The impact of the core globalisation strategy development on the product strategy at strategic business unit level is, however, not direct and it seems that a number of other factors might have a heavier impact on the product strategy at business unit level. Hence, it may be concluded that working proposition 4 was only **partially**

supported. The interviews revealed that the management orientation towards the foreign subsidiaries was more important for the product strategy at the business level. These management orientations or attitudes are assumed to reflect the goals and philosophies of the company with respect to international activities and to lead to different management strategies and planning processes (See Perlmutter 1969, Wing et al. 1973). Hence, the impact on product strategy at business unit level can also be assumed to be more evident.

When further analysing the management orientation and changes in different global market development phases it was seen that these have had an impact on the selected product strategy. As the management orientation evolved towards the geocentric and the market strategy towards the global alignment phase, the product strategies were found to be developing towards higher standardisation across countries and customers worldwide. It can therefore be concluded that working propositions 5 and 6 were **supported.** Propositions 4-6 were decided to be combined into one proposition. The empirical finding of the importance of the development of the standardisation towards not only higher standardisation across countries but also across customers was added to the new proposition as well as the impact of management orientation, while the impact of core globalisation strategy was adequately reflected as part of the management orientation. The proposition was postulated as follows:

_PR 4 – 6 a:_
 When the company shifts from international to global in respect of geographical markets, management orientation, and market development phase, the product strategies and product management processes become more standardised across countries and customers.

During the empirical phase, two important findings were discovered in evolution of the product assortment: the product assortment is developing towards a broader one and the horizontal co-operation is increasing in the value networks. Moreover, it was found that the product lines in the product assortment are planned so that they

are highly focused in a SBU. Common product platforms, technology development, production facilities, channels and customers are used when possible across product lines. The examination of the constructs resulted in an understanding that both macro and micro variables affected this development (Later, the impact of milli-micro variables will also be discussed). It was found that when the number of global segments increases and the product technology life cycle matures and globalisation advances both the product range becomes broader and the horizontal co-operation increases in a strategic business unit. Therefore, a new proposition was postulated as follows:

PR 4-6 b NEW:

An increase in global segments, and maturing of product technology and globalisation favour a focused wider product assortment and horizontal co-operation in value networks.

4.3.2.3 Centralisation and decentralisation of business operations

4.3.2.3.1 Development of production and marketing operations in the cases

NMP established production facilities during the 80s and 90s in a number of countries. Currently, it has relatively decentralised manufacturing, as it has 10 manufacturing plants in nine countries. Also, outsourcing is used to a certain extent as around 15-20 percent of the volumes in 2002 were outsourced (Nokia Form 20-F 2002). The factories are co-ordinated globally and they have common manufacturing technology and processes, which enable the manufacturing of mobile telephones not only for a specific region, but for other regions as well when needed. To retain this type of flexibility, the products need to be standardised. NMP has also gradually built up its network of sales offices abroad. Currently, it has a sales subsidiary in most important markets. It can therefore be concluded that the production and marketing operations have been increasingly decentralised.

NET has seven production facilities (end of 2002), of which four are in Finland and three in China. Over 60% of NET's production is outsourced as are some support

services. (Nokia Form 20-F 2002) The reason for establishing manufacturing abroad had been more related to trade barriers than a need to be able to adapt to national requirements. For example the production facilities in China had to be established to be able to enter that specific market. NET has had production facilities in other countries as well, for example Australia, but these have been closed down. NET's production is planned currently so that it is driven by efficiencies only. The factories are delivering the products globally. NET has also established a large number of sales offices abroad. The steering of market and sales is global, but the execution and customer interface is local. The marketing directions are set on global level at headquarters in Finland. It may be concluded that the sales and marketing operations have developed into a more decentralised direction, while production operations have been evolving towards a more centralised approach.

Tecnomen's has built a network of 11 sales subsidiaries and recently established a regional sales and marketing structure. Production is centralised in Ireland and Finland; sales are decentralised into the regions and sales subsidiaries. In **Salcomp,** production is located in Finland, China, and Brazil. The Finnish factory delivers to Europe and Asia, but will focus more on Europe in the future. The factory in China will focus on Asia. The Brazilian operation produces only for local markets; the reason for establishing this factory was the high import duties duties in Brazil. The operations are in these countries, because the company wants to be close to the mobile telephone manufacturers (customers). Chargers are added to the mobile telephone sales package in the place where the mobile telephones are manufactured and therefore the closeness to the mobile telephone factories is essential. Production is outsourced in Brazil. The marketing and sales operations have developed so that earlier Salcomp operated in export mode and used agents in Hong-Kong, Turkey, Italy, the UK and Spain for foreign sales. Currently sales are conducted through regional offices located in the USA, Brazil, China, and Finland, and also through dedicated key account managers. The sales channel is directed to the main mobile manufacturers and contract manufacturers. It can be concluded that the manufacturing and marketing has developed towards a higher decentralization.

NK Cables has production in addition to Finland in Estonia, Russia, China, and Brazil to mention the most important facilities. The RF cables production of NK Cables is located in Finland, Brazil, and China. Trade restrictions were the main reason for establishing the factories in Brazil and China. To be able to expand in China, western technology must be transferred there. In Brazil, a partner is needed to support the local business. In Finland, all cable dimensions are produced, but in both Brazil and China only a part of the product range is produced. There are plans to expand the product range produced in China in the near future. Sales are handled from by sales offices in the USA, Brazil, Singapore, China, Russia, and Sweden in addition to Finland. The main customers are the network manufacturers and installation companies. Closer analysis of the mobile networks area reveals that production is decentralised to three different continents and sales are also decentralised to sales subsidiaries that are close to the markets.

4.3.2.3.2 Examination of the proposition

WPR 7: The higher the centralisation of production and marketing operations globally, the greater the use of more standardised product strategies compared with adapted ones.

The expected pattern was that a higher centralisation of production and marketing operations geographically would increase the use of more standardised product strategies. This was based on assumption that the closer the production and marketing operations are to the market the easier it is to adapt the product and vice versa the further away these operations are the easier it is to standardise the products. When analysing the case companies it was found that all case companies had moved towards higher decentralisation of marketing operations. The manufacturing operations had also developed towards higher decentralisation in all but Nokia Networks. As all cases had developed towards a more standardised product strategy, the empirical evidence did not support the original assumption.

See Figure 49 for a summary of the development. As a result, it can be seen that the proposition did not receive support.

Figure 49. Centralisation / decentralisation of manufacturing and marketing operations globally

Centralisation / decentralisation of operations globally	NMP	NET	Tecnomen	Salcomp	NK Cables
Manufacturing operations have developed towards	decentralised	centralised	centralised	decentralised	decentralised
Marketing operations have developed towards	decentralised	decentralised	decentralised	decentralised	decentralised
Product strategy	standardised	standardised	modified	modified	standardised (Mobile BU)

Source: Compiled by the author based on the research data.

Further analysis of the cases reveals that instead of the centralisation / decentralisation of operations geographically, the actual management of these operations across countries is more important. This further confirms the importance of understanding the development of the management orientation towards the foreign affiliates and the market strategy applied. For example, although NMP has decentralised manufacturing to a number of continents, production is tightly co-ordinated from headquarters; similar processes and production technologies are used. Each factory can therefore produce also for other regions when such flexibility is needed. The importance of the relationship between headquarters and subsidiary and co-ordination of headquarters in standardisation of marketing mix elements has also been also raised by earlier literature (Quelch and Hoff 1986, Sohlberg 2000) Also, it was found that in many cases the reason for establishing a production operation abroad was related to trade barriers and the relationship with the product strategy as such was vague.

It may therefore be concluded that the proposition **was not supported** in this research.

4.3.2.4 Economies of scale, scope, resources and capabilities

4.3.2.4.1 Development of economies of scale, scope, resources and capabilities in the case companies

The impact of economies of scale, scope[62], resources and capabilities on product strategies will be examined next in the case companies.

The economies of scale benefits were seen as crucial for **NMP**. NMP seeks to achieve all possible volume benefits. This was already important in the beginning of 1990s, and its importance has further increased. Especially during the logistic crisis in NMP in 1995 it was seen that the manufacturing and logistic operations were still too complex. Economies of scale are important in manufacturing, logistics and purchasing, and also in product development. It is very demanding and costly to write new software and it is important to divide these investments on a large number of units. Also, in the mobile telephone business, the reusability of existing software is important when developing new products and learning economies of this type also play an important role. NMP is in a very good position to take advantage of the economies of scale and learning benefits, as it is the market leader with a 38% market share in 2002. One of the interviewees commented on this as follows:

"Economies of scale are important for NMP…It is an area of constant development. The number of platforms and their versions as well as new software is kept to the minimum. NMP believes that it is able to obtain advantages compared with competitors due to its logistics and large volumes."

Technological resources and competencies are especially important for NMP, because the products are very technical by nature and they were also expected to be so in the future. Product concepting is a particularly strong area at NMP, and its

---

[62] In this research, the economies of scope benefits are based on the notion that cost per product may decrease as the number of product versions, variants, and other adaptations increases in a specific local market due to sharing of physical assets, external relations, and knowledge. The researcher acknowledges that also other types of scope benefits exist, e.g. industry scope, but these are not examined.

importance stem from the requirement of having a high degree of newness in products. In new technologies Nokia seeks to prevent that no company is able to lock these from the use of others. The target is "open global technology" as stated by one interviewee. This means open so that no one controls the market and global so that the market does not split up and critical mass is obtained. In addition, NMP seeks to safeguard its investments in technology through patent protection including design patents, trademark registrations, and copyrights to protect the proprietary features of the products worldwide. Also, from the marketing side the brand is important as well as the understanding of the consumer marketing. NMP was able to create a truly global brand during the 90s. Development of the brand was commented on as follows by one of the interviewees:

"NMP was 10 years ago a private label and OEM producer….Now Nokia is the world's leading brands, so the change has been dramatic."

It may be concluded for NMP that economies of scale are very important. The capabilities related to understanding and developing global technology standards in co-operation with the industry were also emphasised, as was the importance of the global brand of Nokia. Also, economies of scope are used as the same production facilities, product platforms, and components are used across different products and increasingly also across product lines.

The importance of economies of scale is especially great in **NET** as their own production is mainly software. The cost per unit falls sharply as more units are sold. One interviewee at NET described the impact of volumes as following:

"This is an R&D and software-intensive company and it makes a big difference if the product can be sold 5 times or 100 times. Economies of scale are crucial as you can only be in this business if you are global and have a high market share."

The scope economies were also important as the company used DX 200 platforms and in the future increasingly Flexi servers as platforms across a number of product lines and product categories.

Marketing competencies related to understanding the customer requirements worldwide were seen as important, but also technical competencies in developing software. An especially strong area at NET was seen to be the software development skills. NET is able to develop software faster and at lower cost than its competitors. This is related to personnel skills, but also very much to globally competitive product platforms/architectures. NET has a global network of R&D sites. The importance of globally seeking the most competitive R&D personnel with respect to skills and cost was emphasised. It can therefore be concluded that economies of scale are essential and also global R&D skills in NET's business.

In **Tecnomen**'s business the role of economies of scope is especially important due to the substantial R&D investments required. Tecnomen is looking for synergies across the product lines and customer base. The company had developed during the 90s a unified product management process, which facilitated the adaptation of products to different customer requirements. Traditional economies of scale benefits have not been so important as the company is not producing products requiring large production runs. However, it must be able to distribute the produced software over a large customer base. The CEO and President of Tecnomen Vesa Helkkula commented on this as follows:

"These are big systems and a lot of product development personnel is needed. Without a certain number of customers we cannot live. In other words, a big enough markets share is needed. Managing the product processes is really an essential issue in this conjunction."

In resources and competencies, the communication skills and co-ordination skills in developing products are essential. Communication and co-ordination are important when developing in a multi site environment products in Finland and Ireland. The best resources are often not available in Finland and need to be acquired wherever available. Technological capabilities are another important factor. This has played an important role in Tecnomen's globalisation as it has been driven by the successful development of innovative and technical advanced

products. Tecnomen's strengths in R&D are extensive knowledge of telecommunication networks, highly scalable systems, customised interfaces, internet technology and co-operation in industry forums like the WAP Forum and 3GPP. It can be concluded that the importance of economies of scope has increased lately in Tecnomen's business. Also, the capabilities related to co-ordination and integration of R&D activities on global level were considered to be of great importance. By establishing competence centres in Malaysia and Brazil, the company has been building the ability to adapt the products to local requirements.

The persons interviewed in **Salcomp** emphasised the importance of both economies of scale and scope advantages. Although the products are often customer-adapted, the components used in the products are normally standard and purchased from the same suppliers. This makes it possible to achieve cost savings in purchased components when large volumes are reached. These components can be used in a number of different charger products, which gives clear scope economies to the company. Also, the same production lines can be used to produce a number of different mobile chargers for various customers. The importance of economies of scale was also emphasised. The company is only interested in products that can be run in large volumes, a minimum of millions of units a year. In fact, they have become the largest manufacturer of switch mode chargers in the world, which gives them considerable advantages due to economies of scale. Analysis of the capabilities area shows that the power supplies area demand a high level of analog electronic understanding, which is essential in power supply technology. Persons with these competences are rare. Another important capability is OEM sales skills, where the key issue is for example to be able to negotiate with demanding global customers requiring adaptations. As production is now distributed globally, it is important to understand different production technologies, so that the best possible fit with the location is achieved. In China Salcomp can benefit from lower salary cost and use of less automation.

Economies of scales are important in the cables production of **NK Cables**. In both copper and fibre optical cables, processes are constantly developed to increase

production speed and reduce the costs. However, in RF cables a reasonable volume of production is reached already at 50 kilometres per batch. A bigger quantity does not provide additional benefits. This has meant that production can be divided between several factories close to the markets, serve the customers flexible, and still reach the required minimum volumes. Economies of learning are important in RF cables production. The foaming process of the insulation material is difficult and NK cables accumulated such knowledge starting with cables for cable TV produced in the 80s and later with RF cables. This was commented on by one of the interviewees as follows:

"If a potential new entrant would receive a sample of our products they could not produce a similar sample in a year's time."

Analysis of the fibre cables area within NK Cables, which uses a more adapted product strategy, reveals that the manufacturing process is highly standardised although the products are tailored to customer needs. The same manufacturing processes and machines are used as well as raw materials, which provides clear benefits from economies of scope to the company.

Technological capabilities in developing a global technical break through product are especially important in the early phase, when the global markets were entered. However, as globalisation proceeds, building the needed global production capacity and global distribution were also seen as crucial competencies. Moreover, the importance of understanding of how local business is conducted around the world was seen as especially important by one of the interviewees in the RF cable area. The emphasis was however, on sales competences and understanding of different foreign cultures, instead of on understanding different product requirements, as these are highly similar across countries in this area.

Analysis of the case companies reveals that in addition to the type of resources and capabilities available the amount of resources is also important. The increased resource commitments to the strategic business units selected for globalisation with respect to physical, intangible assets and financial resources proved to be an

important factor, with an impact on broadening of the product range and the introduction of more advanced product strategies. An interviewee commented on this as follows:

"After focusing on telecommunications and mobile business, the top management focus has been considerably greater, which has supported the advancements in this area."

The impact of the amount of resources on the broadness of product range and nature of products will be examined further in 4.3.3.2. The proposition concerning the impact of the scale, scope and capabilities on the product strategy will be examined next.

4.3.2.4.2 Examination of the proposition

WPR 8: The economies of scale and learning, and global capabilities in technology, marketing and management, favour a more standardised product strategy. The economies of scope and local capabilities in technology, marketing, and management favour a more adaptive product strategy; moreover the economies of scope also favour a wide product assortment.

Analysis of the case companies that pursued the standardised product strategy (NMP, NET, NK Cables) reveals that economies of scale were at least important and in most cases very important. Also, in those cases that used the modified product strategy (Salcomp, Tecnomen), the economies of scope economies were important as expected. The emphasis of Salcomp in both economies of scale and scope can be understood by its role as a mass producer of components for global customers. They need to simultaneously adapt the products based largely on customer needs, but also manufacture these in high volumes at low cost. In those companies where economies of scope were important a broad product range was also discovered as expected. See Figure 50.

Figure 50. Economies of scale, scope and capabilities

Factors:	NMP	NET	Tecnomen	Salcomp	NK Cables
Economies of scale	Very important	Very important	Less important	Important	Important
Economies of scope	Important	Important	Very important	Very important	Less important
Global capabilities in technology, marketing and management	Very important	Very important	Important	Important	Very important
Local capabilities in technology, marketing and management	Less important	Less important	Very important	Important	Less important, except local marketing capability
Used product strategy	Standardised	Standardised	Modified	Modified	Standardised
In line with expected pattern	Yes	Yes	Yes	Partly	Yes

Source: Compiled by the author based on the research data.

Global capabilities in technology, marketing, and management were very important for those companies applying the standardised product strategy (NMP, NET, NK Cables) as expected. They had built capabilities in mastering technologies, which had been adopted around the world and also sought to protect their rare resources globally when possible through patents and trademark registrations. Global brands had been established by the consumer businesses (NMP), but also business-to-business orientated companies had developed recognized brands among their target customers. Moreover, these companies had sought for global management and integration capabilities.

The local capabilities in technology, marketing and management were important for those using the modified product strategy (Tecnomen, Salcomp) as expected. Tecnomen had built competence centres, the main purpose of which was to situate close to the markets and enable adaptations based on country or customer requirements. Salcomp had outsourced manufacturing to all continents to be close to the customers manufacturing facilities and to build in-depth OEM sales skill. However, the global capabilities in technology, marketing and management also seemed important to a certain extent to those companies that had selected the

modified strategy. The reason seems to be in the fact that these companies use global product platforms, which also requires such skills, and that the customers of these companies are increasingly global. The modified product strategy lies between the localised and standardised product strategy in standardisation and thus both global and local capabilities are needed.

Analysis of the stage when the case companies pursued the localised product strategy at the end of 80s reveals that the global capabilities where not essential. For example, NMP had a number of different brands and had not established a globally recognised brand. Its products were developed rather separately for different parts of the world, using a large number of different technology standards. Salcomp's products were based almost entirely on customer specifications and no global platforms were used. Moreover, NK Cables' production was focused on fixed cables that were customised to a large extent. This seems to indicate that global capabilities in technology, marketing and management were not in place at that time, which is in line with the pattern expected.

It can be concluded on the basis of the above examination that the proposition was **supported**. However, to determinate that the proposition would have been strongly supported would have required deeper numerical information.   The proposition will stay as originally stipulated:

PR 8: The economies of scale and learning, and global capabilities in technology, marketing and management, favour a more standardised product strategy. The economies of scope and local capabilities in technology, marketing, and management favour a more adaptive product strategy; moreover the economies of scope also favour a wide product assortment.

4.3.3 Micro and milli-micro level variables

4.3.3.1 Development of decision-making related variables

As described in the cross case analysis, the nature of the products has developed towards more demanding categories as the companies shift from the international towards the global. This development was especially visible in NMP and NET, but also in Tecnomen and NK Cables to some extent. NMP's main sales still came from terminal sales (goods), although they also had developed their offering increasingly towards services and know-how categories. NET had evolved from an equipment supplier to a system supplier in an early phase, and had increased the share of services and know-how products as globalisation proceeded. Tecnomen reached an advanced stage of selling systems early on and had advanced towards more demanding and complex systems. NK Cable had developed towards more demanding antenna line systems and installation services, although most sales came still out of physical goods. In one of the cases, namely Salcomp, the development towards more advanced product categories in this respect was not evident.

Increasing global business experience could be seen to drive this development. For example, NET intentionally rotated people in different foreign countries to increase the accumulation of competencies and global business experience. This had increased the understanding of global product requirements. Interviewees saw the impact of global business experience as follows:

"The foreign business experience and the organisational learning has meant that NET has learnt to build truly global products that have the best fit in features and functions for all the markets"

"Due to the fact that the Nokia is more global than some of its local operator customers it learns how complex value chains work in new services like MMS. This has enabled us to offer consulting-type services to operators on how to get moving fast".

