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Firm response strategies under globalization impact in high-tech and knowledge-intensive fields

ABSTRACT

Globalization, particularly the stronger presence of cost competitive East Asian rivals, are putting heavy competitive pressure on high-tech and knowledge-intensive firms from the industrialized countries. In this paper we explore several specific theoretical approaches, namely firm competitive advantage, the resource-based view, and the eclectic model, to develop a theoretical framework by which it is possible to evaluate the impact of globalization on firms originating in small and open economies. We then investigate operation mode and marketing strategies as a possible means to respond to globalization pressure. The research highlights the need to develop dynamic capabilities, particularly in configuration and coordination of the global value chain, and recommends usage of response strategies that result in multiple advantages, such as cost and differentiation. Also, focus strategy was used espe-

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cially in the growth phase of the industry. Moreover, the results indicate that the response strategies are environment- and situation-specific and their nature is dependent on whether the industry is in the growth or maturity stage.

Key words: Globalization, competitiveness, competition, competitive advantage, response strategy

INTRODUCTION

Research has started to address a major ongoing challenge caused by globalization. In this paper, globalization is defined as the “creation and growth of globalized activities, that is, phenomena that transcend national borders, extending across, leveraging, and moving between many locations around the globe simultaneously” (Eden and Lenway, 2001). As such, globalization has benefited western multinationals by allowing them to create global value-chain networks, which have in turn allowed them to locate global activities such as production, research & development and marketing in the most attractive countries of the world. This has greatly enhanced the competitiveness of western firms, but has also led to concerns over the role of their traditional home bases. Moreover, as western firms have taken advantage of favorable factor conditions in developing and newly industrializing countries, they have also acted as change agents, thereby enhancing the capabilities of these countries. Thus firms coming from newly industrialized countries are increasingly able to challenge established players.

These developments have recently generated much discussion in the popular press using labels such as the “China phenomenon” – a term which refers both to the transfer of the production activities of western firms to newly industrialized countries to take advantage of lower labor costs and also increasingly to the competitive threat that these countries pose. Since the end of the 1990s firms originating in low-cost countries such as China, Korea and Taiwan have specialized in the same areas of foreign trade as many firms coming from developed countries, that is in the high-tech and knowledge-intensive fields. Naturally the above-mentioned developments call for a reassessment of competitive logic among western firms as innovative strategies are needed to combat competition that is based on both skills and lower costs. Many firms have moved rapidly to redistribute their global value chains with the aim of leveraging global factor conditions and resource endowments.

The globalization phenomena have thus raised the concern of small and open economies (SMOPECs) and a considerable number of reports have been compiled to assess the impact of globalization on national economies. We have taken the competitiveness of firms based in SMOPEC countries such as Finland, Sweden, Denmark, and Norway as the focal point in this article.

This is fruitful since one can argue that global developments have been felt intensively in these countries. Firms coming from SMOPEC countries must compete against global multinationals with fewer resources and little opportunities for protectionist measures by their home countries.

This paper adopts a firm-level approach and gives more weight to the response strategies aspect. By the term response strategies we refer to both proactive and reactive operation mode and marketing strategies that are effective in dealing with the globalization impact. Hence, the **research problem** centers on *“identifying firm level response strategies that enhance achievement of sustainable competitive advantage under globalization pressure.”*

The above research problem opens up many research avenues. We have decided to focus on selective response strategies that can create a sustainable competitive advantage for West-European SMOPEC firms in the rapidly changing global environment, and may enable retention of at least some key activities in their home countries. These responses include operation mode strategies as well as marketing strategies concerning product, design, and channel decisions. Hence, the research objectives can be stated as follows:

1. To develop a conceptual framework for exploring the globalization impact on and response strategies of firms that are operating in SMOPEC knowledge- and technology-intensive fields.
2. To explore operation mode and marketing response strategies that can create a sustainable competitive advantage in the rapidly changing global environment.

This research is focused on high-technology and knowledge-intensive firms. High-technology firms utilize advanced technologies in their products. In these firms research and development (R&D) expenditure is often more than 5 per cent of the company’s total sales. Knowledge-intensive firms sell unique know-how in their products. This know-how is specific, it is protected with trademarks or patents, and is usually licensable.

We have then empirically examined the response strategies of four case companies in the high-tech and knowledge-intensive fields using multiple case study methodology. These cases were selected from Finland, a typical SMOPEC country.

CONCEPTUAL AND THEORETICAL FRAMEWORK

The strategy literature is vast and suggests that sources of competitive advantage at the firm level can be found in various areas, including the position in the industry value chain, firm activities, resources, and knowledge (Porter, 1991; Barney, 1991). Also, cost- and efficiency-related aspects should be acknowledged, and the potential offered by externalization and location selection should be examined (Dunning, 1998). This section examines the earlier research and develops a

theoretical framework based on three specific theoretical approaches: 1) firm competitive advantage, 2) the resource-based view, and 3) economics-based eclectic model.

Firm competitive advantage

The competitiveness of high-technology and knowledge-intensive firms is greatly affected by the globalization phenomena. First, due to the often high R&D costs, it is of utmost importance to spread these over a large number of markets, including the rapidly emerging markets of Asia, Latin America, and soon Africa as well. Second, the ongoing global trade liberalization and regional integration into different trading blocks around the world is expected to further decrease trade and investment-related restrictions. Third, technological advances and technical standardization are expected to drive globalization (Levitt, 1983). The impact of globalization is based on the industry technology life-cycle phase, such as whether the industry is in an era of fermentation and rapid growth or an era of incremental growth and maturity (Anderson and Tushman, 1990). Fourth, market needs are becoming more similar across countries, and global or at least regional customers and channels are often present. Fifth, even in the high-tech and knowledge-intensive fields, global competitive pressures continue to escalate due to increased cost-based competition from East Asia, and many western companies have been forced to reassess their competitive strategies (Yip, 1989).