For example in NK Cables, customers outside Europe and especially in Asia who did not have the competence to buy different components separately started to insist that NK cables deliver not only the RF cable, but also the jumper cables, connectors, and other required accessories. Hence, one can see that the global presence in these markets has triggered a change in the product strategy. One interviewee commented on this as follows:

"This type of driver has come from the world. The further one goes there are new operators who do not have the competences to source these components themselves. In these cases they request the whole package, bigger entities, more services... This has directed our product strategy."

Also, the increase in the number of product lines and number of products in each line could be explained by the increased global business experience. For example in Salcomp, it was global customers who insisted on linear chargers. These customers have switched between switch mode and linear technologies several times and it has therefore been important to include linear charger technology in Salcomp's product portfolio to ensure sales. This competence was acquired by acquisition of a foreign company in Switzerland. The introduction of new advanced product categories such as services, know-how and systems often meant that the total product assortment grew in width.

It may be concluded that the increasing global business experience and the resulting decreased lateral rigidity have enabled the companies to transfer to more advanced product categories, but also to broaden the product assortment.

4.3.3.2 Examination of the proposition

WPR 9: Due to increased global business experience, companies will increasingly use a bigger proportion of services, know-how and systems as globalisation proceeds.

Companies select a product category from which they have experience for global entry and then later expand to more advanced categories as globalisation advances further, as their lateral rigidity decreases (See also Luostarinen 1979, 1994). Four cases (NMP, NET, Tecnomen and NK Cables) had developed in line with the pattern expected. One case (Salcomp) had not evolved to more advanced product categories, but had developed the offering further within the physical goods category.

Analysis of the cases that were still selling a relatively high share of physical goods (NK Cables) or only physical goods (Salcomp) reveals that these cases were still developing towards the global phase. NK Cables had a relatively low globalisation degree compared with the other cases. The most global business unit, mobile networks, had a globalisation degree of 40%. Salcomp had a high globalisation degree, but in terms of management orientation, market strategy, and global organisation it was still in an early phase towards becoming global. The interviewees also confirmed that Salcomp's globalisation degree gave a misleading view of the actual global stage of the company. The company had globalised by following mainly one customer. This resulted in a very thin global organisation.

Also, use of less advanced products could be understood from the constrained resources available. During the 90s, Salcomp and NK Cables were in a high growth period, which meant a shortage of resources. Moreover, these strategic business units were also among those that were to be divested from Nokia and additional resources were not available from the parent company to develop the business towards more advanced product categories. Interviewees commented on this as follows:

"We have not wanted to expand to network planning, installation services, base station assembly or other such areas. In the 90s, the mobile network business meant mainly delivery of RF cables. The rapid growth has meant that we have not been able to invest more…therefore, we have focused on this area."

" We have not expanded to these other areas as we cannot control these....We do not have a big enough organisation for this."

To conclude, it was found that not only does the increased global business experience and resulting decreased lateral rigidity affect evolution towards more advanced product categories, but it also affects the broadening of the product offering towards an increased number of product lines and products in each line when moving from the international to the global stage. The companies start the globalisation with a limited number of product lines and number of products, but increase their number as globalisation proceeds. Also, the empirical examination revealed that increased resource commitments to the strategic business units selected for globalisation with respect to physical and intangible assets and to financial resources are an important factor regarding the broadening of the product range and a shift towards more advanced product strategies (see also discussion in section 4.3.2.1).

Based on the above discussion, it can be concluded that the proposition was supported. It was further developed by adding the broadening of the product assortment and the impact of resources as part of the final proposition. It is therefore postulated as follows:

PR 9: Due to increased global business experience and resource commitments, companies will increasingly use a wider product assortment and bigger proportion of services, know-how, and systems as globalisation proceeds.

4.4 Synthesis of product strategy evolution and selection

4.4.1 Development of the revised framework

Based on the analysis of the evolution of the product strategies and the examination of the theoretical constructs and their impact on the product strategy, a revised framework was constructed for product strategy development of globalising international ICT companies. The main building blocks are the same as in the

theoretical framework built earlier (cf. Figure 17 on page 124). The corporate and business level strategy has been combined, as it was evident that these are highly interlinked. In the case companies, the corporate strategy was often built from the business level strategies or in very intense co-operation with strategic business units management and therefore their separation did not increase the understanding of the phenomena. The management orientation (EPRG profile) was added as its importance became evident from the empirical analysis. The postulated proposition in the centralisation / decentralisation of operation strategies and its impact on product strategies did not receive support and hence the operation strategies are not included in the revised framework. This result must be taken as a very initial one. It is apparent that the impact of operation strategies on product strategies requires further study. Moreover, references to the final propositions have been added to the framework and as can be seen a number of propositions have been combined based on the deeper understanding of their impact gained in the empirical analysis.

Also, the evolution of the product strategy dimensions and standardisation alternatives have been incorporated with the revised framework to illustrate development based on information from empirical part. See Figure 51 for the revised framework.

Figure 51. Revised framework for product strategy development of globalising international ICT companies
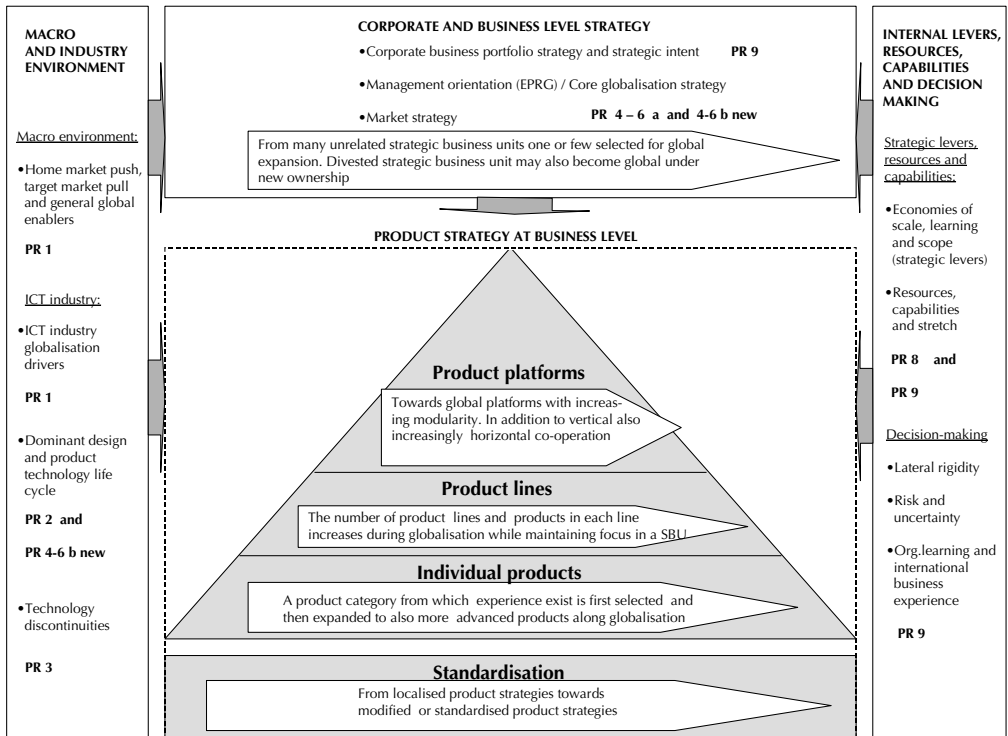
Note: Evolution from the international to the global is described in the arrows.

4.4.2 Summary of propositions development

The nine working proposition developed based on the theoretical discussion were examined utilising multiple case research methodology. Of these, two were strongly supported (WPR 1, WPR 3), five supported (WPR 2, WPR 5, WPR 6, WPR 8, WPR 9), one partially supported (WPR 4), and one not supported (WPR 7). Also, propositions were combined and developed further as their interlinked nature was understood based on the empirical analysis (See e.g. WPR 5, WPR 6, WPR 9). Moreover, the in-depth understanding of the evolution of the product strategies enabled a deeper explanation of the development of product strategies along globalisation. In addition to standardisation of product strategies, the final

propositions also explains the development within the product strategy dimensions, such as the broadening of the product range and the increasing horizontal co-operation in products in the value network. See Table 8, in which the final propositions have been illustrated together with the original working propositions. The results and the deviations of the propositions will be discussed further on the basis of earlier research in the summary and conclusion part (see 5.2).

Table 8. Summary of the propositions

Level	Working proposition	Support received	Final proposition
Macro and Meso	*WPR 1:* *The stronger the target market pull, the domestic market push, and the macro and industry level globalisation drivers, the greater the use of more standardised product strategy alternatives compared with adapted ones across countries.*	*Strongly supported*	*PR 1:* *The stronger the target market pull, the domestic market push, and the macro and industry level globalisation drivers, the greater the use of more standardised product strategy alternatives compared with adapted ones across countries*
Meso	*WPR 2:* *The greater the dominance of one or a few technologies and the similarity of stages across countries, the greater the use of more standardised product strategies compared with adapted ones.*	*Supported*	*PR 2:* *a) The greater the dominance of one or a few technologies and the similarity of stages across countries, the greater the use of more standardised product strategies compared with adapted ones.* *(See also new proposition 4 -6 b)*
Meso	*WPR 3:* *Industry leaders seldom sustain their leadership when facing disruptive technology discontinuities requiring a change of strategy from international towards global. The new global leaders are likely to come from other industries or challenger positions in current industry.*	*Strongly supported*	*PR 3:* *Industry leaders seldom sustain their leadership when facing disruptive technology discontinuities requiring a change of strategy from international towards global. The new global leaders are likely to come from other industries or challenger positions in current industry.*
Micro	*WPR 4:* A company applying a multi-domestic strategy is expected to favour a localised product strategy, a company applying a transnational strategy is expected to favour a modified product strategy, and a company applying a pure global strategy is expected to favour a standardised product strategy.	*Partially supported*	*PR 4 –6:* *a) When the company shifts from international to global in respect of geographical markets, management orientation, and market development phase, the product strategies and product management processes become more standardised across countries and customers.*

Micro	WPR 5: As the company expands geographically from international to global markets, and the faster and the more geographically diversified the expansion, the more standardised the product strategies.	Supported	b) New (Meso and Micro): An increase in global segments, and maturing of product technology and globalisation favour a focused wider product assortment and horizontal co-operation in value networks.
Micro	WPR 6: As the company moves from the international market (entry or penetration) phase to the global market alignment phase, the more standardised product strategy alternatives and product management processes will be applied.	Supported	
Micro	WPR 7: The higher the centralisation of production and marketing operations globally, the greater the use of more standardised product strategies compared with adapted ones.	Not supported	
Micro	WPR 8: The economies of scale and learning, and global capabilities in technology, marketing, and management favour a more standardised product strategy. The economies of scope and local capabilities in technology, marketing, and management favour a more adaptive product strategy; moreover the economies of scope also favour a wide product assortment.	Supported	PR 8: The economies of scale and learning, and global capabilities in technology, marketing, and management favour a more standardised product strategy. The economies of scope and local capabilities in technology, marketing, and management favour a more adaptive product strategy; moreover the economies of scope also favour a wide product assortment.
Micro and Milli-micro	WPR 9: Due to increased global business experience, companies will increasingly use a bigger proportion of services, know-how and systems as globalisation proceeds.	Supported	PR 9: Due to increased global business experience and resource commitments, companies will increasingly use a wider product assortment and bigger proportion of services, know-how and systems as globalisation proceeds.

5. SUMMARY AND CONCLUSION

This research is concluded by first summarising both the theoretical and empirical findings, and then discussing the findings in light of earlier research. Then the theoretical contributions, implications for management and future research suggestions will be outlined.

5.1 Summary of theoretical and empirical findings

5.1.1 Theoretical objectives and findings

A highly interesting research problem relates to how international ICT companies from small and open economies (SMOPECs) can meet the huge globalisation challenge of developing products and managing them during global expansion? This question is of great managerial value to the international ICT companies planning to globalise their business. This question is also expected to be of great interest to academics. The internationalisation process of companies has been widely studied (see Luostarinen 1970, 1979 and 1994; Johansson and Vahlne 1977). Also, recent research on the internationalisation of firms has concentrated on operation strategies (see e.g. Luostarinen and Welch 1990; Buckley and Casson 1998), market selection (Tyyri 1994) and channels (Gabrielsson M. 1999). Moreover, research has been done both on multinationals and already global companies (see Bartlett and Ghoshal 1987a; Doz 1986; Doz and Prahalad 1984). However, the globalising internationals and development of the product strategies of ICT companies have been researched very little. Hence, a better understanding of this area will contribute to the international business research field.

The more specific research question was formulated as: How do product strategies change when ICT companies move from international to global and why? The research objectives were divided into theoretical and empirical. The theoretical objectives and findings are discussed first and then the empirical ones will be covered. Based on the research question, the theoretical objectives were set as follows:

1. To identify and analyse what global product strategy alternatives are available and how the product strategies are expected to change when international ICT companies globalise.

2. To describe and analyse the influence of the environment, corporate and business level strategies and resources on the global product strategies of the ICT companies and the other motives and reasons for these decisions.

3. To build a framework explaining the determination of global product strategies in the ICT companies and to develop propositions regarding the influence of the explanatory variables on the global product strategies.

In the question of the first theoretical objective, in this study the product strategy was described as consisting of several dimensions: product platforms, product lines and individual products (goods, services, know-how and systems) (see McGrath 1995). The global product strategy was expected to develop along these dimensions as the company is globalising. Three different product strategy configuration alternatives were developed based on the standardisation degree. These are the following:

1. Localised product strategy

2. Modified product strategy

3. Standardised product strategy

The literature related to the product strategy dimensions and standardisation was reviewed and product strategy alternatives were described. For a detailed description of these see 1.6 and 1.7. Based on the discussion, it was expected that the globalising internationals would develop towards more standardised product strategy alternatives as they globalise (see Douglas and Craig 1989; Yip 1989). Moreover, increasingly more advanced product categories were also expected to be used, including in addition to goods, also services, know-how, and systems (cf. Luostarinen 1979). This review was seen to provide a good basis for further analysing the changes in the product strategy as globalisation proceeds and for examining the influencing factors.

The second theoretical objective was approached by analysing the global product strategies based on five main theoretical approaches: (A) internationalisation, MNC development and globalisation; (B) corporate strategies; (C) resource- based view, (D) technology discontinuities and product technology life cycles, and (E) global standardisation of product and marketing strategies. Each of these approaches could be seen to explain the global product strategies of globalising internationals.

The internationalisation theory (Luostarinen 1979) explained the internationalisation of firms and the expected development of the products towards more advanced products as globalisation proceeds. The decision making of globalising companies was expected to be characterised by lateral rigidity, but through increasing global business experience the companies were expected to shift to more demanding product categories. Moreover, the market and operation strategies were also assumed to have an impact on global product strategies. It was expected that the closer the manufacturing unit and marketing subsidiary to the markets, the easier it would be to adapt the products to local requirements (see also Luostarinen 1970, 92). The MNC development and globalisation theories explained the core globalisation strategies available and the global evolution of the company through distinctive phases in which the market strategy changes from international entry to international penetration and further to global alignment (Douglas and Craig 1989; Yip 1992; Perlmutter 1969). For globalising internationals, it was expected that the core globalisation strategy and the evolution of market phases would have an impact on the selected global product strategy alternatives. The standardisation of product strategies was expected to increase when reaching the global alignment phase.

The business portfolio strategies were reviewed and based on the Ansoff (1965 and 1987) growth vector and diversification literature, three main corporate level business portfolio strategy alternatives were developed (See also Luostarinen 2001a). It was expected that the global focus strategy would be preferred by the ICT companies due to the limited resources. However, as the ICT industry matures use of related diversification could also be expected. Moreover, it was expected that product businesses requiring low local adaptation and those having high expected

benefits from globalisation would be the most attractive product businesses to be selected initially for globalisation (see also Gupta and Govindarajan 2000).

The literature related to international product life cycles, technology discontinuities and product technology life cycles was reviewed. It was argued that the international product life cycle pattern (Vernon 1966) may be applicable in the internationalisation phase, but not be useful in explaining the globalisation phase. Also, it was found when examining disruptive technology discontinuities requiring the change from international to global strategy that industry leaders may have difficulties in responding to these. (See e.g. Christensen 2000, 113). The emergence of a dominant design and similar product technology life cycles across countries was seen as a prerequisite for standardised products to emerge. Furthermore, building on the resource-based view (e.g. Wernerfelt 1984; Barney 1991), competencies and capabilities (Prahalad and Hamel 1990; Verona 1999) and requirements in a global/national context (Prahalad and Doz 1987, 14-25; Porter 1986), and strategy formulation related literature (Grant 1991), it was proposed that global capabilities in technology, marketing and management favour a more standardised product strategy while local capabilities in these areas would favour a more adapted approach. Finally, the standardisation of marketing strategy literature further explained the factors involved in the standardisation of product strategies and product management processes (see e.g. Sorenson and Wiechmann 1975; Walters 1986; Boddewyn et al. 1986; Jain 1989).

The third theoretical objective set for this research was to build a framework explaining the global product strategies in the ICT companies and to develop propositions on the influence of the explaining variables on the global product strategies. The theoretical framework was built on the basis of the five theoretical approaches selected for this study. See Figure 17 for the original theoretical framework. It consists of four explaining blocks which (A) the macro and industry environment, (B) the corporate level business portfolio, strategic intent and core globalisation strategy, (C) the business level market and operation strategies, and (D) the internal strategic levers, resources and decision-making variables. The factor to be explained is the evolution of product strategy dimensions and the standardisation alternatives. Altogether nine working propositions were developed

on the basis of the five theoretical approaches. Refer to 2.5.3 for the development of the working propositions and the summary of these in Table 4. The working propositions indicated that globalising internationals are developing towards more standardised product strategy alternatives as they expand geographically from an international to a global company and advance to the global alignment phase. Moreover, increasingly more advanced product categories are also used, including services, know-how and systems in addition to goods. The framework and working propositions developed on the basis of the existing literature were then examined based on the empirical material gathered from selected case companies in the ICT equipment field. The working propositions developed were used to guide the compilation and analysis of the empirical data.

5.1.2 Empirical objectives and findings

The empirical objectives were set on the basis of the research problem and research question as follows:

1. To analyse whether the product strategies change when international ICT equipment companies globalise and, further to explain how the product strategies change if such development is found.

2. To analyse the motives and reasons for selecting a certain global product strategy and the factors influencing the development of such strategies in globalising ICT equipment manufacturing companies.

3. To examine the theoretical framework and propositions developed in the theoretical part and, if necessary, suggest a revised framework and revised propositions.

To meet the empirical objectives set in this research it was decided to use a multiple case study research methodology (see Yin 1994, Eisenhardt 1989). The unit of analysis was selected to be the evolution of product strategies of strategic business units. Five ICT equipment manufacturers were selected as cases for this

study: Nokia Mobile Phones, Nokia Networks, Tecnomen, Salcomp and NK cables. The methodology used, data compilation and analysis are described in chapter 3.

The first empirical research objective was approached by analysing the evolution of the product strategies in the selected cases in the product strategy dimensions, product management processes, and standardisation strategy alternatives. First the evolution was analysed for each case and then cross case analyses was conducted. It was found that a number of changes happen in the product strategies as globalisation proceeds. First of all, one or few strategic business units with the highest global growth potential are selected for globalisation from a large number of diversified and often unrelated businesses in the international stage. The findings were in line with earlier research on the growth of Finnish firms (see Luostarinen 2001a). An interesting finding of this research was that often the divested strategic business units also developed into global businesses under new ownership. Secondly, the product platforms have developed from local to global platforms with increasing modularity. An important finding was that horizontal co-operation in products with value network members also takes place increasingly as globalisation proceeds. Earlier research on internationalisation has proposed that in the latter stages of internationalisation co-operation increases (see Luostarinen 1994; Johanson and Mattsson 1988). This research was able to find a similar pattern in globalisation, but noted that especially the horizontal co-operation increased as globalisation matured.