According to Porter (1985), a firm may possess two distinctive types of competitive advantage 1) low cost, or 2) differentiation, which can either target industry-wide leadership or then a focused segment. These are based on the firm's ability to perform the activities in the value chain either more cheaply or in a unique way compared to competitors. In the global context it is important for the company to decide how to spread the activities in the value chain among countries. When analyzing the different activities in the value chain one may notice that downstream activities such as sales and service create competitive advantages that are more country-specific than upstream activities such as inbound logistics, production operations, and support activities, including technology/ product development and procurement, which grow out of the firm's global operations. Companies need to decide where they place each activity in the value chain. Additionally, the co-ordination / configuration of these activities on a global scale becomes an essential capability to develop.

The emergence of lower cost competition from East Asia obviously poses a threat to SMOPEC companies, but also provides the potential for these companies to establish parts of their value chain activities in East Asia. Establishing production in low-cost countries brings considerable competitive benefits compared with those companies that do not utilize these opportunities. It also puts the West European SMOPEC companies at least on a par with East Asian companies. Some other value chain activities, such as technology and product development, may benefit from

being placed in SMOPEC countries such as Finland and Sweden, which possess a pool of highly educated workers and highly specialized clusters (Porter, 2000; Cantwell and Janne, 1999).

The resource based view

The resource-based theory deepens our understanding of how resources are applied and combined to achieve a sustainable competitive advantage, which is crucial in global competition. Barney (1991) has postulated that the firm should go beyond the traditional analysis of internal and external environment and analyze the potential of its resources to generate sustainable competitive advantage.

Resources are defined as those tangible and intangible assets that are tied to the firm. Examples of resources include brand names, in-house technological know-how, professional personnel, trade contacts, machinery, efficient processes, and capital (Wernerfelt, 1984). Firms obtain sustained competitive advantage by implementing strategies that utilize a valuable resource base that enables them to respond to market opportunities, while at the same time neutralizing external threats and minimizing the impact of internal weaknesses. However, resources by themselves are not sufficient. Firms must have the capabilities needed to deploy them (Verona, 1999). Thus their resource base gives rise to firm-specific capabilities that can be used to enhance their competitive advantage. If these resources give rise to capabilities that cannot be easily duplicated, they will provide a sustainable competitive advantage. Not all resources are potential sources of sustained competitive advantage. The requirement is that the resources fulfill four attributes. They must be valuable for exploiting opportunities or neutralizing threats, they must be rare among the firm's current and potential competition, they must be imperfectly imitable, and there cannot be substitutes for the resource in question (Barney, 1991).

A closely linked theoretical perspective to the resource-based approach is competence-based competition (Hofer and Schendel, 1978; Prahalad and Hamel, 1990). In this research, we use the terms capabilities and competencies interchangeably to refer to the firm's ability to deploy its unique resource base for enhanced competitive advantage. For analyzing the SMOPEC companies in the global environment, it is important to not look only at current competencies. Instead, Hamel and Prahalad (1990) 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. Some more recent research highlights the importance of dynamic capabilities in achieving competitive advantage (Teece et al, 1997). Dynamic capabilities can be seen as the firm's ability to integrate, build, and reconfigure internal and external resources and competences in the global value chain, and thereby respond to rapidly changing environments. Moreover, this approach emphasizes the importance of a firm's internal processes as a basis for competitive advantage.

The implication for the response strategies of SMOPEC firms is that it is important to develop resources and capabilities that are needed to build competitiveness in the new market situation throughout the entire value chain. It can be expected that certain resources and capabilities favor a specific response strategy alternative. For example, West European SMOPEC companies' technological know-how and patents, fast product development processes, skilled personnel, and established channel relations could very well be resources that enable these companies to stay competitive against lower cost producers operating from East Asia. Furthermore, efforts to enhance the intangible elements of value such as brands and design are needed. Many SMOPEC companies have traditionally had extremely good products, but have not been as good at transferring them to recognized brand promises. Moreover, Finnish and Swedish firms have good design capabilities, but these capabilities must be further developed and leveraged.

The eclectic model

Economics-based literature can help us to understand the suitability of the response strategies based on efficiency considerations. One of the most common approaches is the 'eclectic model' or the OLI (ownership, location and internalization) model by Dunning (1992a, 1998). It stipulates that multinational companies (MNCs) have a competitive resource or 'ownership advantage' as compared with their competitors; they utilize it when establishing production facilities in locations (i.e. target countries) that are attractive due to their 'location advantage'. Ownership advantage is equivalent to competitive advantage in Porter's terminology. MNCs retain control over their networks of assets because of the "internalization" advantages of doing so. Dunning (1992b, p.2) describes the internalization advantages as "the transactional benefits... arising from a common governance of network of these assets, located in different countries". According to Dunning (1992b), such benefits can only be obtained through coordination within the firm rather than by market coordination due to transactional market failure. Dunning's approach has been used successfully by researchers investigating international production as well as other international business operation modes.

According to the eclectic theory, source country firms possessing ownership advantages will use FDI to penetrate host countries which have location advantages (e.g. low costs, resources), thereby maximizing the efficient utilization of resources under globalization impact. The eclectic paradigm has been further developed to incorporate strategic variables and contingency attributes (Hill et al, 1990). In respect to the research problem, this makes the 'eclectic model' particularly suitable for evaluating the potential of high-tech and knowledge-intensive firms to enhance competitive advantage by selectively moving production operations abroad when the location advantage can be achieved without sacrificing ownership advantages.

Theoretical framework

In this paper we present a framework (figure 1) that illustrates the connection between resources, capabilities, competitive advantage, and selected response strategies to the globalization impact. It builds on literature discussed in this paper and earlier research on the resource-based view of Grant (1991) and Barney (1991), the eclectic model of Dunning (1998), and the competitive strategy of Porter (1985). The framework has a process nature. It suggests that globalization pressures companies to review their resource and capability base and to design response strategies according to the competitive advantage sought. Firms need to start by analyzing their own core resources and by accessing external complementary resources. The decision to use complementary resources depends on a cost analysis of internalization versus externalization (see also Williamson, 1975). Especially those core resources that fulfill the criteria of being valuable, rare, imperfectly imitable, and non-substitutable have the potential for creating a sustainable competitive advantage and should be kept inside the firm. These resources, together with the capabilities that they form, determine which type of competitive advantage the firm relies upon, and often shape the basis for profitability.

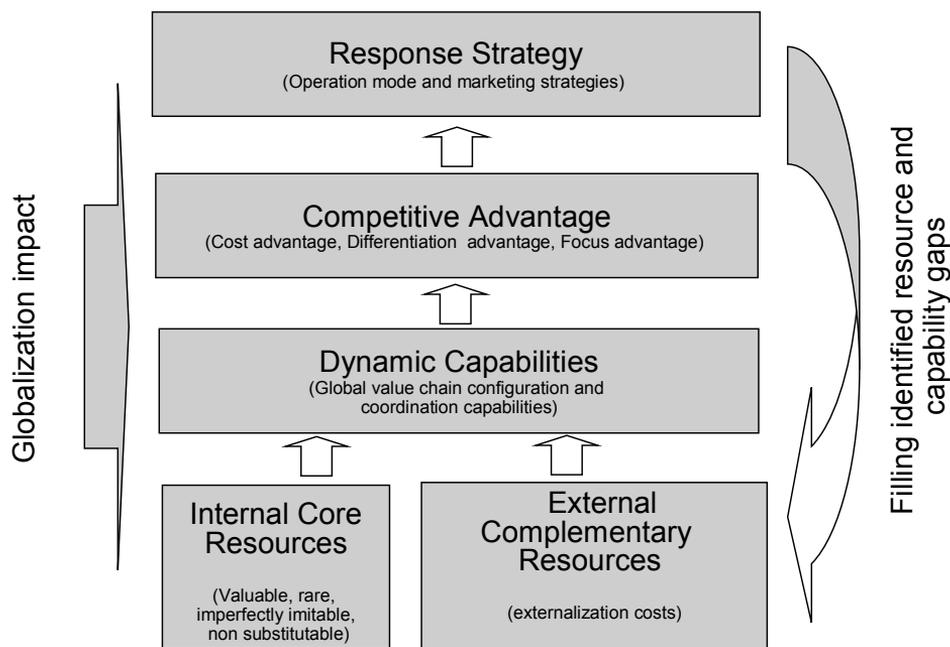


FIGURE 1. Framework for Globalization Impact on West European SMOPEC Firms and Their Response Strategies.

Process technology, size of plants, and access to low cost inputs, for instance, contribute to cost advantage. On the other hand brands, product technology, marketing, channel, and service capabilities, among others, contribute to differentiation advantage. These capabilities need to be constantly updated and developed on the basis of requirements set by the global environment. Furthermore, in global competition, coordination and configuration capabilities assume a central role. Globally integrated value chains enable the simultaneous pursuit of cost advantage by accessing location-based advantages, and differentiation benefits through accessing and harnessing resources that contribute to building ownership advantages.

The company should select the response strategies in the operation modes and marketing areas that best exploit its resources and capabilities relative to external opportunities. Finally, it may identify resource gaps that need to be filled successfully to implement the response strategies. Investing in replenishing, augmenting and upgrading the firm's resource base becomes essential to achieve sustainable competitive advantage.

METHODOLOGY

This research is a multiple case study (see Yin, 2003, p. 46–53) of four Finnish high-tech and knowledge-intensive firms. The complexity with respect to the number of factors and their inter-relationship and lack of prior in-depth research suggest case study methodology as the best alternative for achieving an in-depth understanding (Stake, 2000).

As proposed by Yin (2003) each case is selected to be a representative or typical case illustrating the use of a particular response strategy. This does not exclude that a certain case company would use a number of response strategies. However, the response strategy described in each case was selected to illustrate a certain kind of response strategy. The preliminary list of potential case companies was developed by consulting several international business specialists, and by searching through member and participant lists of industry associations in the sector. These experts were asked to suggest typical Finnish high-tech and knowledge-intensive firms using effective response strategies. The four cases were Kone Corporation, Wärtsilä, Nokia, and Ensto. In studies working on small samples, such as case studies, the objective is to select informative and typical cases rather than to obtain a statistical representation of the total population (Ghuri et al., 1995). The research utilized the triangulation technique and use of evidence from multiple sources including interviews, archival information, and documentation, as well as newsletters and press releases published by the case companies (Yin, 2003; Patton, 1980). The interviewees consisted of senior management and directors representing various functional areas. The lessons learned from these cases are assumed to be informative to both researchers and managers alike.

DEVELOPMENT OF RESPONSE STRATEGIES

There are many alternative response strategy areas in which there is a considerable potential for developing sustainable, globally competitive business, while retaining many key activities of the companies in the home countries of West European SMOPEC firms. Based on our empirical methodological approach described earlier, we have identified the following response strategies that are pertinent for SMOPEC firms facing globalization pressure: (1) operation mode response strategies and (2) marketing response strategies in the areas of product, design and channel choices. We next turn to the results of a multiple case study examining these response strategies.

Operation-mode-based response strategies: the case of Kone Corporation

The case presented below illustrates how Kone has responded to the globalization impact by moving from the use of traditional foreign direct investments in industrially advanced countries to the use of innovative combinations of different business operation modes that take advantage of lower cost structures in developing countries in order to serve global markets.

Kone is the world's fourth largest company specializing in the manufacturing, installation, modernization, and maintenance of elevators and escalators. It possesses 10% of the world market share. Kone was originally established in Finland by the Strömberg Company as a small electrical repair shop business in 1910. Kone's real foreign expansion started in 1968 when it acquired the elevator business of Swedish Asea-Graham. This tripled the volume of business and gave the company market leadership in the Nordic countries.