Thirdly, the company selects a few product lines and products in each line for global entry and as globalisation proceeds the number of product lines and products in each line increases. The product assortment is, however, expanded so that focus is maintained. Often common product platforms, technology development and production are used across product lines, and also same direct customers / channel members are targeted. (Compare also with the growth model developed by Luostarinen 2001a and the model of evolution of marketing strategies by Douglas and Craig 1989). An important finding can be seen when comparing the globalisation process with the internationalisation process. In the internationalisation process, the company gradually develops a broad diversified

product range. In the globalisation process, the company also develops a broad product range by first entering the global markets with a focussed narrow product range and then gradually broadening the product range as globalisation proceeds while maintaining synergies among the product lines. Fourthly, as the company globalises it will initially select a product category from which it has experience and then also expand to more advanced product categories as globalisation proceeds. This was in line with the pattern of introducing sales objects found in earlier internationalisation research by Luostarinen (1979). Also development within a specific product category could be found. For example NET expanded the share of services and know-how in delivered systems and Tecnomen expanded the scope of the system delivery from voice mail systems to unified messaging systems. Fifthly, the standardisation of product strategy evolves from localised towards modified or standardised alternatives along globalisation of the company. The important finding of this study is that standardisation of the product strategy increases as globalisation of the company proceeds (See also Douglas and Craig 1989; Yip 1992, 4). Moreover, it was found that in addition to examining standardisation across countries also standardisation across customers is of importance. Thus, five strategies were developed for globalising internationals: (1a) the local customer adapted product strategy, (1b) the local market adapted product strategy, (2) the modified product strategy, (3a) the global customer standardised product strategy, and (3b) the global market standardised product strategy. For a detailed description of alternatives, see 4.2.2.1. Finally, it became evident that the importance of the different product strategy dimensions shifts as globalisation proceeds so that the importance of product platforms increases towards the global stage in the product strategy compared with the other dimensions.

See Figure 52, in which the evolution of the number of product lines and standardisation of product strategy across countries and customers is depicted along globalisation. It is evident that as globalisation proceeds, both the standardisation of the product strategy and the number of product lines increases in the strategic business units.

Figure 52. Evolution of product lines and the degree of product strategy standardisation as globalisation proceeds
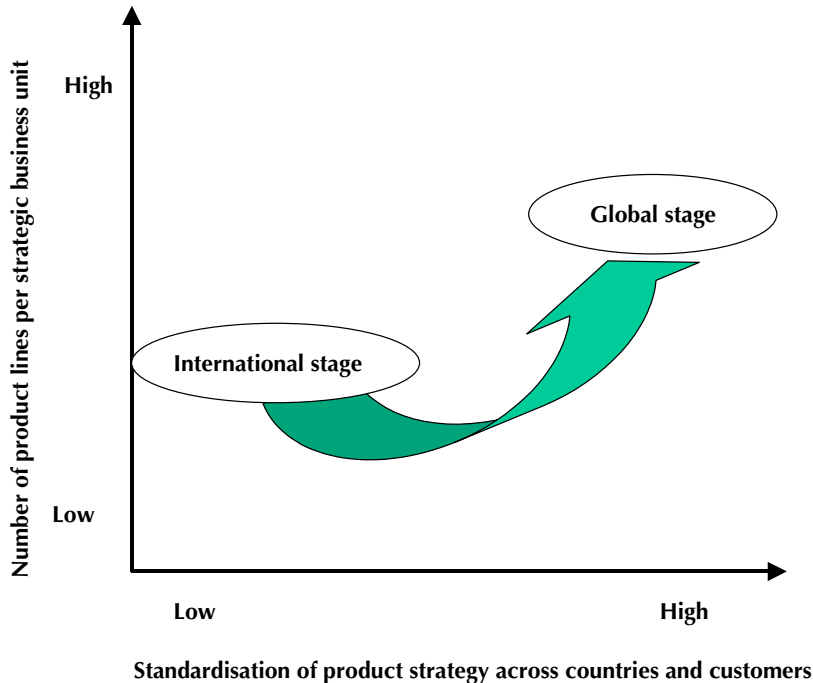
Source: Compiled by the author based on the research data.

The second empirical research objective concerned the explanatory factors of the product strategy selection and development during globalisation. The motives and reasons for the selection of the product strategy and for the development of the product strategy were analysed on the basis of top management interviews, although the evidence was also triangulated on the basis of the internal documents and archival records obtained from the companies. As a general analytic strategy, case descriptions were developed and also the framework and working proposition were used to guide the analysis (see also Yin 1994, 102). Moreover, the analyses used pattern matching, explanation building, and replication logic (see e.g. Yin 1994, 106-111; Pettigrew 1997). According to this logic, the actual outcome was analysed on the basis of the expected pattern. If these patterns were alike, literal

replication could be claimed. On the other hand, if the patterns were different, but for reasons explained by the theory and working propositions, a theoretical replication could be said to have happened. The analysis proceeded from analysing first within each case to cross case analysis.

As a result of the analysis, a revised framework for product strategy development of globalising international ICT companies was developed. See Figure 51 for the revised framework. The main explanatory blocks remained, although some changes were made to better illustrate reality. For example, the evolution of the product strategies along globalisation was added to the framework to illustrate the dynamic nature of the phenomenon. Also the corporate and business level strategies were combined into one block due to their interlinked nature. The nine original working propositions were examined and it was found that two were strongly supported, five supported, one partially supported, and one not supported in this research. As a result of the examination, six final propositions were developed. The propositions were developed further to better explain the evolution of the product strategies. In addition to the standardisation of product strategies broadening of the product range and increasing horizontal co-operation in products during globalisation were also covered by the final propositions. See Table 8 for the summary of the original working propositions and the final propositions.

5.2 Discussion of the findings

Next the results and the deviations from the original propositions will be discussed on the basis of earlier research and the theoretical framework.

The working propositions related to macro and industry environment (Macro and/or Meso level variables) were either strongly supported (WPR 1, WPR 3) or supported (WPR2). See Table 8 for a summary of the working propositions and the final ones. In WPR1, earlier research had identified a number of macro and industry level factors (home market push, target market pull, global enablers, industry globalisation drivers) that were expected to affect the globalising companies (see Luostarinen 1994; Luostarinen et al. 1994; Hansen 1999; Yip 1989; Levitt 1983;

Govindarajan and Gupta 2000; Jain 1989). Moreover, the globalisation drivers were expected to be especially strong for ICT equipment companies. It had also been argued that these globalisation drivers had an impact on the global product strategy (See Yip 1991, 7; Takeuchi and Porter 1986). This research further outlined the impact of these variables on the standardisation of the product strategy. The results were in line with the expectations derived from earlier literature. WPR 2 outlined the impact of technology life cycles and dominant design on selected product strategy standardisation alternative. Also, the results here were as expected, based on earlier research by Anderson and Tushman (1990) that had found that a dominant design favoured a standardised product (see also Albernathy 1978), and the earlier research in the international marketing field (See Buzzell 1968; Sorenson and Wiechmann 1975) that argued that similarity of technology life cycle favoured a more standardised product strategy alternative. It was also found that the maturing of technology and increase of global segments had an impact on the broadness of the product assortment and the amount of horizontal co-operation that was incorporated to a new proposition (PR 4-6 b). This was in line with earlier research based on the Profit Impact of Market Strategies (PIMS) database, which found that the product line breadth is greatest during maturity (See Anderson and Zeithmal 1984). The importance of horizontal co-operation have also been acknowledged by some recent research (see Gabrielsson M. and Gabrielsson P. 2003; Chetty and Wilson 2003). WPR 3 discussed the impact of disruptive technology discontinuities (see Christensen 2000, 113). It was asserted that industry leaders may have difficulties in responding to disruptive technology discontinuities requiring a change in strategy from the international to the global. It was therefore assumed that the new global leaders would often come from other industries or challenger positions in current industry. The research findings supported this assumption. Many of the globalising international here under study had benefited from responding swiftly to these disruptive technology discontinuities and had developed into global leaders in their fields.

The working proposition related to corporate and business level (Micro level variables) were supported (WPR 5, WPR 6), partially supported (WPRS 4) or not supported (WPR 7). The earlier literature had identified different geographical

market strategies for global expansion (see Ayal and Zif 1979; Hollensen 2001; Luostarinen 2000a). Moreover, it had been identified that a geographically less diversified strategy often allowed a deeper penetration in the markets (See Ayal and Zif 1979). Earlier research also argued that when expanding to global markets standardising of the product was essential for success (See e.g. Levitt 1983; Alahuhta 1990) Also, research had shown that globalisation develops in phases, in which companies first enter and then penetrate the international markets and in the last phase start to align activities across markets. In product strategy, the international entry and penetration phase meant a greater adaptation to the local markets, while the transfer to global alignment phase meant a higher co-ordination and integration of products across countries (see Douglas and Craig 1989). The empirical evidence supported that both the higher geographical market diversification and the transfer to the global alignment phase increased the product strategy and process standardisation. Also, it was shown that the further the company expanded geographically outside home continent the more standardised product strategies were used. The impact of the corporate's core globalisation strategy on product strategy was only partially supported as it was found that more importantly, the management orientation affected the business level product strategies. Moreover, the centralisation or decentralisation of marketing or production operations geographically was not seen to affect the standardisation degree of products (WPR7). The relationship between headquarters and subsidiary and co-ordination of headquarters in the standardisation of product strategies can be considered more important (see also Quelch and Hoff 1986; Sohlberg 2000). This led to the development of proposition (PR 4-6 a), which incorporated the impact of management orientation (see Perlmutter 1969; Wind et al. 1973), geographical market diversification (see Ayal and Zif 1979), and market strategy (see Douglas and Craig 1989) on the standardisation of product strategy.

The important finding of this research is that standardisation increases as globalisation of the company proceeds. Earlier literature has, with only a few exceptions (see Douglas and Craig 1989; Yip 1992), analysed standardisation across countries without considering the stage of the company in the globalisation process. The results are in line with earlier research that claim that product standardisation

across countries is increasingly used (Levitt 1983; Boddewyn et al 1986; Sorenson and Wiechmann 1975) and it is a feasible alternative for global companies (Levitt 1983; Yip 1992; Boddewyn et al 1986; Ozsomer et al. 1991; Whitelock and Pimblett 1997). Also the results, support the finding that the standardisation of processes is increasingly important (Walters 1986; Sorenson and Wiechmann 1975). A novel finding of this research was that in addition to standardisation across countries standardisation across customers also increases during globalisation. Moreover an important result was that during globalisation, the product assortment also become wider and horizontal co-operation with value network members increased. This was incorporated in the new proposition PR 4-6 b. This finding was also in line with patterns proposed by Luostarinen related to the growth of Finnish firms (Luostarinen 2001a, 2003) and holistic internationalisation (Luostarinen 1994).

The working propositions related to internal levers, resources (Micro level variables) and decision-making (Micro and Milli-micro level variables) were supported (WPR 8, WPR 9). WPR 8 proposed that the economies of scale, economies of scope, economies of learning and global capabilities in technology, marketing, and management would have an impact on global product strategies. Earlier research had found that economies of scale and global synergies were increasing the probability of selecting a more standardised product strategy (See Quelch and Hoff 1986; Keegan 1969) and that economies of scope advantages would lead to a broad product portfolio (Hamel and Prahalad 1985). Moreover, resources and capabilities could be seen as sources for achieving a competitive advantage (See Wernerfelt 1984; Barney 1991) and could also be expected to affect product strategies (Penrose 1959, 82 and Wernerfelt 1984). The results of this research from globalising ICT equipment companies supported these earlier research findings.

WPR 9 asserted that companies would increasingly use a bigger proportion of more advanced product categories due to increased global business experience. This was supported in this research. The result was in line with earlier research on the internationalisation of companies by Luostarinen (1979) that had found that companies introduce new sales objects in a specific order during internationalisation (goods, services, know-how and systems) due to the lateral rigidity of decision making. It should, however, be noted that globalising

internationals in some cases had already developed to an advanced product category (e.g. systems) in the international stage. Furthermore, in the cases, development towards more demanding products within the product category in question was evident. For example, the scope of the systems was becoming broader or increasingly a bigger proportion of services and know-how was included in the system delivery. Moreover, a new finding was that the product assortment also becomes increasingly wider during globalisation due to increased global business experience and, hence, to a better understanding of the customer needs in the global market. Furthermore, as the importance of the impact of resource commitment on the development towards more advanced product categories and broader product range became evident it was added to the original proposition (See PR 9). The corporate management needs to allocate adequate resources for developing the global product range of the strategic business units. This was in line with earlier findings by Johanson and Vahlne (1977) that also the commitment decision is an important factor to consider in the internationalisation of companies.

The issue of the generalizability of the results in case study research is an area that is much debated (see Stake 2000; Lincoln and Guba 2000; Yin 1994). Yin (1994, 36) has proposed that the purpose of case studies is 'analytic generalization', in which the results are generalized back to some broader theory, contrary to statistical generalization to population. Stake (2000) argues that the purpose of case studies is 'naturalistic generalization'. By acquiring a full and thorough knowledge of the particular, and as readers recognize essential similarities to cases of interest to them, they can use the results in the context of their interest as applicable. By using a multiple case study research design and the replication logic proposed by Yin (1994) in this research generalization back to theory has been increased. Moreover, due to the fact that the study was limited to the globalising internationals in the Finnish ICT equipment manufacturing field and since the studied companies represent about two thirds of the Finnish ICT equipment exports (see Ali-Yrkkö et al. 2000, 48), the results are expected to be particularly useful in understanding the development in this sector. The thorough analysis of the development of the product strategies and examination of the affecting variables gives the readers a good basis for naturalistic generalization of the results of this study beyond the

studied cases. The fact that many of the companies studied had belonged or belong currently to Nokia may affect the generalizability of the results as discussed in section 3.4, although no major differences were found between those with Nokia background or without this background. To the extent that the conditions are similar in other industries, the result may be generalizable to other industries as well. Moreover, the study results are expected to be most relevant for companies originating from SMOPEC countries. However, despite this conclusion, one should be cautious about generalization beyond the companies studied. It is up to future research to prove whether such generalization is possible.

5.3 Theoretical contributions

It is time to examine the theoretical contributions of this study. The fact that the topic has not been studied extensively provides an interesting area for study. The following theoretical contributions can be identified:

1. Although in earlier research, the internationalisation process has been well described (Luostarinen 1970, 1979 and 1994; Johanson and Vahlne 1977), the evolution from the international to the global stage has been little researched. Actually, this research is among the first studies to examine in detail globalising internationals, i.e. companies that first internationalise and then globalise. (see also Gabrielsson P. 2002; Gabrielsson P. and Gabrielsson M. 2003). It should, however, be noted that the term globalising internationals and the definition for it has been developed by Luostarinen (see Luostarinen 2001a; Luostarinen and Gabrielsson M. 2001).

2. A detailed analysis is presented of the evolution of product strategies when the company shifts from the international to the global stage. With a few exceptions, earlier research on internationalisation has focused almost entirely on operation and market strategies, neglecting the very important product strategy area. The most important exception is the research by Luostarinen (1979) that also included the evolution of product categories in an extensive study of the internationalisation of 1006 Finnish firms. Hansén (1981) included also product strategies as part of his

study of the internationalisation of the pharmaceutical industry. Moreover, Douglas and Craig (1989) outlined the change of marketing strategies in the initial entry, local market expansion, and global rationalization phases. In the global context, previous literature has considered the product strategy decision as mainly a decision of either adaptation or standardisation (see Buzzell 1968; Jain 1989). This study describes in detail the product strategy dimensions and standardisation alternatives for globalising international ICT companies. This more holistic understanding of the product strategy evolution included the product platforms, product lines, individual products, and product management processes. For example it was found that it is of importance to define a common product platform that is used across the globe, decide upon the number of product lines and products in each line, and the nature of the individual products during globalisation. Moreover, unified product management processes are essential for global companies.

3. Recognising that the product strategies and product management processes become more standardised across countries and customers during globalisation of the company is important. Earlier literature has mainly, with only a few exceptions (see Douglas and Craig 1989; Yip 1992), analysed the standardisation of product strategies across countries without considering the stage of the company in the globalisation process. A novel result of this study relates to the finding that standardisation should be analysed across both countries and customers. Earlier international marketing standardisation literature has mainly analysed standardisation across countries and the results have been often contradictory, perhaps in part for this reason (See Levitt 1983; Sorenson and Wiechmann 1975; Buzzell 1968; Keillor et al. 2001). Also, very few studies can be found examining the standardisation of product strategies in detail. Hence, a better understanding in this area is a clear contribution. This study gives support to earlier literature claiming that standardisation of products is indeed increasing and seems a feasible option for global companies (Sorenson and Wiechmann 1975; Levitt 1983; Walters 1986; Boddewyn et al. 1986; Ozsomer et al. 1991; Yip 1992).

Moreover, an important finding is that in addition to a standardised product strategy, global companies may also use a modified product strategy. The modified

product strategy uses a standardised product platform, but allows adaptation of product lines and individual products on the basis of the requirements from countries and customers. This supports earlier findings that standardisation should be understood as a continuum (Quelch and Hoff 1986). Due to the exceptionally strong globalisation drivers and large research and development investment required, standardisation may be expected to be especially important in the ICT equipment manufacturing field.

4. Earlier research by Luostarinen (2001a, 2003) has proposed that the growth strategies of Finnish companies can be divided into four stages at the corporate level: 1. unrelated diversification and domestic business, 2. unrelated diversification and internationalisation, 3. full focus and globalisation, and 4. related diversification and globalisation. It was found that globalising internationals select one or a few strategic business units for globalisation from a large number of unrelated international strategic business units, which is in line with earlier research by Luostarinen. It was also apparent that companies often seek further growth by related diversification. Interestingly, divested strategic business units may also become successful global businesses.

5. Moreover, this research has shown that few product lines and products are chosen for initial global entry; but the amount increases as globalisation advances in the selected strategic business units. The widening of the product assortment is planned so that focus (highly related product lines) is maintained and global synergies are achieved. The pattern of an increasing number of focused product lines and number of products in each line is an important contribution to the understanding of the development of product strategies in globalising internationals. The results support earlier research by Craig and Douglas (1996) that argues that companies focus and integrate their activities as they move towards the global alignment phase. Development at the strategic business unit level is also very similar to that outlined on corporate level by the growth strategy of Finnish firms (Luostarinen 2001a, 2003).

6. It has been shown that the products are becoming more advanced with respect to share of services, know-how and systems as globalisation progresses. The pattern

found is in line with earlier findings from internationalisation research concerning the introduction of sales objects in an orderly pattern (See Luostarinen 1979). Also, development within product categories could be found. For example, development within the systems category towards broader scope and a larger share of service and know-how elements was found (See also Kosonen 1991, 74). The realization that a pattern similar to that found in internationalisation also appears in the globalisation of companies is a contribution to international business theory.

7. The finding that the horizontal co-operation increases during globalisation in the value networks with regard to products is an important contribution to existing globalisation literature. Other researchers have also distinguished between vertical and horizontal value networks (see Möller et al. 2002), but the examination of this development during globalisation is new. The findings support earlier research that has asserted that the co-operation increases in the latter stages of internationalisation (See Luostarinen 1994; Johanson and Mattsson 1989).

8. The study has applied a number of theories to explain the global product strategies. For example, the internationalisation (e.g. Luostarinen 1979) and globalisation theories and models (Douglas and Craig 1989; Craig and Douglas 1996; Luostarinen et al. 1994; Hout et al. 1982; Bartlett and Ghoshal 1987b), the corporate growth matrix (Ansoff 1965), the pattern of growth strategies of Finnish firms (Luostarinen 2001a, 2003), the theory related to technology discontinuities (see Christensen 2000; Anderson and Tushman 1990), and the resource-based view (Wernerfelt 1984, Barney 1991) were applied when examining this phenomenon.

9. Finally, the theoretical framework developed and the proposals put forward are expected to be a contribution to the understanding of the research phenomena. The theoretical framework is expected to be helpful for future empirical research in this area. The propositions contribute by providing a deeper understanding of the impact of the explanatory factors on global product strategies in the ICT field than previous research has done. For example, the propositions dealing with impact of the technology discontinuities (PR 2), the shift from the international to the global stage (PR 4-6a & 4-6 b), resources (PR 8), and global experience and resource commitment (PR 9) on product strategies brings valuable new understanding.

5.4 Managerial implications

The results of this research also have a number of managerial implications, which are reviewed next.

1. This study has outlined the product strategy dimensions and the standardisation alternatives that the managers of globalising internationals have to decide upon. Altogether, five global product strategy alternatives have been developed and explained, which are expected to be useful for management of ICT equipment companies.