The march toward international operations continued by various acquisitions in countries such as Spain (1969), Austria (1970), France (1972), Germany (1973), Brazil (1976), the USA (1982), India (1984), Canada (1985), the Czech Republic and Turkey (1992), South Africa (1997), China and Japan (1998), Thailand, Korea, and Russia (2005). Early acquisitions, particularly of companies larger and older than Kone itself, brought Kone respectability and moved it into a position of global market prominence. However, this position has been under continuous strain since the mid 1990s due to heavy competitive pressure from indigenous producers and global firms producing in low-cost markets. In response to these globalization pressures, Kone decided to address not only its global presence but also the cost-competitiveness of its operations. This required a relocation of certain supply functions, consolidation of production volumes in cost effective locations, and global consolidation of certain core competences in order to achieve economies of scale.

As a result of changes and developments in the company's operations, the Indian minority joint-venture (JV) was elevated to a majority one in 1994, and later became one of Kone's four

R&D centers located outside of Finland. In 1998, Kone established the Kunshan factory in China to supply the Chinese market. In 2002, it was developed into a new growth platform for supplying global markets with various components. Furthermore, the plant is being gradually developed into a logistics centre for the Asia-Pacific area. In 1998, Kone's strategic alliance with Toshiba accorded the latter company the right to manufacture and market machine-room-less elevators in Japan based on Kone's Mono Space technology. In April 2004, Kone and Toshiba Elevator and Building Systems Corporation (TELC) agreed to strengthen their cooperation through long-term collaboration for the advancement of high rise elevator technology. As a first step, they agreed on a licensing arrangement enabling Kone to supply high-speed double-deck elevators based on Toshiba's technology and Toshiba to gain access to new markets outside Asia. In addition they agreed to collaborate in competing for project entry modes in mega-projects around the globe.

Finally, the year 2005 witnessed the formation of four joint-ventures in low-cost countries. Kone began its own operations in Korea by acquiring a majority shareholding in Soolim Elevator. In China, Kone and Giant Elevator Co. Ltd agreed to form an independent joint venture (JV). In March of the same year, Kone acquired a controlling interest in Thai Lift Industries PLC (90%) and in Russia a JV agreement was signed with Premier elevator company.

Kone's early entry mode strategy during the growth phase of the industry had thus been to acquire highly experienced firms mainly located in industrially advanced countries, which fit the old multi-domestic business model. During this period Kone gained experience from most of the conventional operation modes including exporting, contractual modes, and foreign direct investments (FDI). However, the industry has become mature and more globalized. This has encouraged Kone to seek rapid market expansion, particularly in developing countries, and to search continuously for cost efficiencies and new capabilities. This has been achieved by using combined entry modes consisting of alliances, licensing, project operations, and FDI (wholly owned and joint ventures). Thus Kone has through building on its dynamic resources and core competencies, particularly in the technological field, formulated new entry mode strategies that enable it to benefit from its technological know-how and management of international operations, while gaining rapid access to growing markets and lower cost inputs.

Discussion on the results of operation-based response strategies

Since a firm's competitiveness cannot be achieved in contemporary global business without presence and participation in important international markets, business operation mode decisions have become an important dimension in Kone's response to globalization pressures.

Kone's case illustrates how resources and capabilities were constantly developed to provide a base for operations-based response strategies. Many technology- and knowledge- intensive firms

such as Kone, from small, developed economies, possess an ownership advantage relating to their core technology and also employ highly skilled human resources. It is natural that these firms will pursue strategies of continuous R&D, human resource development, reduced competitive learning, and protection of their resources and capabilities. The operation modes with which they choose to enter different markets will depend on how these modes help to preserve the ownership advantages they have or contribute to their enhancement and sustainability. The entry and penetration into foreign markets requires knowledge to select a business operation mode that is suitable to the market environment at a particular time (Luostarinen and Welch, 1990). In Kone's case, this meant that in developed western markets FDIs in the form of acquisitions were appropriate. In Japan, strategic alliances and in developing countries such as China, joint-ventures matched the resources and capabilities at a given time.

Operation mode choices made by Kone have considerably contributed to its competitiveness as suggested in the literature by enabling it to benefit from cost reductions, differentiation, location advantages, access to specialized local skills, developing a relationship with pivotal partners or customers, and exercising control (see e.g. Luostarinen and Welch, 1990; Benito and Welch, 1993). Next, the operation mode strategies of Kone will be first examined in respect to exporting and contractual modes. Then foreign direct investments (FDI) will be discussed.

Kone did not emphasize exporting to a substantial extent, which is understandable because it had already built a global presence through more advanced operation modes. Exporting modes are basically marketing-oriented and keep employment in the home country, but they do not allow the firm to fully benefit from internalization or access to target-market knowledge and resources (Agarwal and Ramaswani, 1992). Contractual modes such as licensing, on the other hand, have allowed Kone and other firms utilizing them to capitalize on intangible resources, while contract manufacturing and subcontracting allow them to benefit from the host country firms' surplus capacity or local low cost inputs. These non-equity cooperation modes offer the possibility and flexibility of obtaining benefits such as access to world markets that contribute to competitive advantages without the risks associated with FDI (equity) modes.

Kone and other firms that opt for FDI modes are motivated by market-, knowledge-, and efficiency-seeking, as well as risk-reduction, which these modes help to achieve (Dunning, 1992a). Access to foreign markets or production locations can result in gaining proximity to customers or low cost inputs (both tangible and intangible), savings on logistics, and growth opportunities. Many of the markets in the industrially advanced countries have either been growing more slowly or are approaching saturation. In contrast, markets in Asia and Eastern Europe are developing rapidly and thus provide opportunities for expansion. It is through achieving these four benefits that the FDI modes give firms the opportunity to enhance their competitiveness.

The innovative operation mode strategy choices illustrated by Kone emphasize “soft” issues such as the orientation towards creativity, innovativeness, technological leadership, and the simultaneous use of different entry modes (exporting, contractual and FDI type of modes). This is consistent with earlier findings according to which SMOPEC high-tech and knowledge-intensive firms have combined licensing and joint ventures to benefit from gaining access to low cost production locations in various developing countries, which at the same time offer market growth potential (Al-Obaidi, 1999). Similarly, potential exists for firms to combine FDI and contract manufacturing to achieve the advantages of these modes by for instance controlling only selective parts of the value chain. This allows the firms to focus on protecting and developing their core competences in the firm’s value chain.

Kone was able to fill the resource and capability gaps enabling successful operation- based responses that balanced and integrated the various forces and multiple challenges emanating from the global business environment. The capability of operation modes to contribute to firm competitiveness depends on the firm’s internal resources, human resources in particular, and the manner with which these can be combined with external factors and conditions. Technological advances and cost pressures to locate activities in different countries necessitate speed and flexibility as key capabilities. Cooperation modes with suppliers, customers, and competitors have proliferated out of this necessity and enable firms to respond with different, perhaps radical, operation mode strategies.

Product- based response strategies: the case of Wärtsilä

The case below shows how Wärtsilä Corporation has responded to the globalization impact by developing a number of related product lines, including complete systems selling capabilities that bring considerable differentiation benefits, while utilizing common technology platforms to reap cost benefits.

Wärtsilä Corporation is a global equipment, systems, and service provider for ships and power plants that is headquartered in Helsinki, Finland. It is composed of three main business divisions: Ship Power (29% of sales), Power Plants (29%), and Service (42%). Wärtsilä’s Ship Power and Power Plant businesses have been built on its technical expertise in diesel engine technology and production.

Its Ship Power division is a global leader in medium speed engines and number two in low speed engines after MAN B&W of Germany. During the growth period of the industry Wärtsilä’s strategy has largely been based on differentiation with attention to costs. Wärtsilä therefore competes through technological product leadership. Its product development capabilities have for instance enabled it to pioneer in the production of environmentally friendly, but cost-effective engine solutions.

Wärtsilä has grown through expansion from diesel engines into a number of highly related product lines including auxiliaries, propulsion, and maneuvering equipment lines. These product lines are built on common technology platforms standardized across countries. The individual products can be adapted to end product requirements resulting in cost effective, but tailored solutions.

Moreover, as the industry matured and globalized further, Wärtsilä has recognized the need to innovate beyond physical products. Its reliable and sophisticated products are complemented by an effective global service network present in sixty countries around the world. This network ensures reliable product performance that is crucial for the shipping industry and serves as a significant source of revenue. An increased number of product lines and service capabilities combined with technological know-how have also enabled Wärtsilä to evolve into a systems supplier specializing in complete ship machinery systems. The rationale behind this strategic shift is that Wärtsilä must seek new ways to add more customer value to compete against cost competitive rivals.

Thus as a response to globalization forces, firms need to develop innovative product strategies that build on their knowledge-intensive resources and capabilities. Differentiation can be achieved through product technology leadership or value added business process reengineering as in the case of systems. Cost efficiency is enhanced through efficient utilization of core technology platforms along a range of related product lines.

Discussion on results of product based response strategies

To offer a sustainable competitive advantage, the product strategies illustrated by Wärtsilä must be based on resources that have the potential to be valuable, rare, imperfectly imitable and non-substitutable (Barney, 1991). For example, globally patented technologies, superior marketing research, global product requirement knowledge, and innovative product concepts and designs are such resources. Moreover, skillful personnel and efficient product management processes contribute to the sustainability of the advantage. Innovative product development and superior global product management capabilities demand co-ordination of different resources on a world-wide basis.

Product strategy is an especially important determinant of competitiveness for Wärtsilä and other similar companies that face the pressures of globalization. Interestingly, research has found that especially bigger companies that have started to globalize are moving towards broader product assortments and more demanding product categories in response to the increasingly competitive environment and global opportunities (Gabrielsson et al., 2006). Many of these companies have been able to achieve simultaneously both cost and differentiation advantages with the selected strategies; this lesson is expected to be particularly important when planning product-based

response strategies. Moreover, research has found that systems businesses are a particularly appealing alternative because of their ability to mount a strategic response in mature industries. They enable the seller to capitalize on its accumulated stock of industry and product experience through the application of the know-how and services required to develop, produce, and service systems on a global basis (Salonen et al, 2006). The global environment calls for a product strategy (McGrath, 1995) that is standardized across countries to achieve economies of scale and other global synergies. As the case analysis confirms, an important element when standardizing the product offering is the use of the same product platforms across countries (Mayer and Lehnerd, 1997). Even when selecting the differentiation strategy it is of importance to reap all of the benefits available from the lower-cost countries in East Asia, for instance.

The company needs to evaluate potential product strategy alternatives with different challenges posed by the global environment and global competition, and to select the alternatives that will bring a sustainable competitive position. However, in many cases, the company may notice that there is a gap in the resources and capabilities needed to implement the required product strategy. To achieve the targets this requires development and renewal of the company's product-related resource and capability base. Additional investments may be needed in R&D to enable development of innovative products or to speed up the product renewal rate. It may also mean acquiring new technical competencies from outside the company, acquiring patented technology, or developing internal product-related processes and capabilities in some form.

Design-based response strategies: the case of Nokia

The case below illustrates how Nokia has successfully responded to the impact of globalization by investing in design capability development and developed both differentiating product designs and cost effective production processes.

Nokia transformed itself from an unknown conglomerate at the end of the 1980s to the world's leading manufacturer of mobile devices by the end of the 1990s. Nokia group's sales reached 34 billion euros in 2005. Much of this success can be traced back to its design innovations and strategy.