2. A framework and propositions have been built that explain in what circumstances a specific strategy may be applied. It was found that managers must follow the development in a macro and ICT industry environment. Also, the corporate level strategy, and business level market strategies are expected to influence the global product strategy. Furthermore, the company's management needs to continuously examine the internal strategic levers, develop resources, and foster the growth of global business experience.

3. The understanding of how the product strategies change when an international company globalises is expected to be useful for companies planning their product strategies during this often crucially important transformation period. Managers should select a narrow product assortment for initial globalisation and then the product assortment may be widened as globalisation proceeds, while maintaining the focus of the lines. Moreover, the product strategy should be standardised increasingly during globalisation across both countries and customers. Increasingly, opportunities for co-operating in the horizontal network should also be sought.

4. The globalisation of a strategic business unit is so demanding in respect of required managerial and financial resources that the implication for corporate level management is that only one or a few strategic business units may be selected for global entry. As total sales is derived increasingly from one or a few strategic businesses during globalisation the importance of strategic business unit level decision-making seems to be increasing. As a result, the corporate and strategic business unit decision-making also becomes highly interlinked.

5.5 Suggestions for future studies

Many interesting alternatives for future studies can be pursued. These are discussed next.

1. One interesting suggestion would be to test the developed propositions in a large international survey in ICT or some other similar field. The survey methodology would allow increased generalizability of the results presented in this research.

2. It would be interesting to compare the results of the product strategies of globalising internationals found in this study with the research on born globals (see e.g. Luostarinen and Gabrielsson M. 2004), which differ from the globalising internationals in that they globalise instantly after establishment of their business. This might yield interesting findings on differences in product strategy in these two globalisation approaches (Gabrielsson M. and Gabrielsson P. 2003) .

3. The framework developed is also expected to be useful for studying other elements of marketing strategy. In future in addition to products, also channels, brands and pricing of globalising internationals could be studied (Gabrielsson P. and Gabrielsson M. 2003). Moreover, also a deeper understanding of the development of operation strategies of globalising internationals would be important.

4. A deeper understanding of co-operation with different value network members could bring interesting findings. For example, how co-operation partners could be used for adapting products based on country and customer needs, while offering fully standard products in their range.

5. Finally, it would also be interesting to extend the study from the strategic business unit level to a detailed examination of corporate level strategies. For example, the factors that explain the evolution of business portfolio strategies and how business portfolio decisions are made in large companies during globalisation could be studied.

REFERENCES

Aaker, David A. and Briance Mascarenhas, (1984) 'The Need for Strategic Flexibility'. *The Journal of Business Strategy*, Vol. 5, No. 2, pp. 74-82.

Abernathy, William J., (1978) *The Productivity Dilemma: Roadblock To Innovation In The Automobile Industry*. Baltimore: The Johns Hopkins University Press.

Aharoni, Yair, (1966) *The Foreign Investment Decision Process*. Boston: Division of Research, Harvard Business School.

Alahuhta, Matti, (1990) *Global Growth Strategies for High Technology Challengers*. Electrical Engineering Series No. 66, Helsinki: The Finnish Academy of Technology.

Alahuhta, Matti, (2001) Nokia Mobile Phones- Market Environment and Strategy, Presentation at *Nokia Market Capital Days on the 27th of November 2001*, web cast, New York.

Ala-Härkönen, Martti, (1997) *Diversification Paths and Performance in the Global Base Metals Industry*. Helsinki School of Economics and Business Administration: Helsinki, Series A:121.

Ala-Pietilä, Pekka, (2001) Mobile Services expansion, Presentation at *Nokia Market Capital days on the 27th of November 2001*, webcast, New York.

Alasuutari, Pertti, (1996) *Researching culture: Qualitative method and cultural studies. First published in 1995. Reprinted version, Sage Publications:London.*

Ali-Yrkkö, Jyrki, Laura Paija, Catherine Reilly and Pekka Ylä-Anttila, (2000) *NOKIA – A Big Company In A Small Country*. Helsinki: ETLA

Al-Obaidi, Zuhair and Mika Gabrielsson, (2002) 'Multiple sales channel strategies in export marketing of high tech SMEs'. CIBR research papers, Y-7, Helsinki School of Economics: Helsinki.

Andersen, Otto, (1993) 'On the internationalisation process of firms: A critical analysis'. *Journal of International Business Studies*, Second Quarter, pp. 209-231.

Anderson, Philip and Michael L. Tushman, (1990) 'Technological Discontinuities and Dominant Designs: A cyclical model of Technological Change'. *Administrative Science Quarterly*, Vol. 35, pp. 604-633.

Anderson, Charl R. and Carl P. Zeithaml, (1984) 'Stage of the Product Life Cycle, Business Strategy, and Business Performance'. *Academy of Management Journal*, Vol.27, No.1, pp. 5-24.

Andrews, Kenneth R., (1980) The Concept of Corporate Strategy (original). In Mintzberg, Henry, Quinn, James Brian and Ghoshal, Sumantra. *The Strategy Process*. 1995, Englewood Cliffs: Prentice-Hall, pp. 55-63.

Ansoff, Igor, (1965) *Corporate Strategy, Business Policy for Growth and expansion*, McGraw-Hill Book Company.

Ansoff, Igor, (1967) 'Strategies for a technology-based business'. *Harvard Business Review*, November-December, Vol. 45, No. 6 pp. 71-101.

Ansoff, Igor (1987). *Corporate Strategy*. Revised edition, London: Penguin Books.

Ansoff, H. Igor and John M. Stewart, (1967) 'Strategies for a technology-based business'. *Harvard Business Review*, Vol 45, No. 6, November-December, pp. 71-101.

Ayal, Igal and Jehiel Zif, (1978) 'Competitive Market Choice Strategies in Multinational Marketing'. *Columbia Journal Of World Business*, Vol. XIII, Number 3, Fall 1978, pp. 72-81.

Ayal, Igal and Jehiel Zif, (1979) 'Market Expansion Strategies In Multinational Marketing'. *Journal of Marketing*, Vol. 43, Number 2, Spring, pp. 84-94.

Aylmer, R. J., (1970) 'Who Makes Marketing Decisions in the Multinational Firm?'. *Journal of Marketing*, Vol. 34, No. 4, October, pp. 25-30.

Baldwin, Carliss Y. and Kim B. Clark, (1997) 'Managing in an age of Modularity'. *Harvard Business Review*, September-October 1997, pp. 84-93.

Barney, Jay, (1991) Firm resources and sustained competitive advantage. *Journal of Management*, Vol. 17, No. 1, pp. 99-120.

Bartlett Christopher A. and Sumantra Ghoshal, (1987a) "Managing Across Borders: New Strategic Requirements". *Sloan Management Review*, Summer 1987, pp. 7-17.

Bartlett Christopher A. and Sumantra Ghoshal, (1987b) "Managing Across Borders: New Organisational Responses". *Sloan Management Review*, Fall 1987, pp. 43-53.

Bartlett Christopher A. and Sumantra Ghoshal, (1989) *Managing Across Borders: The Transnational Solution*. Boston: Hutchinson Business Books.

Bayus, Barry L. and William P. Putsis, Jr., (1999) 'Product Proliferation: An Empirical Analysis of Product Line Determinants and Market Outcomes'. *Marketing Science*, Vol. 18, No. 2, pp. 137-153.

Beard, Charles and Chris Easingwood, (1996) 'New Product Launch – Marketing Action and Launch Tactics for High-technology Products'. *Industrial Marketing Management*, Vol.25, pp. 87-103.

Bengtsson, Lars, (2000) 'Corporate Strategy in a Small Open Economy: Reducing Product Diversification While Increasing International Diversification'. *European Management Journal*, Vol. 18, No. 4, August 2000, pp. 444-453.

Berry, Maureen, Pavlos Dimitris and Michael McDermott, (2001) "Globalisation and the Smaller Firm: Reconcilable Notions". *Academy of International Business*, *28th Annual Conference*, 6&7 April 2001.

Bilkey, Warren J. and George Tesar, (1977) 'The Export Behavior of Smaller-sized Wisconsin Manufacturing Firms'. *Journal of International Business Studies*, Spring/Summer, pp. 93-98.

Birkinshaw, Julian, Allen Morrison, and John Hulland, (1995) 'Structural and Competitive Determinants of a Global Integration Strategy'. *Strategic Management Journal*, Vol.6, pp. 637-655.

Boddewyn, J.J., Robin Soehl and Jacques Picard, (1986) 'Standardisation in International Marketing: Is Ted Levitt in Fact Right?'. *Business Horizons*, November-December, pp 69-75.

Bower, Joseph L., (1970) *Managing the Resource Allocation Process: A Study of Corporate Planning and Investment.* Boston: Harvard University Press.

Bowersox, Donald J., Theodore P. Stank, and Patricia J. Daugherty, (1999) 'Lean Launch: Managing Product Introduction Risk Through Response-Based Logistics'. *Journal of Product Innovation Management*, Vol.16, pp. 557-568.

Brandt, William K. and James M. Hulbert, (1977) 'Headquarters Guidance in Marketing Strategy in the Multinational Subsidiary'. *Columbia Journal of Word Business*, Vol. 7, No. 4, Winter, pp. 7- 13.

Buckley, Peter J., (1988) 'The Limits of Explanation: Testing the Internalization Theory of the Multinational Enterprise'. *Journal of International Business Studies*; Vol. 19, No. 2, Summer, pp. 181-193.

Buckley, Peter J. and Mark C. Casson, (1998) 'Analysing Foreign Market Entry Strategies: Extending the Internationalisation Approach'. *Journal of International Business Studies*, Vol. 29, number 3 (Third Quarter 1988), pp. 539-562.

Buzzell, Robert D., (1968) 'Can You Standardize Multinational Marketing'. *Harvard Business Review*, November-December, pp. 102-113.

Cavusgil, S. Tamer, (1984) 'Organisational Characteristics Associated With Export Activity'. *Journal of Management Studies*, Vol. 21, pp. 3-22.

Chakravarthy, Balaji S. and Howard Perlmutter, (1985) 'Strategic Planning for A Global Business'. *Columbia Journal of World Business,* Summer 1985, pp. 3-10.

Chandler, Alfred D., (1962) *Strategy and Structure*, *Chapters in the History of the Industrial Enterprise.* Cambridge, Massachusetts: Massachusetts Institute of Technology.

Chang, Tung-lung, (1995) 'Formulating Adaptive Marketing Strategies in a Global Industry'. *International Marketing Review*, Vol.12, No. 6, pp. 5-18.

Chatterjee, Sayan and Birger Wernerfelt, (1991) 'The Link Between Resources and Type of Diversification: Theory and Evidence'. *Strategic Management Journal*, Vol.12, pp. 33-48.

Chetty, Sylvie K. and Heather I.M. Wilson, (2003) 'Collaborating with competitors to acquire resources'. International Business Review, Vol. 12, Issues 1, pp- 61- 81.

Christensen, Clayton M., (2000) *The Innovator's Dilemma*. First published 1997, New edition 2000, New York: HarperCollins Publishers Inc.

Christensen, Clayton M., (2001) 'The Past and Future of Competitive Advantage'. *MIT Sloan Management Review*, Winter 2001, pp 105 – 109.

Cooper, Robert G., (1980) 'Project New Prod: Factors in New Product Success'. *European Journal of Marketing*, Vol. 14, No. 5/6, pp. 277-293.

Cooper R. G. and E. J. Kleinschmidt, (1987) 'Success Factors in Product Innovation'. *Industrial Marketing Management*, Vol. 16, pp. 215-223.

Craig, Angie and Susan Hart, (1992) 'Where to Now in New Product Development Research', *European Journal of Marketing*, Vol. 26, Number 11, pp. 3-49.

Craig, C. Samuel and Susan P. Douglas, (1996) 'Developing Strategies for Global Markets: An Evolutionary Perspective'. *The Columbia Journal of World Business*, Spring 1996, 31.1, pp. 71-81.

Cyert, Richard M. and James G. March, (1963) *A Behavioral Theory of the Firm*. Englewood Cliffs, New Jersey: Prentice-Hall, Inc.

Darling, John R., (1999) 'Competitive positioning in developed export markets: A model for strategic decision-making'. In Lehtinen, Uolevi and Hannu Seristö (eds), Perspectives on Internationalization, pp. 141-155. Helsinki: Helsinki School of Economics and Business Administration.

Darling, John R. and Thomas M. Box, (1999) 'Keys for Success in the Leadership of Multinational Corporations 1990 Through 1997'. *SAM Advanced Management Journal*, Vol. 64, No.4, Autumn, pp. 16-24.

Day, George S., (1990) *Market Driven Strategy – Processes for Creating Value*. New York: The Free Press, Macmillan, Inc.

Dhalla, Nariman K. and Sonia Yuspeh, (1976) 'Forget the product life cycle concept!'. *Harvard Business Review*, Vol. 54, January-February, pp. 102-112.

Dobson, Gregory, and Shlomo Kalish, (1993) 'Heuristics for Pricing and Positioning a Product-line using Conjoint and Cost Data'. *Management Science*, Vol.39, No. 2, February, pp. 160 – 175.

Douglas, Susan P. and C. Samuel Craig, (1989) 'Evolution of Global Marketing Strategy: Scale, Scope and Synergy'. *Columbia Journal of World Business*, Fall, pp. 47-59.

Doukas, John A and LHP Lang, (2003) 'Foreign direct investments, diversification and firm performance'. *Journal of International Business Studies*, Vol. 34, No.2, pp. 153- 172.

Doz, Yves L., (1978) 'Managing Manufacturing Rationalization Within Multinational Companies'. *Columbia Journal of World Business*, Vol. 13, No. 3, Fall, pp. 82-94.

Doz, Yves and C. K. Prahalad, (1984) "Patterns of Strategic Control Within Multinational Corporations". *Journal of International Business Studies*, Fall 1984, pp. 55-72.

Doz, Yves, (1986) *Strategic Management in Multinational Companies*. Oxford, UK: Pergamon Press.

Doz, Yves, (1991) 'International Industries: Fragmentation Versus Globalisation'. In *Global Strategic Management, The Essentials*. Eds. Vernon-Wortzel, Heidi & Wortzel, Lawrence, New York, USA: John Wiley & Sons, 1991, pp. 18-34.

Dunning, John H., (1988) 'The Eclectic Pardigm of International Production: A Restatement and Some Possible Extensions'. *Journal of International Business Studies*, Vol. 19, No. 1, Spring, pp. 1-31.

Eisenhardt, Kathleen M., (1989) 'Building theories from Case Study Research'. *Academy of Management Review*, Vol. 14 No. 4, pp 532 – 550.

Erramilli, M. Krishna, (1990) 'Entry Mode Choice in Service Industries'. International Marketing Review, Vol. 7, No. 5/6, pp. 50-63.

European Information Technology Observatory (2002). 10th Edition. Germany: European Information technology Observatory (EITO) – European Economic Interest Grouping (EEIG).

Euro, Kalevi, (2001) *Locational changes of headquarters of multinational corporations – A theoretical study on the motives and reasons for relocating Finnish Divisional Headquarters abroad*. Helsinki: Helsinki School of Economics and Business Administration, Series A:194.

Gabrielsson, Mika, (1999) *Sales Channel Strategies For International Expansion: The Case of Large Companies In The European PC Industry*. Helsinki: Helsinki School of Economics and Business Administration, Series A:163.

Gabrielsson, Mika and Peter Gabrielsson, (2003) 'Global Marketing Strategies of Born Globals and Globalising Internationals in the ICT Field'. *Journal of Euromarketing*, Vol. 12, No. 3/4.

Gabrielsson, Peter, (2002) *Globalising Internationals: Global product strategies of the ICT companies*. Licentiate thesis, Helsinki: Helsinki School of Economics.

Gabrielsson, Peter and Mika Gabrielsson, (2003) 'Globalizing Internationals: Standardization of Product and Marketing Strategies in the ICT Field'. In Wheeler, Colin, McDonald Frank and Greaves, Irene (Eds.), Chapter 7, pp. 100-119, *Internationalization - Firm Strategies and Management*. New York, USA: Palgrave Macmillan.

Geringer, J. Michael, Paul W. Beamish, and Ricard C. daCosta, (1989) 'Diversification Strategy and Internationalisation: Implications for MNE performance'. *Strategic Management Journal*, Vol. 10, pp. 109-119.

Ghoshal, Sumantra, (1987) 'Global strategy: An organizing framework'. *Strategic Management Journal*, Vol. 8, pp. 425-440.

Glaser, Barney G. and Anselm L. Strauss, (1967) *The Discovery of Grounded Theory: Strategies for Qualitative Research.* Chicago: Aldine Publishing Company.

Gomez, Fernando, (2001) Presentation handout, 19th of November 2001, Fernando Gomez, Senior Vice President and General Manager, Europe, Middle-East, and Africa Region, Personal Communications Sector, Motorola, Inc.

Govindarajan, Vijay, and Anil Gupta, (2000) 'Analysis of the Emerging Global Arena'. *European Management Journal*, Vol.18, No.3, pp 274-284.

Grant, Robert M., (1991) 'The Resource-Based Theory of Competitive Advantage: Implications for Strategy Formulations'. *California Management Review*, Spring, pp. 114- 135.

Groenveld, Pieter, (1997) 'Road mapping Integrates Business and Technology'. *Research-Technology Management*, Vol. 40, No. 5 September-October, pp. 49-55.

Grönroos, Christian, (1987) *Developing the service offering – A source of competitive advantage*. Swedish School of Economics and Business Administration Working papers no. 161. Helsinki: Swedish School of Economics.

Grönroos, Christian, (1990) Service Management and Marketing – Managing the Moments of Truth in Service Competition. Massachusetts: Lexington Books.

Gupta, Anilj K. and Vijay Govindarajan, (2000) 'Managing Global Expansion: A Conceptual Framework'. *Business Horizons*, March-April, pp. 45-54.

Hamel, Gary, (2000) *Leading The Revolution*. Boston, Massachusetts: Harvard Business School Press.

Hamel, Gary and C.K. Prahalad, (1985) 'Do you really have a global strategy?'. *Harvard Business Review*, July-August, pp. 139 –148.

Hamel, Gary and C.K. Prahalad, (1989) 'Strategic Intent'. *Harvard Business Review*, May-June 1989, pp. 63 – 76.

Hamel, Gary and C.K. Prahalad, (1993) 'Strategy as Stretch and Leverage'. *Harvard Business review*, March-April 1993, pp. 75 – 84.

Hammersley, Martyn and Roger Gomm, (2000) 'Introduction'. In Gomm, Roger, Martyn Hammersley and Peter Foster (Eds*), Case Study Method*, pp. 1-16. London: Sage Publications Ltd.

Hansén, Sten-Olof, (1981) *Studies in internationalisation of the pharmaceuticals industry, - a taxonomic approach*. Turku: Research Institute of the Åbo Akademi Foundation, no. 66.

Hansén, Sten-Olof, (1999) 'International competition: A challenge for Finnish companies'. In Lehtinen, Uolevi and Hannu Seristö (eds), Perspectives on Internationalization, pp. 49-57. Helsinki: Helsinki School of Economics and Business Administration.

Hart, Stuart L., (1995) 'A Natural-Resource-Based View Of The Firm'. *Academy of Management Review*, Vol.20.No.4, pp. 986-1014.

Heenan, David and Howard V. Perlmutter, (1979) *Multinational Organisational Development*. Reading, Massachusetts: Addison-Wesley Publishing Company.

Hedlund, Gunnar, (1985) *The hypermodern MNC – A Heterarchy?* Institute of International Business, Stockholm School of Economics.

Hilke, Henri, Niina Nummela, and Sten-Olof Hansén, (2002) ' "Something old, something new,…" globalisation and the corporate world.' In Nummela, Niina (ed), *Viewpoints on the economic dimension of globalisation*, Series A-8:2002, pp. 31-46. Turku: Turku School of Economics and Business Administration.

Hill, John S. and Richard R. Still, (1984), 'Adapting products to LDC tastes'. *Harvard Business Review*, March-April, pp 92-101.