At the end of the 1980s and the beginning of 1990s Nokia faced tremendous pressure from globalization as competition started to open up worldwide, technical standards such as GSM started to spread globally, and universal consumer needs in mobile telephony emerged. As a result, Nokia introduced a number of innovative form elements, unique materials, and product designs during the 1990s, but also extended design to cover aspects such as easy-to-use user interfaces. Commitment to product design with a 'human touch' including timeless, classic product styling that combines ergonomics and aesthetics and also fulfillment of increasingly segmented user needs were considered important. During this period of growth in the industry

Nokia's design was considered user friendly and this clearly contributed to increased sales. Nokia also realized at an early point that it is important to protect design elements such as brand, user interfaces, patterns, and key technologies with intellectual property rights (IPRs) to enhance the sustainability of the advantage.

During the late 1990s when the industry had started to approach a mature phase, Nokia realized that the design aspect was a core competency that was integrated with other functions throughout the company. It realized that design affects early design conceptualization, product creation and development processes, production and logistics, as well as marketing and retailing. Nokia design has evolved through collaboration between global designer teams, mechanical and electronic designers, and marketing personnel. Moreover, Nokia recognized design as a fundamental concept, including not only product design, but also advertising and brand related communication that have identifiable Nokia characteristics. Efficient production and achievement of demanding cost targets have become increasingly important for Nokia. The introduction of product design and technology platforms has been a way to achieve economies of scale in production and the supply chain while also enabling Nokia to meet the demands of different end user segments and country- and operator-specific requirements. Moreover, when the competition has increased and technologies have become more standardized, the role of design as a differentiator has increased. Nokia's competitors have from time to time been able to introduce new design formats even earlier, such as the clamshell phones. In these situations Nokia has, however, been able to respond relatively quickly to these new design requirements from the market. In overall Nokia has been able to achieve differentiation advantages through innovative designs that meet the requirements of different end user segments and to reap cost advantages through utilization of platforms and standardization.

Renewal of resources and capabilities has been important for Nokia. Nokia has constantly had to renew its design capabilities to be able to introduce new innovative designs. A proactive approach of setting new design and fashion trends requires that the design team is aware of developments in the environment. Hence the design process is kept flexible and competence development is important in Nokia.

Discussion based on the results of design-based response strategies

In high-tech and knowledge-intensive sector, Korean, Japanese and Chinese firms have increasingly improved their resources and capabilities in designing products making Asian companies extremely competitive on these fast growing markets. The case demonstrated how Nokia has responded to this by developing their resources and capabilities. This has included many of the design areas identified in earlier literature, such as (1) the development of corporate identity, (2) the design of saleable products, and (3) the design of operative environments (Cooper and Press,

1995; also see Olson et al., 1998). Each of these areas requires different resources and capabilities. Corporate identity development requires personnel that are capable of designing in a holistic way to reflect corporate values, to develop consistency across the product range, and to define the attributes of the brand identity clearly. The design of saleable products for foreign markets requires knowledge of regulations and customer requirements in different countries, and of cultural differences. Skills are also needed in considering how the company's own concept of design is combined with the prevailing design perception in the market. Finally, design can enhance R&D, production, and other operative environments and thus contribute to the internal efficiency of the firm.

The non-imitability of resources and capabilities in the design area is an important aspect to consider since product-design related attributes and design of marketing communications are subject to imitation. This is partly due to the fact that on many of the markets in which Nokia operate, global regulations protecting IPRs like design are still relatively weak, although organs like the EU have tried to strengthen the protection with new forms of model registration. The problem is even worse in countries like China, Korea, and India, which are playing a critical role in the globalization phenomenon. However, a holistic approach to design that in addition to saleable goods includes the development of corporate identity and the design of the operative environments may be more difficult to imitate.

Design has offered Nokia many ways of enhancing competitiveness. This is consistent with the findings of earlier research (Walsh et al., 1992) according to which design may have an impact on reduction of price (manufacturing costs, cost of use and maintenance), non-price aspects (performance, quality, uniqueness, reliability, ease of use, durability), company image (product presentation, display, packaging, promotion), delivery time (design for ease of development) and after-sales service (design for ease of service and repair). Design has the potential to both increase market effectiveness by adapting the product designs to the market specific needs and differentiating the offerings from competitors and increase the internal efficiency of the production processes (Salimäki, 2003, Salimäki and Gabrielsson, 2005). Here platform (Mayer and Lehnerd, 1997) thinking can be applied to design, resulting in both increased production efficiency and differentiation. A design platform comprises the attributes that are common and typical for all objects of design (products, communications, user interfaces, etc). Based on this discussion it becomes evident that design can create a competitive advantage when implementation is managed successfully.

To stay competitive through differentiation and internal production efficiency, firms need to constantly develop their design capabilities as Nokia has done. Companies need to invest in increasing the knowledge of their industrial design personnel. This personnel needs to understand the varying customer requirements in target countries in addition to artistic and aesthetic features.

Moreover, design knowledge needs to be integrated with business knowledge to form strong design management capabilities within companies.

Channel-based response strategies: the case of Ensto

The below case illustrates how Ensto has been able to successfully develop its sales and marketing capabilities in response to globalization and to both differentiate and maintain its cost efficiency by first using the MNC-based large channel approach and then later the hybrid channel approach.

Ensto was established in 1958 in the small Finnish city of Porvoo as a one-man business. It grew rapidly into an industrial group involving design, development, and manufacturing of components and accessories for electricity distribution and transmission lines. It has since grown into an international firm, whose 160 million euro revenues are generated in Finland (40%), other Nordic countries (28%), Western Europe (8%) and increasingly Eastern and Central Europe (23%), whereas global sales play a minor role (1%). The firm is highly profitable. Much of the success can be traced to its early sales channel strategy response to the liberalization of the power utility construction business during the 1970s and 1980s, and the intensified competition in the early 1990s.

During the 1970s and 1980s, the power utility construction business grew and developed rapidly. After modern electric utility systems had been developed in Western European markets, the focus shifted to development of such systems in the Middle East, South America, and Asia. Ensto usually participated in global tenders so that it was allied with Nokia Telecommunications, a Finland-based global supplier of telecom and power network systems. This channel strategy combined the project selling competencies of Nokia with the innovative products of Ensto, and enabled them to prosper throughout the 1980s. This MNC-based large channel approach was highly successful from Ensto's perspective. They were able to benefit from the differentiation advantage of their systems, while the costs of developing global sales and marketing competencies were minimal.

In the early 1990s, the industry became mature and the business environment changed dramatically. First, the Soviet Union, which had been a significant market for Ensto, collapsed. Second, competition in other parts of the world, including Asia, had led to overcapacity in the power cable business, which prompted Nokia Telecommunications to exit that business. Thus the project business of Ensto declined due to the exit of its large MNC partner, but also due to cost competition from India and other East Asian countries such as Malaysia and Taiwan. In response to this globalization impact, Ensto decided to strengthen its sales channel presence in East European countries. After an analysis of their resource and competence base they decided that investments should be made in building up a marketing and distribution network in Hungary, Ukraine,

Estonia and other Eastern European countries. The starting point for the design of the channels was challenging as they themselves did not have the resources or capabilities to handle local sales and to support utilities. Still, there was a need for direct contacts with these end-customers. They set off to plan a channel structure that would enable them to both build on their differentiation advantage of being a reliable and innovative provider of electrical systems and solutions, but also to reach a competitive cost level, which was decisive on these markets. As a result, a hybrid marketing channel was established in these countries. It became the responsibility of the local agent or distributor to handle local sales, distribution, and logistics whereas sales promotion and technical support was provided directly by either the headquarters in Finland for smaller markets or then via a marketing subsidiary when large markets were concerned.

Thus Ensto had to constantly respond to the impact of globalization. This has also required them to build up sales and marketing resources and capabilities, and then to renew them as the nature of globalization changed.

Discussion on results of channel-based response strategies

The resource and capability situation has a heavy impact on channel design as became evident from the case of Ensto. Skillful sales and marketing personnel are a scarce resource that firms can recruit and train by themselves or then outsource. Nevertheless, the firm needs to verify that its sales channel is competitive and based on strong key capabilities such as customer generation, promotion, stockholding, distribution control, and reselling or retailing capabilities. Furthermore, as illustrated by Ensto, the size and other resources of the firm put limitations on the alternative competitive advantages and resulting channel strategies (Gabrielsson and Gabrielsson, 2003).

The imitability of the resources and capabilities that the channel strategy is based on is naturally of high importance when the sustainability of the strategy is concerned. However, research (Anderson and Coughlan, 1987) suggests that inappropriate channel selections are difficult to change, have a long-term impact on company performance, and may therefore also be difficult for the competitors to imitate. This is partly because distribution arrangements are part of the whole value chain and it is not enough to copy the distribution strategy. To succeed, a competitor of Ensto would also need to change its key resources and capabilities, such as channel management, logistics, production arrangements and marketing operations. However, this also means that when barriers to competitive responses are developed, the firm may need to lock itself into an internal operation or into close ties with selected partners, such as the relationship Ensto had with the MNC channel partners.

The competitive advantages that were sought also influence the channel design. In Ensto's case, both cost and differentiation advantages were sought within the highly focused segment selected. Thus, cost leadership strategy implies to have highly efficient operations, rigorous cost

controls, and economies of scale based on high unit sales volumes. Moreover, Ensto also aims to differentiate by creating a distinct value or image for its products and service, which justifies charging higher prices. (Lassar and Kerr, 1996) To safeguard achievement of cost leadership and differentiation, partnership advantages should be gained from co-operation with local channel members and integration benefits from standardization of the channel program (Rosenbloom et al, 1997).

In particular, two response strategies were used by Ensto: 1) the large channel approach in which MNCs are used as the channel to the world markets and 2) the hybrid channel approach in which direct and indirect channels are used in a composite manner by dividing the marketing functions between the producer and channel middleman (Gabrielsson and Kirpalani, 2004). Within the former approach, components or software are offered for piggy-backing by MNCs acting as either system integrators or distributors. The latter approach of sharing functions with local distributors, resellers or retailers has proven particularly effective when products are innovative, but unknown to the end customers and the manufacturer needs to participate actively in demand generation.

Resources, capabilities and strategies must constantly be renewed in response to the requirements set by the environment. The market for high-tech- and knowledge-intensive firms has been characterized as a high-velocity environment with fragmentation of customer segments, accelerating product life cycles, and proliferation of products (see Anderson et al, 1997). In coping with the impact of globalization, Ensto's channel-related resourced had to be developed considerably when moving from the MNC-based channel to the hybrid channel approach faced with changes in the global business environment.

SYNTHESIS OF THE FINDINGS

Based on the explorative examination the impact of globalization in high-tech- and knowledge-intensive sectors, we assert that it is essential for firms to sequentially develop competitive advantages that are based on multiple-response strategies and also on achieving multiple advantages such as cost and differentiation. Moreover, strategy is always environment- and situation-dependent and it was noticed in the empirical examination of the cases that the industry development stage had a significant influence on the emphasis of a particular response strategy (see also Emery and Trist, 1965; Anderson and Tushman, 1990). Each of the response strategies changed when moving from the era of fermentation and rapid growth to the era of incremental change and maturity. See Table 1.

Business operation-mode-based response strategies are especially important for companies facing the globalization pressure. The operation modes must be managed carefully to safeguard firm competitiveness and to retain key value added activities in the home country. In an era of

TABLE 1. Dynamic Response Strategies Matched to Industry Lifecycle Phase.