Hill, John S., (1994) 'Strategic Approaches To International Markets – Global, Multinational, or what?' *In Global Marketing Perspectives and Cases*, edited by Salah S. Hassan and Roger D. Blackwell, Orlando: The Dryden Press, Harcourt Brace College Publishers.

Hitt, Michael A., Robert E.Hoskisson, and Hicheon Kim, (1997) 'International Diversification: Effects on Innovation and Firm Performance in Product-Diversified Firms'. *Academy of Management Journal*, No.4, pp. 767-798.

Hofer, Charles W., (1975) 'Towards a Contingency Theory of Business Strategy'. *Academy of Management Journal*, December, No. 4, pp. 784-810.

Hofer, Charles W. and Dan Schendel, (1978) *Strategy Formulation: Analytical Concepts*, St. Paul, Minnesota: West Publishing Co.

Hollensen, Svend, (2001) *Global Marketing: A Market Responsive Approach*. Second edition. Essex, England: Pearson Education Limited.

Hout, Thomas; Michael E. Porter and Eileen Rudden, (1982) 'How global companies win out'. *Harvard Business Review*, September- October, pp. 98 – 108.

Hurmerinta-Peltomäki, Leila, (2001) *Time and Internationalisation – The shortened Adoption Lag in Small Business Internationalisation*. Turku: Turku School of Economics and Business Administration, series A-7:2001.

Häikiö, Martti, (2001a) *Nokia Oyj:n historia: Globalisaatio - Telekommunikaation maailmanvalloitus 1992-2000*, Helsinki: Edita Oyj.

Häikiö, Martti, (2001b) *Nokia Oyj:n historia: Fuusio – Yhdistymisen kautta suomalaiseksi monialayritykseksi 1865 -1982*, Helsinki: Edita Oyj.

ITU, (2002) World Telecommunication Development Report 2002 – Reinventing Telecoms, Executive summary. March 2002. International Telecommunication Union (ITU).

Jain, Subhash C., (1989) 'Standardisation of International Marketing Strategy: Some Research Hypotheses'. *Journal of Marketing*, Vol. 53, January, pp. 70-79.

Johanson Jan, and Lars Gunnar Mattsson (1988). Internationalization in Industrial Systems – A Network Approach. In N. Hood and J-E. Vahlne (Eds), *Strategies in Global Competition*. New York: Croom Helm.

Johanson, Jan and Jane-Erik Vahlne, (1977) 'The Internationalization Process of The Firm – A Model of Knowledge Development and Increasing Foreign Market Commitments'. Journal of International Business Studies. Vol. 8, Spring/Summer, No. 1, pp. 58-62.

Johanson, Jan and Finn Wiedersheim-Paul, (1975) 'The Internationalization of the Firm- Four Swedish Cases'. *The Journal of Management Studies*, Volume XII, October, pp. 305-322.

Jolly, Dominique,(2000) 'Three Generic Resource-based Strategies'. *International Journal of Technology Management*, Vol. 19, Nos. 7/8, pp. 773-787.

Keegan, Warren J., (1969) 'Multinational Product Planning: Strategic Alternatives'. *Journal of Marketing*, Vol. 33, January 1969, pp. 58-62.

Keillor, Bruce D., R. Douglas Hausknecht and R. Stephen Parker, (2001) 'Thinking Global, Acting Local: An attribute Approach to Product Strategy'. *Journal of Euromarketing*, Vol. 10, No. 2, pp. 27-48.

Kirpalani, Manek V. H. and Reijo Luostarinen, (1999) 'Dynamics of Success of SMOPEC Firms in Global Markets'. Paper presented at *EIBA Annual Conference in Manchester 1999 Dec 12-14*.

Knight, Gary A. and S. Tamer Cavusgil, (1996) 'The Born Global Firm: A Challenge to traditional internationalisation theory". In Cavusgil, Tamer S. and Tage Koed Madsen (eds), Advances in International Marketing, Vol. 8, pp. 11-26.

Kogut, Bruce, (1985) 'Designing Global Strategies: Comparative and Competitive Value-Added Chains'. *Sloan Management Review*, Vol. 26, No.4, Summer, pp. 15-28.

Kohli, Rajeev and R. Sukumar, (1990) 'Heuristics For Product-Line Design Using Conjoint Analysis'. *Management Science*, Vol. 36, No.12, December, pp. 1464-1478.

Koivusalo, Mikko, (1995) *Kipinästä tuli syttyi – Suomalaisen radiopuhelinteollisuuden kehitys ja tulevaisuuden haasteet*. Cetonia Systems: Espoo.

Konola, Kai, (2003) Openness - The road to success. Nokia Networks' presentation at Cebit 2003, March, 12 2003.

Korhonen, Heli, (1999) *Inward-Outward Internationalization of Small and Medium Enterprises*. Helsinki: Helsinki School of Economics and Business Administration, series A:147.

Kosonen, Heikki M., (1990) *Systems sales as an international business strategy for industrial companies – A Theoretical Approach*. Helsinki: Helsinki School of Economics and Business Administration.

Kosonen Heikki M., (1991) *The Internationalisation of Industrial Systems Suppliers; A Case Study of The Internationalisation Process of Industrial Systems Suppliers with Special Emphasis on Strategy and Organisation*. Helsinki, Finland: Helsinki School Of Economics and Business Administration, Series A:78.

Kosonen, Mikko, and Kurt Engelvuori, (1998) Towards a systematic approach in process management - Case Nokia Telecommunications Business. In Miikka Jahnukainen and Ari Vepsäläinen (eds), *Process management works –if only implemented…Reassuring Experiences of Global, Technology-Intensive Companies from a Finnish Perspective*. Helsinki: Systems Group Publications, Series: A:10.

Kotler, Philip, (1965) 'Phasing Out Weak Products'. *Harvard Business Review*, March-April, pp. 107-118.

Kotler, Philip, (1984) *Marketing Management: analysis, planning and control*. Fifth edition, London: Prentice-Hall International, Inc.

Kotler, Philip, Liam Fahey, and Somkind Jatusripitak, (1985) *The New Competition*. Englewood Cliffs, New Jersey, USA: Prentice-Hall, Inc.

Kotler, Philip and Gary Armstrong, (2001) *Principles of Marketing, Ninth Edition*, Upper Saddle River, New Jersey: Prentice Hall International Inc.

Kulkki, Seija, (1996) *Knowledge Creation of Multinational Corporations: Knowledge Creation Through Action*. Helsinki: Helsinki School of Economics and Business Administration, Series A:115.

Laaksonen, P., P. Ala-Pietilä, T. Hannukainen ja H. Rautio, (1998) 'Process Management as a Tool in Managing Global Growth. Case Nokia: Nokia Mobile Phones'. In Miikka Jahnukainen and Ari Vepsäläinen (eds), *Process management works –if only implemented…Reassuring Experiences of Global, Technology-Intensive Companies from a Finnish Perspective*. Helsinki: Systems Group Publications, Series: A:10.

Lambkin, Mary and George S. Day, (1989) 'Evolutionary Processes in Competitive Markets: Beyond the Product Life Cycle'. *Journal of Marketing*, Vol. 53, July, pp. 4-20.

Lancaster, Kelvin, (1990) 'The Economics of Product Variety: A Survey'. *Marketing Science*, Vol. 9, No. 3, Summer, pp. 189 – 206.

Laroche, Michel, V.H. Kirpalani, and Frank Pons, (2001) 'A Model of Advertising Standardization in Multinational Corporations'. *Journal of International Business Studies*, Vol. 32, No. 2, pp. 249-266.

Leonidou, Leonidas C. and Constantine S. Katsikeas, (1996) 'The export development process: An integrative review of empirical models'. *Journal of International Business Studies*, Vol. 32, Quarter 3, pp. 517-546.

Levitt, Theodore, (1965) 'Exploit The Product Life Cycle'. *Harvard Business Review*, Vol. 43, November-December, pp. 81 – 94.

Levitt, Theodore, (1969) *The Marketing Mode: Pathways to Corporate Growth*. USA, New York: McGraw-Hill, Inc..

Levitt, Theodore, (1980) 'Marketing success through differentiation - of anything'. *Harvard Business Review*, January-February, pp. 83 – 91.

Levitt, Theodore, (1983) 'The Globalisation of Markets'. *Harvard Business Review*, May-June, 1983, pp. 99-102.

Lieberman, Marvin B. and David B. Montgomery, (1988) 'First-Mover Advantage'. *Strategic Management Journal*, Vol.9, pp. 41-58.

Lincoln, Yvonne S. and Egon G. Guba, (2000) 'The only generalizations is: there is no generalization'. In Gomm, Roger, Martyn Hammersley and Peter Foster (eds), *Case Study Method*. London: Sage Publications Ltd.

Lord, Michael D. and Anette L. Ranft, (2000) 'Organisational Learning About New International Markets: Exploring the Internal Transfer of Local Market Knowledge'. *Journal of International Business Studies*, Vol. 31, No. 4, pp. 573 – 589.

Lukka, Kari and Eero Kasanen, (1993) 'Yleistettävyyden ongelma liiketaloustieteessä'. *Liiketaloustieteellinen Aikakauskirja*, Vol. 12, pp. 348 – 379.

Luostarinen, Reijo, (1970) *Foreign operations of the firm: Their quantitative structure and the factors behind them*. Licentiate thesis. Helsinki: Helsinki School of Economics and Business Administration.

Luostarinen, Reijo, (1979) *Internationalisation of the Firm – An empirical study of the internationalisation of firms with small and open domestic markets with special emphasis on lateral rigidity as a behavioural characteristic in strategic decision-making.* Helsinki: Helsinki School of Economics, Series A: 30

Luostarinen, Reijo, (1994) *Internationalisation of Finnish Firms and their Response to Global Challenges.* Helsinki: UNU World Institute for Development Economic Research.

Luostarinen Reijo, (2000a) *Internationalization of Business Course 26D011*. Lecture notes, Helsinki School of Economics.

Luostarinen, Reijo, (2000b) *Strategic Planning For Global Business*. Course 26D021, Lecture notes, Helsinki School of Economics.

Luostarinen, Reijo, (2001a) 'Outward Foreign Direct Investment – Country study: Finland'. In Outward internationalisation facilitating transformation and EU accession; The case of Czech Republic, Hungary, and Slovenia. Phare ACE Project no.P97-8073-R.

Luostarinen, Reijo, (2001b) 'Palvelujen kansainvälistyminen suomalaisissa teollisuusyrityksissä.' In Grönroos, Christian and Raija Järvinen (eds), *Palvelut ja asiakassuhteet*. Helsinki: Kauppakari Oyj.

Luostarinen, Reijo (2003) 'Growth, Globalization and competitive strategies of born globals versus traditional companies'. Working seminar on Born Globals, Helsinki School of Economics, 26-27 May 2003.

Luostarinen, Reijo and Lawrence Welch, (1990) *International Business Operations*. Finland: Kyriiri.

Luostarinen, Reijo, Heli Korhonen, Jukka Jokinen and Timo Pelkonen, (1994) Globalisation and SME – Globalisation of Economic Activities and Small and Medium-sized Enterprises (SMEs) Development, Finland. Finland: Ministry of Trade and Industry.

Luostarinen, Reijo and Mika Gabrielsson, (2001) 'Born Globals of SMOPEC – What, where, when, why and how'. *The 27th Annual Conference of the European International Business Academy in Paris, December 13 – 15, 2001*, pp. 1-22.

Luostarinen, Reijo and Mika Gabrielsson, (2002) ´Globalization and Global Marketing Strategies of Born Globals in SMOPECs'. *The annual conference of the European International Business Academy* (EIBA) on the 8-10 December 2002 in Athens.

Luostarinen, Reijo and Mika Gabrielsson, (2004) 'Born Globals of Small and Open Economies (SMOPECs) - A New Entrepreneurial Challenge', In Dana, Leo Paul, ed., *Handbook of Research on International Entrepreneurship*, Cheltenham: Edward Elgar (Forthcoming).

Madsen, Tage Koed and Per Servais, (1997) 'The Internationalization of Born Globals: an Evolutionary Process?'. *International Business Review*. Vol.6, No.6, pp. 561-583.

Mason, Charlotte H. and George R. Milne, (1994) 'An Approach for Identifying Cannibalisation Within Product Line Extensions and Multi-Brand Strategies'. *Journal of Business Research*, Vol. 31, pp. 163-170.

Mattsson, Lars-Gunnar, (1975) Systemförsäljning. Sweden: Marknadstekniskt centrum.

Maula, Marjatta, (1999) Multinational Companies as Learning and Evolving Systems. A multiple-case study of knowledge intensive service companies. An application of Autopiesis theory. Helsinki School of Economics and Business Administration, series A-154.

McGrath, Michael E., (1995) *Product Strategy For High-technology Companies: How to Achieve Growth, Competitive Advantage, and Increased Profits*. USA: McGraw-Hill.

Mejias, Roberto J. and Jose G. Vargas-Hernandez, (2001) 'Emerging Mexican and Canadian Strategic Trade Alliances Under NAFTA'. *Journal of Global Marketing,* Vol. 14, No. 4, pp. 89-116.

Melin, Leif, (1992) 'Internationalisation As a Strategy Process'. *Strategic Management Journal*, Vol. 13, pp. 99-118.

Meyer, March H. and Alvin P. Lehnerd, (1997) *The Power of Product Platforms: Building value and Cost Leadership*, New York: The Free Press.

Meyer, March H. and Dhaval Dalal, (2002) 'Managing platform architectures and manufacturing processes for nonassembled products'. *The Journal of Product Innovation Management, Vol. 19, No. 4, pp. 277-293.*

Miles, Matthew B. and A. Michael Huberman, (1994) Qualitative Data Analysis: An Expanded Sourcebook. Second edition. Thousand Oaks, California, USA: Sage publications, Inc.

Mintzberg Henry, (1990) 'The Design School: Reconsidering the Basic Premises Of Strategic Management'. *Strategic Management Journal*, Vol. 11, pp. 171-195.

Mintzberg, Henry and James A. Waters, (1985) 'Of Strategies, Deliberate and Emergent'. *Strategic Management Journal*, Vol.6, pp. 257-272.

Moore, Geoffrey A., (1995) *Crossing The Chasm: Marketing and Selling High-tech Products to Mainstream Customers.* First published 1991, Paperback edition 1995, New York: HarperBusiness, HarperCollins Publishers.

Moore, Geoffrey A., (1998) *Inside The Tornado: Marketing Strategies From Silicon Valley's Cutting Edge.* First published in 1995, Paperback edition 1998, Oxford: Capstone Publishing Limited.

Moore, Geoffrey A., (2000) 'High-Tech Marketing Strategies for the New Millenium: Becoming a Gorilla.' *Presentation at seminar organized by Helsinki School of Economics / JOKO and Sitra on the 3rd of February 2000.*

Murray, George R. Jr. and Harry B. Wolfe, (1970) 'Length of Product Line'. *California Management Review*, Vol.12, No.4, Summer, pp. 79- 85.

Möller, Kristian, Arto Rajala and Senja Svahn, (2002) Strategic Business Nets – Their Types and Management. Working papers, W-326. Helsinki School of Economics.

Nohria, Nitin and Sumantra Ghoshal, (1997) *The Differentiated Network: Organizing Multinational Corporations for Value Creation. San Francisco: Jossey-Bass Inc.*

Nonaka, Ikujiro, and Hirotaka Takeuchi, (1995) *The Knowledge-Creating Company.* New York: Oxford University Press.

OECD 2000, OECD Economic Surveys 1999-2000: Finland. Paris: OECD.

Ozsomer, Aysegul, Muzzafer Bodur, S. Tamer Cavusgil, (1991) 'Marketing Standardisation by Multinationals in an Emerging Market'. *European Journal of Marketing*, Vol. 25, No. 12, pp. 50-64.

Oviatt, Benjamin M. and Patricia Phillips McDougall (1994), 'Toward A Theory of International New Ventures'. *Journal of International Business Studies*, first quarter, pp. 45-64.

Paija Laura, (2000) *ICT Cluster – The Engine Of Knowledge-Driven Growth In Finland.* Discussion papers, No. 733, Helsinki: ETLA.

Paija Laura, (2001) 'The ICT Cluster in Finland – Can We Explain It?' in Paija, Laura (ed.), *Finnish ICT Cluster in the Digital Economy*, Taloustieto Oy, pp. 9-70.

Patton, Michael Quinn, (2002) Qualitative Research & Evaluation Methods. Third edition. Thousand Oaks, California, USA: Sage Publications, Inc.

Peebless, D.M., J.K.Ryand and I.R. Vernon, (1977) 'A New Perspective on Advertising Standardisation'. European Journal of Marketing. Vol.11, No.8, pp. 569-576,

Peng, Mike W., (2001) 'The resource-based view and international business'. *Journal of Management*, Vol. 27, pp. 803-829.

Penrose, Edith T., (1959) *The Theory of the Growth of the Firm*. Oxford.

Perlmutter, Howard V., (1969) 'The Tortuous Evolution of the Multinational Corporation'. *Columbia Journal of World Business*, Jan-Feb 1969, pp. 9-18.

Pettigrew, Andrew M., (1997) 'What is a Processual Analysis'. *Scandinavian Journal of Management*, Vol. 13, No.4, pp. 337-348.

Porter, Michael E., (1985) *Competitive Advantage: Creating and Sustaining Superior Performance*. New York: The Free Press.

Porter, Michael E., (1986) 'Changing Patterns of International Competition'. *California Management Review*, Volume XXVIII, No. 2, Winter, pp. 9-40.

Porter, Michael E., (1998) *Competitive Advantage: Creating and Sustaining Superior Performance: with a new introduction*. New edition, New York: The Free Press.

Prahalad, C.K. and Yves L. Doz, (1987) *The Multinational Mission: Balancing Local Demands and Global Vision*, New York: Free press.

Prahalad, C.K. and Gary Hamel, (1990) 'The Core Competence of The Corporation'. *Harvard Business Review*, May-June, pp. 79-91.

Proff, H., (2002), 'Business Unit Strategies Between Regionalisation and Globalisation'. *International Business Review*, Vol. 11, pp. 231-250.

Quelch, John A. and Edward J. Hoff, (1986) 'Customizing Global Marketing'. *Harvard Business Review*, May-June, pp. 59- 68.

Quelch, John A. and David Kenny, (1994) 'Extend Profits, Not Product Lines'. *Harvard Business Review*, September-October, pp. 153-160.

Rajala, Arto, (1997) *Marketing High Technology: Organizing Marketing Activities in Process Automation Companies*. Finland: Helsinki School of Economics and Business Administration, A-123.

Ramdas, Kamalini, and Mohanbir S. Sawhney, (1999) 'A Cross functional Approach to Evaluating Multiple Line Extensions for Assembled Product'. *Marketing Science Institute*, Working paper, Report No.99-105.

Rau, Pradeep A. and John F. Preble, (1987) 'Standardisation of Marketing Strategy By Multinationals'. *International Marketing Review*, Autumn, pp. 18-27.

Raynor, Michael E. and Joseph L. Bower, (2001) 'Lead From The Center, How to Manage Divisions Dynamically'. *Harvard Business Review*, May 2001, pp. 93 – 100.

Rink, David R. and John E. Swan, (1979) 'Product Life Cycle Research: a Literature Review'. *Journal of Business Research*, Vol. 7, pp. 219 – 242.

Robertson, David and Karl Ulrich, (1998) 'Planning for Product Platforms'. *Sloan Management Review*, Summer 1998, pp. 19-31.

Robinson, William T., Claes Fornell, and Mary Sullivan, (1992) 'Are Market Pioneers Intrinsically Stronger Than Later Entran'. *Strategic Management Journal*, Vol.13, No. 8, pp. 609-624.

Rogers, Everett, (1962) *Diffusion of Innovations*. New York: The Free Press of Glencoe.

Root, Franklin R., (1970) *Strategic Planning for Export Marketing*. Third edition. Copenhagen: Erhvervsokonomisk Forslag S/I.

Rugman, Alan, (1976) 'Risk Reduction by International Diversification'. Published originally in Journal of International Business Studies, Vol. 7, No.2, Fall-Winter, 1976, reproduced in Rugman, Alan M, *The Theory of Multinational Enterprises: The Selected Scientific papers of Alan M. Rugman*. Volume One, Cheltenham, UK: Edward Elgar, 1996, pp. 75-80.

Rugman, Alan and Richard Hodgetts, (2001) 'The End of Global Strategy'. *European Management Journal*, Vol. 19, No. 4, August, pp. 333-343.

Rumelt, Richard P., (1982) 'Diversification Strategy and Profitability'. *Strategic Management Journal*, Vol. 3, pp. 359-369.

Saarenketo, Sami, (2002) *Born Globals – Internationalization of Small and Medium-sized Knowledge-Intensive Firms*. Lappeenranta: Lappeenranta University of Technology, no. 145.

Sawhney, Mohanbir S., (1998) 'Leveraged high-variety strategies: From portfolio thinking to platform thinking'. *Academy of Marketing Science*, Winter, pp. 54-61.

Simmonds, Kenneth, (1985) 'Global Strategy: Achieving the Geocentric Ideal'. *International Marketing Review, Vol. 2, No. 1, Spring, pp. 9-17*

Shankar, Venkatesh, (1999) 'New Product Introduction and Incumbent Response Strategies: Their Interrelationship and the Role of Multimarket Contact'. *Journal of Marketing Research*, Vol. 36, August, pp. 327-344.

Shoham, Aviv, (2002) 'Standardisation of International Strategy and Export Performance: A Meta-Analysis'. Journal of Global Marketing, Vol. 16, No. 1/2, pp. 97-120.

Slater, Stanley F., (1993) 'Competing in High-Velocity Markets'. *Industrial Marketing Management*, Vol. 22, pp. 255-263.

Sohlberg, Carl Arthur, (2000) 'Educator insights: Standardization or adaptation of the international marketing mix: The role of the local subsidiary/representative'. *Journal of International Marketing*, Vol. 8, Issue 1, pp. 78-98.

Sood, James, (1975) 'An Empirical Investigation of the Product Cycle Concept in International Trade and Investment'. *The Finnish Journal of Business Economics*, 1975, pp. 87-108.

Sorenson, Ralph Z. and Ulrich E. Wiechmann, (1975) 'Probing Opinions'. *Harvard Business Review*, May-June, 53, pp. 38-54, 166-167

Stake, Robert E. (2000) 'The Case Study Method in Social Inquiry'. In Gomm, Roger, Martyn Hammersley and Peter Foster (eds), *Case Study Method*. Pp. 19 – 26, London: Sage Publications Ltd.

Stopford, J. M. and L.T. Jr. Wells, (1972) *Managing the Multinational Enterprise*. New York: Basic Books.

Takeuchi, Hirotaka and Michael E. Porter, (1986) 'Three Roles of International Marketing in Global Strategy'. In *Competition in Global Industries,* edited by Michael E. Porter, 1986, Boston: Harvard Business School Publishing.

Tallman, Stephen and Jiatao Li, (1996) 'Effects of International Diversity and Product Diversity on The Performance of Multinational Firms'. *Academy of Management Journal*, Vol.39, No.1, pp. 179-196.

Tanner, Maj-Lis, (1988) 'Nokia-Mobira keskittyy radiopuhelimiin'. *Kauppalehti Optio*, Helmikuu, pp. 44- 47.

Teece, David J., Gary Pisano, and Amy Shuen, (1997) 'Dynamic capabilities and strategic management'. *Strategic Management Journal*, Vol. 18, No. 7, pp. 509-533.

Teece, David J., (1998) 'Capturing Value from Knowledge Assets: The New Economy, Markets For Know-How, And Intangible Assets'. *California Management Review*, Vol. 40, No. 3, Spring, pp. 55-79.

Terpstra, Vern, (1977) 'International Product Policy: the Role Of Foreign R&D'. *Columbia Journal of World Business*, Vol. 12, Winter, No. 3, pp. 24-32.

Theodosiou, Marios and Leonidas C. Leonidou, (2003) 'Standardization versus adaptation of international marketing strategy: an integrative assessment of the empirical research'. International Business Review, Vol 12, pp. 141-171.

Turnbull, Peter W., (1987) A Challenge to the stages theory of the internationalisation Process. In Rosson, Philip J. and Stanley D. Reid (eds), *Managing Export Entry and Expansion*, pp. 21 - 41. New York: Praeger Publishers.

Tushman, Michael L. and Philip Anderson, (1986) 'Technological discontinuities and organisational environments'. *Administrative Science Quarterly*, Vol. 31, September, pp.439-465.

Tyyri, Tarmo, (1994) *International Market Selection In Finnish Industrial Multinational Enterprises*. Turku School of Economics and Business Administration, series A-8: 1994.

Vaivio, Fedi, (1963) 'Sivusuuntainen jäykkyys yrityksen käyttäytymispiirteenä'. *The Journal of Business Economics*, 1963, pp. 269-282.

Vandermerwe, Sandra, and Michael Chadwick, (1989) 'The Internationalisation of Services'. The Service Industries Journal, January 1989, Vol. 9, No. 1, pp. 79-84.

Verhage, Bronislaw J., Lee D. Dahringer, and Edward W. Cundiff, (1989) 'Will a Global Marketing Strategy Work - An Energy Conservation Perspective'. *Journal of the Academy of Marketing Science*, Spring, 17.2, pp 129-136.

Verona, Gianmario, (1999) 'A Resource-Based view of Product Development', *Academy of Management Review*, Vol. 24, No. 1, pp. 132-142.

Vernon, Raymond, (1966) 'International Investment and International Trade in the Product cycle'. *The Quarterly Journal of Economics*, May 1966, pp. 191-207.

Walters, Peter G.P., (1986) 'International Marketing Policy: A Discussion of The Standardisation Construct and its Relevance For Corporate Policy'. *Journal Of International Business Studies*, Vol. 17, No. 2, (Summer), pp. 55-69.

Wasson, Chester R., (1974) *Dynamic Competitive Strategy & Product Life Cycles*. St.Charles, Illinois: Challenge Books.

Wells, Louis T., (1972) 'International Trade: The Product Life Cycle Approach'. In *The Product Life Cycle and International Trade*, edited by Louis T. Wells, Boston: Harvard University, pp. 3-33,

Wernerfelt, Birger, (1984) 'A Resource-based View of the Firm'. *Strategic Management Journal*, Vol. 5, pp. 171 – 180.

Whitelock, Jeryl and Carole Pimblett, (1997) 'The Standardisation Debate in International Marketing'. *Journal of Global Marketing*, Vol.10, No. 3, pp. 45-66.

Wind, Yoram, Susan P. Douglas, and Howard V. Perlmutter, (1973) 'Guidelines for Developing International Marketing Strategies'. *Journal of Marketing*, Vol.37, April, pp. 14-23.

Wood, Van R., John R. Darling and Mark Siders, (1999) 'Consumer desire to buy and use products in international markets – How to capture it, how to sustain it'. *International Marketing Review*, Vol. 16, No. 3, start pp. 231.

WTO 2002, World Trade Organization Annual Report, Geneva: WTO Publications.

Yin, Robert K., (1994) *Case Study Research: Design and Methods*. Second Edition, Thousand Oaks, California: Sage Publications.

Yip, George S., (1989) 'Global Strategy…In an World of Nations?' *Sloan Management Review*, 29, Fall, 29-41.

Yip, George S., (1991) *Do American Business Use Global Strategy*? Working paper. Massachusetts: Marketing Science Institute.

Yip, George S., (1992) *Global Strategy: Managing for Worldwide Competitive Advantage*. USA: Prentice-Hall, Inc.

Yip, George S., (1997) 'Patterns and Determinants of Global Marketing'. *Journal Of Marketing Management*, Vol. 13, pp. 153-164.

Yip, George S., Pierre M. Loewe, and Michael Y. Yoshino, (1988) 'How To Take Your Company to the Global market'. *Columbia Journal of World Business*, Winter 1988, pp. 37-48.

APPENDICES

Appendix 1. Glossary of the most frequently used terms and abbreviations

AMPS
AMPS = Advanced Mobile Phone Service. An analog mobile telecommunications standard developed in the USA (Koivusalo 1995, 202)

Born globals
Born globals are companies that have started to globalise their operations from the very inception without any preceding long-term domestic and internationalisation periods (see Luostarinen and Gabrielsson M. 2001).

CDMA
Code Division Multiple Access. A mobile telecommunications standard introduced first in the USA. (Koivusalo 1995, 202)

DCS
Digital Cellular System. A GSM-based mobile telecommunication standard for 1800 and 1900 MHz frequencies. (Koivusalo 1995, 202)

Economies of scale
Economies arising from the ability to perform activities more efficiently at a larger volume, or the ability to amortise the cost of intangibles such as R&D or advertisement over a larger sales volume (Porter 1998, 71).

Economies of scope
Economies arising due to the notion that the cost of the joint production of two or more products can be less than the cost of producing them separately. (Ghoshal 1987)

Ethnocentric orientation
A management orientation in which overseas operations are viewed as secondary to domestic operations (Wind et al. 1973).

Geocentric orientation
A management orientation in which the company views its markets as worldwide (Chakravarthy and Perlmutter 1985).

Global market alignment phase	A market development phase in which the company sees the target markets as global instead of separate country markets, which leads to aligning of activities across countries (See also Craig and Douglas 1996)
Global company	A company is global when over 50% of its total sales come from outside its home continent (Luostarinen 2001a).
Global-customer-standardised product strategy	A product strategy alternative in which the product platforms, product lines, individual products and product management processes are specific to a global customer whose products are standardised across countries.
Global focus strategy	Global geographical expansion in a single or dominant business area with a current product technology and market segment. A corporate level strategy alterative. (see Luostarinen 2001a, 2000b; Ansoff 1987)
Global-market-standardised product strategy	A product strategy alternative in which the product platforms, product lines, individual products and product management processes are standadardised across countries and customers.
Global related-diversification strategy	Global geographical expansion with the present product technology area but offering it to a new market segment or global geographical expansion in the present market segment but with a new product technology. A corporate level strategy alternative. (see Luostarinen 2001a, 2000b; Ansoff 1987)
Global unrelated-diversification strategy	Global geographical expansion in unrelated market segments and unrelated product technology. (see Luostarinen 2001a, 2000b; Ansoff 1987)
Globalisation	Globalisation is understood as a process, in which the firm (A) expands its markets geographically from domestic continent to other continents (see Luostarinen and Gabrielsson M. 2001) and (B) develops towards increasing global alignment of activities across countries (see Craig and Douglas 1996).

Globalising internationals

Globalising Internationals are companies that have first internationalised after the domestic period and then started to globalise their operations outside the domestic continent (see Luostarinen and Gabrielsson M. 2001).

Global product strategy

The different product strategy alternatives the company may choose when addressing global market requirements.

GSM

Global System for Mobile Communications. A digital mobile telecommunications standard. (Koivusalo 1995, 202)

ICT

ICT is an abbreviation for information and communication technology (see e.g. Paija 2001, 11).

International company

A company is international when more than 50 percent of its total sales come from outside its home country. (Luostarinen and Gabrielsson M. 2001).

International market entry phase

A market development phase in which the company expands geographically into new international markets (see Douglas and Craig 1989).

International market penetration phase

A market development phase in which the company penetrates countries where a base has already been established (see Douglas and Craig 1989).

Internationalisation

Internationalisation can be seen as a stepwise process where companies proceed towards higher foreign market involvement (see Johanson and Vahlne 1977, 23; Luostarinen 1979, 200).

Know-how products

Unique know-how that is often protected with a trademark or patent and is usually licensable. Management know-how, technological know-how, marketing know-how, patents, trademarks, pattern designs, copyrights, and software licenses are included (see Luostarinen 1979, 96).

Lateral rigidity

A concept describing the behaviour of firms and their decision making in which companies are rigid in a lateral direction towards new alternatives, but are elastic forwards, towards known alternatives (Luostarinen 1979, 35).

Local-customer-adapted product strategy	A product strategy alternative in which the product platforms, product lines, individual products and product management processes are adapted across countries / regions and customers.
Local-market-adapted product strategy	A product strategy alternative in which the product platforms, product lines, individual products and product management processes are adapted across countries/regions.
Localised product strategy	A product strategy alternative in which the product platforms, product lines, individual products and product management processes are adapted across countries/regions or/and customers. The alternative represents the least standardised product strategy alternative.
NMT	Nordic Mobile Telephone. An analogue mobile telecommunication standard developed by the Nordic telecommunication authorities. (Koivusalo 1995, 202)
Modified product strategy	A product strategy alternative in which the product platforms are standardised globally across countries and customers. There may, however, be there may exist adaptations in product lines, individual products and product management processes to certain extent. It represents the middle alternative on a continuum from localised to standardised.
Management orientation	An international management orientation towards foreigners, ideas, and resources in the company at all management levels (Perlmutter 1969).
MNC	Multinational company.
Modularity	Complex products can be built from smaller subsystems that can be designed independently yet function together as a whole (Baldwin and Clark 1997).
Multi-domestic strategy	A core globalisation strategy in which the company seeks local responsiveness by adapting its strategies to local

market needs (Hout et al. 1982; Prahalad and Doz 1987, 24).

Pure global strategy

A core globalisation strategy in which the company seeks global integration benefits and looks at the whole world as its market (Prahalad and Doz 1987,24; Hout and al. 1982, Porter 1986).

Physical goods

Components, materials, equipment, and machines (See Luostarinen 1979, 96).

Polycentric orientation

A management orientation in which subsidiaries established in foreign markets operate highly independently (Wind et al. 1973).

Product assortment (product mix)

The set of all product lines and items that a particular seller offers for sale to buyers (Kotler 1984, 469-470).

Product assortment width

How many different product lines the company carries. (Kotler 1984, 469--470)

Product line

A group of products that are closely related because they function in a similar manner, are sold to the same customer groups, are marketed through the same types of outlets, or fall within a given price range (Kotler and Armstrong 2001, 314).

Product line length

The number of items in the product line (Kotler and Armstrong 2001, 314).

Product platforms

A set of subsystems and interfaces that form a common structure from which a stream of derivative products can be efficiently developed and produced (Meyer and Lehnerd 1997, 39).

Product range

The term product range is used as synonym for product assortment. See product assortment for definition.

Product strategy dimensions

The product strategy of high technology companies can be seen to consist of three dimensions: product platforms, product lines, and individual products (McGrath 1995, 14).

Regiocentric orientation

A management orientation in which the company views the region(s) as the potential markets, ignoring national boundaries (Wind et al. 1973).

Service products

Services are more or less intangible, often simultaneously produced and consumed, and do not include transfer of ownership (see also Grönroos 1990, 29). Installation, testing, planning, control, training, development, repair, maintenance, financing and digital services are included (See Luostarinen 1979, 96 and 2001b).

Standardised product strategy

A product strategy alternative, in which the product platforms, product lines, individual products and product management processes are standadardised across countries or/and customers. The alternative represents the most standardised product strategy alternative.

System products

A combination of physical goods, services and / or know-how, which represent a total solution to customers' needs. (Luostarinen 1979, 95-97; Mattsson 1975, 4; Kosonen 1991, 40).

TACS

Total Access Communications System. An analogue mobile telecommunication standard developed in the UK (Koivusalo 1995, 202).

Transnational strategy

A core globalisation strategy in which the company seeks to obtain global integration benefits, local responsiveness, and also international learning (Prahalad and Doz 1987, 24; Bartlett and Ghoshal 1987a and 1987b).

Appendix 2. Interview Questions

A. Background:

1. Please describe shortly how XXX has expanded to global markets.
    -   What global businesses have you focused on and why have you selected these?
    -   In what order and when were different main markets entered (Europe, US, APAC, etc.)?
    -   What is the proportion of total sales outside Finland & Europe? When did they reach 50%?
    -   Do you have a global strategy (global co-ordination and integration) and when was this strategy introduced?

B. Product strategy and its development

2. How has the product strategy of XXX developed as the company has moved from international to global and why?
    -   Product platforms (use of sw and hw platforms)?
    -   Product lines (number of lines, products in each line and positioning of products)?
    -   Individual products (Nature: physical goods, services, systems and know-how. Distribution of sales among these categories? Content: importance of augmented product)
    -   product management processes

3. How similar are the following dimensions of the product strategy across countries, and how has it changed during globalisation?
    -   Similarity of product platforms across countries?

- Similarity of positioning of products across countries? Product lines responsibility geographically (global/regional/local)?
- Similarity of individual products across countries? Please give examples. Between regions? Within regions? Please give examples. Similarity of warranty, after market service, and other services across countries?
- Similarity of product management processes across countries.

4. What has been the influence of external factors on the development of the product strategy and its similarity across countries?
- environmental changes?
- technology discontinuities?
- stage of product technology life cycle?
- global market expansion?
- other?

5. What has been the influence of internal factors on the development of the product strategy and its similarity across countries?
- scale, scope and learning economies?
- resources and capabilities (global technological, marketing, managerial capabilities)?
- centralisation / decentralisation of operations globally (production, marketing)?
- increasing international business experience and organisational learning?
- corporate strategy?
- other?

Appendix 3. List of persons interviewed.

Name:	Company:	Position:	Date:
Pekka Ala-Pietilä	Nokia Corporation	President	10.01.2003
Jyrki Salminen	Nokia Mobile Phones	Senior Vice President	12.09.2002
Seppo Laukkanen	Nokia Mobile Phones	Vice President	04.11.2002
Juha Putkiranta	Nokia Mobile Phones	Senior Vice President	15.11.2002
Rene Svendsen-Tune	Nokia Networks	Senior Vice President	22.10.2002
Jorma Häkkinen	Nokia Networks	Vice President	13.11.2002
Petri Pöyhönen	Nokia Networks	Vice President	01.11.2002
Sakari Nikkanen	Nokia Networks	Vice President	26.11.2002
Vesa Helkkula	Tecnomen	CEO and President	02.12.2002
Kari Peltola	Tecnomen	Head of Product Management	03.02.2003
Arvo Mustonen	Tecnomen[63]	Managing Director	14.08.2003
Jarmo Toivanen	Tecnomen[64]	Vice President	14.08.2003
Kari Vuorialho	Salcomp	CEO and President	22.11.2002
Heikki Turtiainen	Salcomp	Vice President	04.02.2003
Kaj Söderling	Draka NK Cables	Vice President	17.12.2002
Petri Lönnblad	Draka NK Cables	Vice President	14.11.2002 & 05.12.2002

---

[63] Arvo Mustonen was employed by Tecnomen 1980-1997. In addition to the position of Managing Director of Tecnomen he has also hold the position of Executive Vice President of Kyro. He is currently CEO and Founding Partner of Certeco.

[64] Jarmo Toivanen was employed by Tecnomen 1978-2001. He is currently Founding Partner of Certeco

Appendix 4. Examples of NET's GSM infrastructure customer references

Europe

Country	Operator	Year
Finland	Radiolinja	1989
UK	Cellnet	1990
UK	Vodafone UK	1990
UK	Vodafone (Europolitan)	1990
UK	Cellnet	1990
Denmark	Sonofon	1991
Sweden	Europolitan	1991
UK	Orange	1991
Finland	Sonera (TELE)	1992
Netherlands	KPN Telecom	1992
France	Cegetel	1993
Germany	E-Plus	1993
Hungary	Pannon GSM (Pannon)	1993
Sweden	Telia Mobile	1993
Italy	Omnitel Pronto Italia	1994
Latvia	LMT	1994
Norway	NetCom GSM A/S	1994
Norway	Telenor Mobil	1994
Russia	North-West GSM	1994
Estonia	Radiolinja	1995
Switzerland	Swiss PTT	1995
Switzerland	Swisscom	1995
Albania	AMC	1996
Belgium	Belgacom	1996
Czech	EuroTel Praha	1996
Finland	Sonera (TELE)	1996
France	Bouygues Telecom	1996
Poland	Polkomtel S.A.	1996
Spain	Teléfónica Móviles	1996
Austria	Mobilkom Austria AG	1997
Austria	ONE Austria GmbH	1997
Denmark	Orange (Mobilix)	1997
Finland	Telia Finland	1997
Germany	Viag Interkom	1997
Greece	Cosmote	1997
Lithuania	Omnitel Lithuania	1997
Poland	Centertel	1997
Sweden	Europolitan	1997
Switzerland	diAx	1997
Denmark	Sonofon	1998
Finland	Oulun Puhelin	1998
Finland	Radiolinja	1998
Finland	Finnet Group	1998
Finland	Sonera (TELE)	1998
Lithuania	Omnitel Lithuania	1998
Netherlands	KPN Telecom	1998
Netherlands	Ben Nederland	1998
Norway	Telenor Mobil	1998
Spain	Telefónica	1998
Spain	Amena	1998
Sweden	Telia Mobile	1998
Switzerland	diAx	1998
Switzerland	Orange Communications S.A.	1998
UK	Cellnet	1998
Belgium	Proximus	1999
Belgium	Belgacom	1999
Czech	EuroTel Praha	1999
Denmark	Tele Danmark	1999
Estonia	Radiolinja Eesti AS	1999
France	Cegetel	1999
Hungary	Vodafone (Europolitan)	1999
Italy	Omnitel Pronto Italia	1999
Latvia	Latvian Mobile Telephone (LMT) Company	1999
Russia	VimpelCom	1999
Russia	North-West GSM	1999
Spain	Amena	1999
Albania	Albanian Mobile Telecommunication	2000
Belgium	Mobistar	2000
Finland	Radiolinja	2000
Finland	Sonera (TELE)	2000
Finland	Suomen 2G Oy	2000
France	Cegetel	2000
Greece	Cosmote	2000
Hungary	Pannon GSM (Pannon)	2000
Hungary	Vodafone (Europolitan)	2000
Ireland	Eircell	2000
Italy	Blu	2000
Italy	Wind	2000
Netherlands	Dutchtone	2000
Poland	Centertel	2000
Poland	Polkomtel S.A.	2000
Portugal	Optimus	2000
UK	Orange	2000
Czech	Eurotel	2000
Lithuania	Omnitel Lithuania	2000
Russia	MegaFon	2001
Austria	ONE Austria GmbH	2002
Estonia	Radiolinja Eesti AS	2002
Russia	MegaFon	2002

Asia

Country	Operator	Year
Australia	Optus	1992
China	Hongkong Telecom Mobile Services	1991
Hong Kong S.A.R	Hutchison Telephone	1991
New Zealand	Vodafone NZ	1992
New Zealand	BellSouth	1992
Iran	TCI	1993
Thailand	Total Access Communications (TAC)	1993
The Philippines	Globe Telecom	1993
China	Beijing Telecom Administration (BTA)	1994
Thailand	Advanced Info Service (AIS)	1994
Hong Kong S.A.R	Fujian TA	1994
New Zealand	HeNan PTA	1995
Thailand	Shanghai Unicom	1995
China	Zhe Jiang Mobile	1995
China	Jiang Xi PTA	1995
China	Zhejiang MCC (Zhejiang PTA)	1995
China	Shanghai Unicom	1995
India	Modi Telstra	1995
India	Skycell	1995
Malaysia	Modi Telstra	1995
China	Time Wireless	1996
China	Changsha Unicom	1996
China	Hu Nan Unicom	1996
China	Yun Nan PTA	1996
China	P Plus Communications	1996
China	New World Mobility	1996
China	Hu Nan Unicom	1996
China	Yun Nan PTA	1996
China	P Plus Communications	1996
China	New World Mobility	1996
China	Hu Nan Unicom	1996
China	Yun Nan PTA	1996
Hong Kong S.A.R	New World Mobility	1996
India	BPL US West	1996
India	Hutchison Gujarat (Fascel)	1996
India	Evergrowth Telecom	1996
India	Tata Communications	1996
India	BPL Mobile	1996
India	Evergrowth Telecom	1996
India	Hutchison Gujarat (Fascel)	1996
India	BPL US West	1996
India	Hutchison Gujarat (Fascel)	1997
India	Evergrowth Telecom	1997
Singapore	MobileOne	1996
Uzbekistan	Uzmacom	1996
China	Shanxi PTA	1997
China	Shanghai PTA	1997
China	Fu Jian PTA	1997
China	Taiyuan PBT	1997
Hong Kong S.A.R	P Plus Communications	1997
Indonesia	Telkomsel	1997
New Zealand	Vodafone (Europolitan)	1997
Thailand	Digital Phone Company Ltd (DPC)	1997
Thailand	Advanced Info Service (AIS)	1997
Turkey	Telsim	1997
Uzbekistan	Uzmacom	1997
China	Ning Xia PTA	1998
China	Beijing Telecom Administration (BTA)	1998
China	Inner Mongolia Unicom	1998
Hong Kong S.A.R	Hong Kong Telecom	1998
Kuwait	Mobile Telecommunications Co. (K.S.C)	1998
Malaysia	Telecom Cellular	1998
Singapore	StarHub	1998
The Philippines	Smart	1998
Venezuela	Corporacion Digitel C.A.	1998
China	China Unicom An Hui	1999
China	China Unicom Gan Su	1999
China	Henan PTA	1999
China	Inner Mongolia Unicom	1999
China	Gan Su Unicom	1999
China	An Hui Unicom	1999
China	China Unicom Inner Mongolia	1999
Kazakhstan	Kar-Tel (K-Mobile)	1999
Kuwait	Mobile Telecommunications Co. (K.S.C)	1999
Taiwan	KG Telecom	1999
China	Hainan MCC	2000
China	Chongqing Mobile	2000
China	Zhejiang Mobile	2000
China	China Unicom Zhejiang	2000
China	Hainan	2000
China	JiLin MCC	2000
China	Hainan MCC	2000
Israel	Partner Communications	2000
Taiwan	Chunghwa Telecom	2000
Philippines	Smart	2000
Turkey	Telsim	2000
Venezuela	Elca	2000
Venezuela	Digitel (Elca)	2000
China	Heilongjiang Mobile	2001
China	Zhejiang Unicom	2001
China	Yunnan Mobile	2001
China	Liaoning Unicom	2001
China	Yunnan Unicom	2001
India	Idea Cellular Limited India	2001
Indonesia	Telkomsel	2001
Israel	Cellcom	2001
Malaysia	Timecel	2001
Saudi Arabia	Saudi Telecom Co	2001
China	Yunnan MCC	2002
China	Shanxi MCC	2002
China	Fujian MCC	2002
India	Idea Cellular Limited India	2002
Israel	Cellcom	2002
Philippines	Smart	2002

Americas

Country	Operator	Year
USA	Aerial Communications	1995
USA	Voice Stream	1995
USA	Aerial Communications	1996
USA	Wireless Alliance	1997
USA	Iowa Wireless Services	1998
USA	SOL Communications	1998
Bolivia	Nuavatel	2000
USA	AT&T	2000
USA	Voice Stream	2000
USA	AT&T	2000
Brasil	Telemar	2001
Peru	TIM	2001
USA	Cingular Wireless	2001
USA	Cingular Wireless	2002

Africa

Country	Operator	Year
Morocco	PTT	1995
Morocco	ONPT	1995
Morocco	Itisalat Al Maghrib	1995
Morocco	IAM Morocco	1995
Morocco	Ben Nederland	1998
Morocco	Maroc Télécom	2000
Egypt	Mobinil ECMS	2001

Source: Compiled by the author based on information provided by Nokia on their customer references (www.nokia.com).

Appendix 5. Examples of global customer references of Tecnomen based on business

	Voice mail	Unified messaging	MMSC system	Paging system	Prepaid system
Europe:					
Mobilkom Austria	X	X			
Swisscom, Mobil	X	X			
Vodafone Ireland	X	X			
Radiolinja			X		
Sonera	X	X			
TDC Mobil Danmark	X	X			
Telenor Mobil	X	X			
Astrid				X	
Middle East & Africa:					
Cell C, South Africa	X				
Mattel, Mauritania, West Africa				X	
Saudi Telecommunications Company, The Kingdom of Saudi Arabia	X			X	
Wataniya, Kuwait	X	X		X	
FTML Services Cellulaire Liban, Lebanon	X	X			
Latin America:					
Americel, Brazil				X	
Telemig celular, Brazil	X	X			X
Telet, Brazil	X	X			X
Amazonia Celular, Brazil	X	X			X
Digitel, Venezeula	X				
Nueva Tel, Bolivia	X				
Digicel, Venezuela	X				
ATL, Brazil	X				
Conecel, Ecuador					X
Asia:					
Indosat, Indonesia	X	X			
Cellular Communications Network, (Celcom), Malaysia	X	X			
Telekom Cellular, Malaysia	X				
TimeCel Sdn Bhd, Malaysia	X				
Total Access Communications, Thailand					X
Cambodia Shinawatra, Cambodia	X				
China Unicom, China	X				
Chunghwa Telecom, Taiwan	X	X			

Source: Compiled by the author based on information received from Tecnomen

Appendix 6. NK Cables international operations

MANUFACTURING OPERATIONS:		
1959	Egypt:	Tecalex (Planning and construction of power transmission lines, later a sales company)
1963	Turkey:	Türkkablo (Cable products and aluminium profiles)
1983	Germany	Monette Kabel und Elektrowerk GmbH bought by Nokia (Special cables)
1988	Netherland	Elkat, minority ownership (copper rod producer)
1990	Holland	Nokia boughts majority of NKF (energy and telecom cables producer)
1991	Netherland	Kazkat, minority ownership
1992	Russia	Neva Cables, majority ownership (copper and telecom cables)
1993	Estonia	Keila Kabel, majority ownership (Installation cables)
1994	China	Shanghai Nokia Optical, majority ownership Cables (optical acbles)
1996	Brazil	ANK Brazil, majority ownership (Optical cables)
1999	China	NK Wuhan Cable, majority ownership (RF-cables)
2000	Brazil	NK RF Brazil, majority ownership (RF-cables)
SALES OFFICES:		
1991	USA	Starting with power cables and RF from –97)
1993	China	Telecommunication cables (representative office)
1995	Sweden	Installation cables, high and mid voltage cables
1996	Latvia	Keila kabel's sales office
1997	Lithuania	Keila kabel's sales office
1996	Brazil	Telecommunication cables
1997	Thailand	Telecommunication cables
1997	Mexico	Telecommunication cables
1998	Russia	Telecommunication cables
2000	Romania	Telecommunication cables
LOGISTIC CENTERS:		
1997	USA	RF cables
1998	China	RF cables
1998	Singapore	RF cables?
1999	Mexico	RF Cables and other telecommunication cables
2000	Germany	RF Cables

Source: NK Cables

Appendix 7. NMP's new product introductions

			- Signature collection (Vertu)
			-9210i GSM 900/1800 (Communicator)
			- 8910i GSM 900/1800 (Premium) - 8910 GSM 900/1800 (Premium)
			- 8265 TDMA (Fashion) - 7250 GSM 900/1800/1900 (Fashion) - 7210 GSM900/1800/1900 (Fashion)
			- 6800 GSM 900/1800 (Business appl.)
			- 6650 WCDMA, GSM 900/1800 (Imaging)
			- 6610 GSM 900/1800/1900 - 6590 GSM 850/1900 (Business class) - 6385 CDMA 2000 1X (Classic) - 6370 CDMA 2000 1X (Classic) - 6340 GSM/TMA/AMPS
		- 9110i GSM (Communicator) - 9210 GSM (Communicator)	- 6310i GSM 900/1800/1900 (Classic) - 6200 GSM 850/1800/1900 (Classic) - 6100 GSM 900/1800/1900 (Classic)
		- 8890 GSM (Premium)	
		- 7160 TDMA (Media) - 7190 GSM 1900 (Media)	- 5100 GSM 900/1800/1900 (Active)
			- 3650 GSM 900/1800/1900 (Imaging) - 3610 (for China)
	- 9000 GSM 900 - 9000 GSM 1900	- 6250 GSM (Tough)	
	- 8810	- 8260 TDMA (Fashion) - 8290 GSM 1900 (Fashion) - 8250 GSM (Fashion)	- 3590 GSM 850/1900 (Expression) - 3585i CDMA (Expression) - 3585 CDMA 2000 1x (Expression) - 3510 GSM 900/1800 (Expression) - 3410 GSM 900/1800 (Expression)
	- 2160 TDMA		
	- 1610 GSM	- 6185i CDMA (Classic) - 6210 GSM (Classic)	
- 2100 series -2010 (Japan digital) - 232 AMPS & Tacs - 250 (NMT) - Cellular data card	- 638 AMPS	-3310 GSM (Basic) - 3390 GSM 1900 (Basic) - 5165 TDMA (Basic) - 5185i CDMA (Basic)	- 3315 GSM (Basic) - 2100 GSM 900/1800 (Mobile entry) - 1260 TDMA 800/1900/AMPS (Basic) - 1220 TDMA 800/AMPS (Basic)
	-- 232N, NAMPS		- 31 GSM Connectivity terminal (M2M) - D211 GSM 900/1800, Wireless LAN - THR880 TETRA
	-Digital Cellular Data Card for Japan	-- NM502i (i-mode)	
YEAR 1994	YEAR 1996	YEAR 2000	YEAR 2002

Time

Source: Compiled by the author based on information in Nokia Annual Reports 1992 – 2002. The figure presents the new products introduced in 1994, 1996, 2000 and 2002.

HELSINGIN KAUPPAKORKEAKOULUN JULKAISUJA
Publications of the Helsinki School of Economics

A-SARJA: VÄITÖSKIRJOJA - DOCTORAL DISSERTATIONS. ISSN 1237-556X.

A:197.   ANSSI ÖÖRNI: Consumer Search in Electronic Markets. 2002. ISBN 951-791-680-9.

A:198.   ARI MATIKKA: Measuring the Performance of Owner-Managed Firms: A systems approach. 2002. ISBN 951-791-685-X.

A:199.   RIITTA KOSONEN: Governance, the Local Regulation Process, and Enterprise Adaptation in Post-Socialism. The Case of Vyborg. 2002. ISBN 951-791-692-2.

A:200.   SUSANNE SUHONEN: Industry Evolution and Shakeout Mechanisms: The Case of the Internet Service Provider Industry. 2002. ISBN 951-791-693-0.

A:201.   MATTI TUOMINEN: Market-Driven Capabilities and Operational Performance. Theoretical Foundations and Managerial Practices. 2002. ISBN 95-791-694-9.

A:202.   JUSSI KARHUNEN: Essays on Tender Offers and Share Repurchases. 2002. ISBN 951-791-696-5.

A:203.   HENNAMARI MIKKOLA: Empirical Studies on Finnish Hospital Pricing Methods. 2002. ISBN 951-791-714-7.

A:204.   MIKA KORTELAINEN: EDGE: a Model of the Euro Area with Applications to Monetary Policy. 2002. ISBN 951-791-715-5.

A:205.   TOMI LAAMANEN: Essays on Technology Investments and Valuation. 2002. ISBN 951-791-716-3.

A:206.   MINNA SÖDERQVIST: Internationalisation and its Management at Higher-Education Institutions. Applying Conceptual, Content and Discourse Analysis. 2002. ISBN 951-791-718-X.

A:207.   TARJA PIETILÄINEN: Moninainen yrittäminen. Sukupuoli ja yrittäjänaisten toimintatila tietoteollisuudessa. 2002. ISBN 951-791-719-8.

A:208.   BIRGIT KLEYMANN: The Development of Multilateral Alliances. The Case of the Airline Industry. 2002. ISBN 951-791-720-1.

A:209.   MIKAEL EPSTEIN: Risk Management of Innovative R&D Project. Development of Analysys Model. A Systematic Approach for the Early Detection of Complex Problems (EDCP) in R&D Projects in Order to Increase Success in Enterprises. 2002. ISBN 951-791-717-9.

A:210.   SAMI KAJALO: Deregulation of Retail Hours in Finland: Historical and Empirical Perspectives. 2002. ISBN 951-791-734-1.

A:211.   TOMMI KASURINEN: Exploring Management Accounting Change in the Balanced Scorecard Context. Three Perspectives. 2003. ISBN 951-791-736-8.

A:212.   LASSE NIEMI: Essays on Audit Pricing. 2003. ISBN 951-791-751-1.

A:213.   MARKKU KAUSTIA: Essays on Investor Behavior and Psychological Reference Prices. 2003. ISBN 951-791-754-6.

A:214.   TEEMU YLIKOSKI: Access Denied: Patterns of Consumer Internet Information Search and the Effects of Internet Search Expertise. 2003. ISBN 951-791-755-4.

A:215.   PETRI HALLIKAINEN: Evaluation of Information System Investments. 2003. ISBN 951-791-758-9.

A:216.   PETRI BÖCKERMAN: Empirical Studies on Working Hours and Labour Market Flows. 2003. ISBN 951-791-760-0.

A:217.   JORMA PIETALA: Päivittäistavarakaupan dynamiikka ja ostoskäyttäytyminen Pääkaupunkiseudulla. 2003. ISBN 951-791-761-9.

A:218.   TUOMAS VÄLIMÄKI: Central Bank Tenders: Three Essays on Money Market Liquidity Auctions. 2003. ISBN 951-791-762-7.

A:219.   JUHANI LINNAINMAA: Essays on the Interface of Market Microstructure and Behavioral Finance. 2003. ISBN 951-791-783-X.

A:220.   MARKKU SALIMÄKI: Suomalaisen design-teollisuuden kansainvälinen kilpailukyky ja kansainvälistyminen. Strateginen ryhmä –tutkimus design-aloilta. 2003 ISBN 951-791-786-4.

A:221.   HANNU KAHRA: Consumption, Liquidity and Strategic Asset Allocation. 2003. ISBN 951-791-791-0.

A:222.   TONI RIIPINEN: The Interaction of Environmental and Trade Policies. 2003. ISBN 951-791-797-X.

A:223.   MIKKO SYRJÄNEN: Data Envelopment Analysis in Planning and Heterogeneous Environments. 2003. ISBN 951-791-806-2.

A:224.   ERKKI HÄMÄLÄINEN: Evolving Logistic Roles of Steel Distributors. 2003. ISBN 951-791-807-0.

A:225   SILJA SIITONEN: Impact of Globalisation and Regionalisation Strategies on the Performance of the World's Pulp and Paper Companies. 2003. ISBN 951-791-808-9.

A:226.   EIREN TUUSJÄRVI: Multifaceted Norms in SMC Export Cooperation: A Discourse Analysis of Normative Expectations. 2003. ISBN 951-791-812-7.

A:227.   MIKA MALIRANTA: Micro Level Dynamics of Productivity Growth. An Empirical Analysis of the Great Leap in Finnish Manufacturing Productivity in 1975-2000. 2003. ISBN 951-791-815-1.

A:228.   NINA KOISO-KANTTILA: Essays on Consumers and Digital Content. 2003. ISBN 951-791-816-X.

A:229.   PETER GABRIELSSON: Globalising Internationals: Product Strategies of ICT Companies. 2004. ISBN 951-791-825-9, ISBN 951-791-826-7 (Electronic dissertation).

A-SARJA: MUITA JULKAISUJA - OTHER PUBLICATIONS

ANNE HERBERT: The Paradoxes of Action Learning: An Interpretive and Critical Inquiry into Vocational Educators' Professional Development. 2002. ISBN 951-791-684-1.

B-SARJA: TUTKIMUKSIA - RESEARCH REPORTS. ISSN 0356-889X.

B:38.   KRISTIINA KORHONEN(ed.): Current Reflections on the Pacific Rim. 2002.
ISBN 951-791-661-2.

B:39.   RISTO Y. JUURMAA: Performance and International Competitiveness of Listed Metal and Telecommunication Industry Groups 1992 - 2000. Finland vs Sweden and Germany. 2002. ISBN 951-791-668-X.

B:40.   KAIJA TUOMI – SINIKKA VANHALA (toim.): Yrityksen toiminta, menestyminen ja henkilöstön hyvinvointi. Seurantatutkimus metalliteollisuudessa ja vähittäiskaupan alalla. 2002. ISBN 951-791-674-4.

B:41.   ANNE ÄYVÄRI: Verkottuneen pienyrityksen markkinointikyvykkyys. 2002.
ISBN 951-791-682-5.

B:42.   RIKU OKSMAN: Intohimoa ja ammattitaitoa: puheenvuoroja tuottajan työstä. 2002.
ISBN 951-791-700-7.

B:43.   RISTO TAINIO – KARI LILJA – TIMO SANTALAINEN: Organizational Learning in the Context of Corporate Growth and Decline: A Case Study of a Major Finnish Bank. 2002. ISBN 951-791-717-1

B:44.   ELINA HENTTONEN – PÄIVI ERIKSSON – SUSAN MERILÄINEN: Teknologiayrittämisen sukupuoli. Naiset miesten maailmassa. 2003. ISBN 951-791-737-6.

B:45.   KIRSI KORPIAHO: "Kyllä siinä pitää elää mukana!" Kirjanpitäjien tarinoita työstä, osaamisesta ja oppimisesta työyhteisönäkökulmasta analysoituna. 2003. ISBN 951-791-742-2.

B:46.   NIILO HOME (toim.): Puheenvuoroja ECR-toiminnasta. Discussions on ECR – Summaries. 2003. ISBN 951-791-749-X.

B:47.   PÄIVI KARHUNEN – RIITTA KOSONEN – MALLA PAAJANEN: Gateway-käsitteen elinkaari Venäjän-matkailussa. Etelä-Suomi Pietarin-matkailun väylänä. 2003. ISBN 951-791-756-2.

B:48.   ANNELI KAUPPINEN – ANNE ARANTO – SATU RÄMÖ (toim.): Myyttiset markkinat.
2003. ISBN 951-791-771-6.

B:49.   MIKKO SAARIKIVI – SIMO RIIHONEN: Suomen puuteollisuuden kilpailukyvyn parantaminen ja kansainvälistyminen piha- ja ympäristörakentamisessa. 2003. ISBN 951-791-779-1.

B:50.   KATARIINA KEMPPAINEN – ARI P.J. VEPSÄLÄINEN – JUKKA KALLIO – TIMO SAARINEN – MARKKU TINNILÄ: From Supply Chain to Networks: A Study of SCM Practices in Finnish Industrial Companies. 2003. ISBN 951-791-780-5.

B:51.   SAMI SARPOLA: Enterprise Resource Planning (ERP) Software Selection and Success of Acquisition Process in Wholesale Companies. 2003. ISBN 951-791-802-X.

B:52.   MATTI TUOMINEN (ed.): Essays on Capabilities Based Marketing and Competitive Superiority. Fimac II - Research: Mai Anttila, Saara Hyvönen, Kristian Möller, Arto Rajala, Matti Tuominen. 2003. ISBN 951-791-814-3.

B:53.   PÄIVI KARHUNEN – RIITTA KOSONEN – ANTTI LEIVONEN: Osaamisen siirtyminen Suomalais-venäläisissä tuotantoalliansseissa. Tapaustutkimuksia pietarista ja leningradin alueelta. 2003. ISBN 951-791-820-8.

CKIR-SARJA: HELSINKI SCHOOL OF ECONOMICS. CENTER FOR KNOWLEDGE AND INNOVATION RESEARCH. CKIR WORKING PAPERS. ISSN 1458-5189.

CKIR:1.   SATINDER P. GILL: The Engagement Space and Parallel Coordinated Movement: Case of a Conceptual Drawing Task. 2002. ISBN 951-791-660-4.

CKIR:2   PEKKA ISOTALUS – HANNI MUUKKONEN: How Do Users of Pda's React to an Animated Human Character in Online News? 2002. ISBN 951-791-664-7.

E-SARJA: SELVITYKSIÄ - REPORTS AND CATALOGUES. ISSN 1237-5330.

E:100.   JUHA KINNUNEN: Opiskelijoiden valikoituminen pääaineisiin Helsingin kauppakorkeakoulussa. Pääainetoiveita ja niihin vaikuttavia tekijöitä kartoittava kyselytutkimus vuosina 1995-2000 opintonsa aloittaneista. 2002. ISBN 951-791-669-8.

E:101.   Research Catalogue 2000 – 2002. Projects and Publications. 2002. ISBN 951-791-670-1.

E:102.   DAN STEINBOCK: The U.S. CIBER Experience: The Centers for International Business Education and Research (CIBERs). 2003. ISBN 951-791-781-3.

N-SARJA: HELSINKI SCHOOL OF ECONOMICS. MIKKELI BUSINESS CAMPUS PUBLICATIONS. ISSN 1458-5383

N:6   JUHA SIIKAVUO: Taloushallinon opas alkavalle yrittäjälle. 2002. ISBN 951-791-686-8.

N:7.   JOHANNA NISKANEN: Etelä-Savon pk-yritysten vienti Tanskaan: ulkomaankaupan erityisraportti 2001. 2002. ISBN 951-791-687-6.

N:8.   MIKKO NUMMI: Etelä-Savon pk-yritysten vienti Saksaan: ulkomaankaupan erityisraportti 2001. 2002. ISBN 951-791-688-4.

N:9.   NOORA RUOHONEN – RIIKKA OLLI: Etelä-Savon pk-yritysten vienti Tsekkiin: ulkomaankaupan erityisraportti 2001. 2002. ISBN 951-791-689-2.

N:10.   ANNA HÄKKINEN – ESKO LÄIKKÖ: Etelä-Savon pk-yritysten vientikohteena USA: ulkomaankaupan erityisraportti 2001. 2002. ISBN 951-791-690-6.

N:11.   JUHA SIIKAVUO: Verkko-oppimisympäristön kehittäminen. Esimerkkinä HA Boctok Venäjän-kaupan erikoistumisopintojen yksi moduuli, vuosi: 2002. 2002.
ISBN 951-791-695-7.

N:12.   JUHO PETTER PUHAKAINEN: German Venture Capitalists' Decision Criteria in New Venture Evaluation. 2002. ISBN 951-791-650-7.

N:13.   MILJA LEMMETYINEN: Suomalaisyrityksen etabloituminen Saksaan. Ulkomaankaupan erityisraportti 2002. 2002. ISBN 951-791-730-9.

N:14.   TAPIO PALLASVIRTA: Pk-yritysten vienti Espanjaan. Ulkomaankaupan erityisraportti 2002. 2002. ISBN 951-791-731-7.

N:15.   ELINA HAVERINEN: Etelä-Savon pk-yritysten Viron kauppa. Ulkomaankaupan erityisraportti 2003. ISBN 951-791-732-5.

N:16.   REETA RÖNKKÖ: Latinalainen Amerikka markkina-alueena Argentiina ja Brasilia. Ulkomaankaupan erityisraportti 2003. ISBN 951-791-733-3.

N:17.   JAAKKO VARVIKKO – JUHA SIIKAVUO: Koulutus, oppiminen ja akateeminen yrittäjyys. 2003. ISBN 951-791-745-7.

N:18.   ANNE GUSTAFSSON-PESONEN – SATU SIKANEN: Yrittäjäkoulutuksesta yrittäjäksi. 2003 ISBN 951-791-763-5.

N:19.   TOIVO KOSKI: Impact of a venture capitalists´ value added on value of a venture. 2003. ISBN 951-791-764-3.

N:20.   LAURA HIRVONEN: Itävalta suomalaisyritysten markkina-alueena. 2003.
ISBN 951-791-765-1.

N:21.   LAURA MALIN: Etelä-Savon pk-yritysten vienti Belgiaan. 2003. ISBN 951-791-766-X.

N:22.   JUKKA PREPULA: Ranska suomalaisten pk-yritysten vientikohteena. 2003.
ISBN: 951-791-767-8.

N:23.   HENNA HUCZKOWSKI: Pk-yritysten perustaminen Puolaan. 2003.
ISBN 951-791-768-6.

N:24.   HENNA KATAJA – LEENA MÄÄTTÄ: Kiina suomalaisen pk-yrityksen vientikohteena. 2003. ISBN: 951-791-769-4.

N:25.   KAROLIINA IJÄS: Etelä-Savon pk-yritysten vienti Puolaan. 2003. ISBN: 951-791-770-8.

N:26.   MARJO VAHLSTEN: Matkailupalvelujen markkinoinnin kehittäminen verkkoyhteistyön avulla. 2003. ISBN: 951-791-792-9.

N:27.   TUULI SAVOLAINEN: Slovakia suomalaisten pk-yritysten markkina-alueena. 2003.
ISBN: 951-791-793-7.

N:28.   HARRY MAASTOVAARA: Etelä-Savon yritysten ulkomaankauppa 2001.
2003. ISBN: 951-791-794-5.

N:31.   HANNA PERÄLÄ: Etelä-Savon pk-yritysten vienti Ruotsiin. 2003. ISBN: 951-791-799-6.

N:34.   TOIVO KOSKI – ANTTI EKLÖF: Uudenmaan yrityshautomoista irtaantuneiden yritysten menestyminen, Yrittäjien näkemyksiä yrityshautomotoiminnasta sekä selvitys "yrittämisestä Työtä 2000" –projektin asiakkaiden yritystoiminnasta. 2003. ISBN 951-791-805-4.

W-SARJA: TYÖPAPEREITA - WORKING PAPERS . ISSN 1235-5674.

W:304.   PETRI BÖCKERMAN – KARI HÄMÄLÄINEN – MIKA MALIRANTA: Explaining Regional Job and Worker Flows. 2002. ISBN 951-791.662-0.

W:305.   PEKKA KORHONEN – MIKKO SYRJÄNEN: Evaluation of Cost Efficiency in Finnish Electricity Distribution. 2002. ISBN 951-791-663-9.

W:306.   SATU NURMI: The Determinants of Plant Survival in Finnish Manufacturing. 2002. ISBN 951-791-665-5.

W:307.   JUSSI KARHUNEN: Taking Stock of Themselves. An Analysis of the Motives and the Market Reaction in Finnish Share Repurchase Programs 2002. ISBN 951-791-666-3.

W:308.   PEKKA ILMAKUNNAS – HANNA PESOLA: Matching Functions and Efficiency Analysis. 2002. ISBN 951-791-671-X.

W:309.   MARKKU SÄÄKSJÄRVI: Software Application Platforms: From Product Architecture to Integrated Application Strategy. 2002. ISBN 951-791-672-8.

W:310.   MILLA HUURROS – HANNU SERISTÖ: Alliancing for Mobile Commerce: Convergence of Financial Institutions and Mobile Operators. 2002. ISBN 951-791-673-6.

W:311.   ANSSI ÖÖRNI: Objectives of Search and Combination of Information Channels in Electronic Consumer Markets: An Explorative Study. 2002. ISBN 951-791-675-2.

W:312.   ANSSI ÖÖRNI: Consumer Search in Electronic Markets: Experimental Analysis of Travel Services. 2002. ISBN 951-791-676-0.

W:313.   ANSSI ÖÖRNI: Dominant Search Pattern in Electronic Markets: Simultaneous or Sequential Search. 2002. ISBN 951-791-677-9.

W:314.   ANSSI ÖÖRNI: The Amount of Search in Electronic Consumer Markets. 2002. ISBN 951-791-678-7.

W:315.   KLAUS KULTTI – TUOMAS TAKALO – TANJA TANAYAMA: R&d Spillovers and Information Exchange: A Case Study. 2002. ISBN 951-791-681-7.

W:316.   OLLI TAHVONEN: Timber Production v.s. Old Growth Conservation with Endogenous Prices and Forest Age Classes. 2002. ISBN 951-791-691-4.

W:317.   KLAUS KULTTI – JUHA VIRRANKOSKI: Price Distribution in a Symmetric Economy. 2002. ISBN 951-791-697-3.

W:318.   KLAUS KULTTI – TONI RIIPINEN: Multilateral and Bilateral Meetings with Production Heterogeneity. 2002. ISBN 951-791-698-1.

W:319.   MARKKU KAUSTIA: Psychological Reference Levels and IPO Stock Returns. 2002. ISBN 951-791-699-X.

W:320.   MERVI LINDQVIST: Possible Research Issues in Management and Control of New Economy Companies. 2002. ISBN 951-791-701-5.

W:321.   MARKO LINDROOS: Coalitions in Fisheries. 2002. ISBN 951-791-702-3.

W:322.   MIKKO SYRJÄNEN: Non-discretionary and Discretionary Factors and Scale in Data Envelopment Analysis. 2002. ISBN 951-791-705-8.

W:323.   KLAUS KULTTI – HANNU VARTIAINEN: VonNeumann-Morgenstern Solution to the Cake Division Problem. 2002. ISBN 951-791-708-2.

W:324.   TOM LAHTI: A Review of the Principal-agent Theory and the Theory of Incomplete Contracts: An Examination of the Venture Capital Context. 2002. ISBN 951-791-709-0.

W:325.   KRISTIAN MÖLLER – PEKKA TÖRRÖNEN: Business Suppliers' Value-Creation Potential: A Capability-based Analysis. 2002. ISBN 951-791-710-4.

W:326.   KRISTIAN MÖLLER – ARTO RAJALA – SENJA SVAHN: Strategic Business Nets – Their Types and Management. 2002. ISBN 951-791-711-2.

W:327.   KRISTIAN MÖLLER – SENJA SVAHN – ARTO RAJALA: Network Management as a Set of Dynamic Capabilities. 2002. ISBN 951-791-712-0.

W:328.   PANU KALMI: Employee Ownership and Degeneration. Evidence from Estonian case studies. 2002. ISBN 951-791-713-9.

W:329.   ANNELI NORDBERG: Yrittäjyys, johtajuus ja johtaminen – uuden talouden innovatiivisia haasteita. 2002. ISBN 951-791-721-X.

W:330.   LEENA LOUHIALA-SALMINEN: Communication and language use in merged corporations: Cases Stora Enso and Nordea. 2002. ISBN 951-791-722-8.

W:331.   TOMMI KASURINEN: Conceptualising the Encoding Process Related to Institutionalisation in Organisations. From Key Performance Indicator Scorecard to a Strategic Balanced Scorecard. 2002. ISBN 951-791-723-6.

W:332.   PEKKA KORHONEN – HELENA TOPDAGI: Performance of the AHP in Comparison of Gains and Losses. 2002. ISBN 951-791-724-4.

W:333.   TARJA JORO – PEKKA KORHONEN – STANLEY ZIONTS: An Interactive Approach to Improve Estimates of Value Efficiency in Data Envelopment Analysis. 2002. ISBN 951-791-725-2.

W:334.   JUHA-PEKKA TOLVANEN – JEFF GRAY – MATTI ROSSI (edit.): Proceedings of the Second Domain Specific Modeling Languages Workshop. 2002. ISBN 951-791-726-0.

W:335.   SATU NURMI: Sectoral Differences In Plant Start-up Size. 2003. ISBN 951-791-738-4.

W:336.   SATU NURMI: Plant Size, Age And Growth In Finnish Manufacturing. 2003. ISBN 951-791-739-2.

W:337.   PETRI HALLIKAINEN – HANNU KIVIJÄRVI: Appraisal of Strategic it Investments: Payoffs And Tradeoffs. 2003. ISBN 951-791-740-6.

W:338. SENJA SVAHN: Knowledge Creation in Business Networks – A Dynamic-capability Perspective. 2003. ISBN 951-791-743-0.

W:339. KRISTIAN MÖLLER – SENJA SVAHN: Role of Knowledge in the Value Creation in Business Nets. 2003. ISBN 951-791-744-9.

W:340. ELI MOEN – KARI LILJA: European Works Councils in M-Real and Norske Skog: The Impact of National Traditions in Industrial Relations. 2003. ISBN 951-791-750-3.

W:341. KJELD MÖLLER: Salatulla ”arvopaperistamisella” tuhottiin yrittäjyyttä. 2003. ISBN 951 791-752-X

W:342. ATSO ANDERSEN: Competition Between European Stock Exchanges. 2003. ISBN 951-791-753-8.

W:343. MARKO MERISAVO: The Effects of Digital Marketing on Customer Relationships. 2003. ISBN 951-791-757-0.

W:344. KLAUS KULTTI – JUHA VIRRANKOSKI: Price Distribution in a Random Matching Model. 2003. ISBN 951-791-759-7.

W:345. PANU KALMI: The Rise and Fall of Employee Ownership in Estonia, 1987-2001. 2003. ISBN 951-791-772-4.

W:346. SENJA SVAHN: Managing in Networks: Case Study of Different Types of Strategic Nets. 2003. ISBN 951-791-774-0.

W:347. KRISTIAN MÖLLER – SENJA SVAHN: Crossing East-West Boundaries: Knowledge Sharing in Intercultural Business Networks. 2003. ISBN 951-791-775-9.

W-348. KRISTIAN MÖLLER – SENJA SVAHN: Managing in Emergence: Capabilities for Influencing the Birth of New Business Fields. 2003. ISBN 951-791-776-7.

W:349. TOM RAILIO: The Taxation Consequences of Scandinavian Mutual Fund Investments and After-Tax Performance Evaluation. 2003. ISBN 951-791-777-5.

W:350. KIRSI LAPOINTE: Subjektiivinen ura työurien tutkimuksessa ja teorioissa. 2003. ISBN 951-791-778-3.

W:351. PANU KALMI: The Study of Co-operatives in Modern Economics: A Methodological Essay. 2003. ISBN 951-791-783-X.

W:352. MARJA TAHVANAINEN: Short-term International Assignments: Popular Yet Largely Unknown Way Of Working Abroad. 2003. ISBN 951-791-784-8.

W:353. MARKKU KUULA – ANTOINE STAM: An Interior Point Method for Multi-party Negotiation Support. 2003. ISBN 951-791-787-2.

W:354. JOUKO KINNUNEN: Quantification of Ordered-level Business Sentiment Survey Forecasts by Means of External Validation Data. 2003. ISBN 951-791-790-2.

W:355. TOM RAILIO: The Nature of Disagreements and Comparability Between Finnish Accumulating Mutual Funds and Voluntary Pension Insurances. 2003. ISBN 951-791-798-8.

W:356. JUKKA JALAVA: 'Has Our Country the Patience Needed to Become Wealthy?' Productivity in the Finnish Manufacturing Industry, 1960-2000. 2003. ISBN 951-791-803-8.

W:357. JARI VESANEN: Breaking Down Barries for Personalization – A Process View. 2003. ISBN 951-791-804-6.

W:358. JUHA VIRRANKOSKI: Search Intensities, Returns to Scale, and Uniqueness of Unemployment Equilibrium. 2003. ISBN 951-791-809-7.

W:359. JUHA VIRRANKOSKI: Search, Entry, and Unique Equilibrium. 2003. ISBN 951-791-810-0.

W:360. HANNA KALLA: Exploration of the Relationship Between Knowledge Creation, Organisational Learning, and Social Capital: Role of Communication. 2003. ISBN 951-791-813-5.

W:361. PEKKA SÄÄSKILAHTI: Strategic R&D and Network Compatibility. 2003. ISBN 951-791-817-8.

W:362. MAIJU PERÄLÄ: Allyn Young and the Early Development Theory. 2003. ISBN 951-791-818-6.

Y-SARJA: HELSINKI SCHOOL OF ECONOMICS.
CENTRE FOR INTERNATIONAL BUSINESS RESEARCH. CIBR RESEARCH PAPERS.
ISBN 1237-394X.

Y:7. ZUHAIR AL-OBAIDI – MIKA GABRIELSSON: Multiple Sales Channel Strategies in Export Marketing of High Tech SMEs. 2002. ISBN 951-791-703-1.

Z-SARJA: HELSINKI SCHOOL OF ECONOMICS.
CENTRE FOR INTERNATIONAL BUSINESS RESEARCH. CIBR WORKING PAPERS. ISSN 1235-3931.

Z:9. V.H. MANEK KIRPALANI – MIKA GABRIELSSON: Worldwide Evolution of Channels Policy. 2002. ISBN 951-791-704-X.

Kaikkia Helsingin kauppakorkeakoulun julkaisusarjassa ilmestyneitä julkaisuja voi tilata osoitteella:

KY-Palvelu Oy
Kirjakauppa
Runeberginkatu 14-16
00100 Helsinki
Puh. (09) 4313 8310, fax (09) 495 617
Sähköposti: kirjak@kyyppari.hkkk.fi

Helsingin kauppakorkeakoulu
Julkaisutoimittaja
PL 1210
00101 Helsinki
Puh. (09) 4313 8579, fax (09) 4313 8305
Sähköposti: julkaisu@hkkk.fi

All the publications can be ordered from

Helsinki School of Economics
Publications officer
P.O.Box 1210
FIN-00101 Helsinki
Phone +358-9-4313 8579, fax +358-9-4313 8305
E-mail: julkaisu@hkkk.fi