Response strategy	Era of growth/ development	Era of maturity
Operations	Entry mode selection from export, contractual or FDI enabling growth and maintaining control of core business operations, and externalizing selectively.	Configuration of the value chain and using multiple operation modes.
Product	Innovative and narrow product range to enter mass markets.	Movement toward broader product assortment, including advanced product categories such as services and systems, and increased standardization across countries.
Design	Innovativeness, ergonomics and aesthetics used to build customer acceptance and loyalty.	Design used to both enhance production efficiency and differentiation.
Channels	Use of single channels, e.g, growth sought through large MNC channels.	Hybrid sales channel arrangement in which marketing functions are divided between the producer and the channel middleman.

growth, selection of operation modes from the export, contractual or FDI operation categories has the potential to bring significant cost advantages and enables the firm to invest in its core business and to differentiate its offering. When the industry is maturing the configuration of the value chain and its functions play a central role. To take advantage of operation modes, firms need to move rapidly to pre-empt available locations and position themselves well in important clusters. Furthermore during this phase, it can be suggested that combinations of multiple operation modes would make them more difficult to be imitated. Kone, for instance, successfully responded to globalization pressure during the growth phase by utilizing foreign-business-operation-based strategies that have enabled it to gain a global market share and benefit from lower cost inputs in growing markets, and then sustained this position through innovative configurations of the value chain by using combinations of several operations modes as the industry matured.

Product-based response strategies can also enhance firm competitiveness and help to maintain value added functions in SMOPEC countries. Product strategies are based on four dimensions including product platforms, product lines, individual products, and standardization of these dimensions across countries. When facing the impact of globalization, innovative product strategy selections should be made to achieve either cost advantage, differentiation advantage, or in the best case, both of these advantages. Often a highly competitive, narrow product assortment is selected for addressing the global market, which is then broadened by adding highly related product lines to maintain growth. Particularly in the mature phase of the industry the move from

low value adding goods towards more advanced products such as services and systems is critical. The importance of standardization in bringing integration benefits is also significant. The sustainability of the product strategies is based on the quality of the resources and their continuous maintenance. This product-based response strategy was demonstrated in the case of Wärtsilä.

Turning to design-based response strategies, it is evident that in the growth phase of an industry design of innovative, ergonomic and user friendly, as well as aesthetically pleasant products is essential. Design can also be used to adapt the offering to market-specific needs. However, when the industry starts to become mature, as illustrated in the Nokia case, design should be used to enhance production efficiency and differentiation simultaneously. Also, the importance of understanding design as a holistic concept to be considered in product design, manufacturing, and communications was demonstrated in the case of Nokia. This may bring both differentiation and cost advantages, which provide the tools with which to survive in global competition. An important way to guarantee sustainability is to use competitive platforms combined with all possible means to protect IPRs.

Channels are routes to international customers and may form an important response strategy when facing globalization pressure. The channel strategy to the end-customer market can be examined through its structure, level of channel support, and coordination. Cost advantages are usually associated with intensive distribution and low levels of channel support and coordination. Differentiation advantages require selective distribution, high support, and coordination. These advantages are, however, available to any firm and therefore additional competitive advantages should be sought through channel program management and partnering with channel middlemen. New, innovative channel strategies were proposed as an effective response to globalization pressure. In the growth phase of the industry the use of a single channel, preferably a large MNC, was seen as an important way to respond to globalization pressure. However, when the industry matures the hybrid sales channel approach, based on sharing of channel functions between independent channel members and the producer, was found useful in sustaining competitiveness. These strategies were demonstrated in the case of Ensto.

This study was limited to the high-tech and knowledge-intensive fields. In addition, the study results are expected to be most relevant for companies originating from SMOPEC countries, such as Finland. To the extent that the conditions are similar in other industries and countries, the results may be generalizable beyond the companies studied. However, despite this conclusion, one should be cautious about generalization beyond the above presented industry and country of origin. Also, one should remember that the case study methodology used in this study considerably limits the generalization of results to a wider population. This is an exploratory type of study methodology and it should be treated as such. It is up to future research to show to what extent generalization is possible.

CONCLUSIONS

Various approaches were applied to examine the globalization impact on SMOPEC firms and their response strategies in the high-tech and knowledge-intensive fields. This resulted in a framework presented in Figure 1 that has a high contribution by integrating the theoretical and conceptual approaches.

The resource based view (Barney, 1991; Grant, 1991) was used to structure the constructs leading to competitive advantage and it provides an essential building block when sustainability of the response strategies is considered. It may be concluded that Porter's (1985) competitive advantage theory proved to be very usable in considering all of the response strategies. However, it was found that the original interpretation should be widened to accept simultaneous attempts to achieve combinations of cost and differentiation advantages. Further, the eclectic model (Dunning, 1992a) was found useful when the location of particular activities was determined and when making internalization versus externalization decisions.

The globalization impact on SMOPEC firms operating in the high-tech- and knowledge-intensive fields was described as significant. Four response strategies were identified in this research to respond to such an impact, and representative cases have been used to verify the developed framework and response strategies. The results that response strategies are environment- and situation-specific are in line with earlier organizational and strategy research (c.f. Emery and Trist, 1965; Anderson and Tushman, 1990). The industry lifecycle stage influenced the response strategy appropriate for a given situation. During the era of internationalization and growth, selection of appropriate operations modes, utilization of innovative products and design, and the use of channels that enable presence in international markets were important. In the maturing phase of escalating global competition, the sustainability of the competitiveness can be increased by efficient configuration of value chain on a global basis and the use of multiple operation modes, expansion of the product range and its standardization, holistic design which enhance both production efficiency and marketing differentiation, and hybrid channel arrangements.

The above results are also expected to bring certain managerial implications. Managers should evaluate globalization threats and opportunities from a holistic and dynamic viewpoint. They should remember the importance of analyzing their resource and capability bases. None of the functions can be investigated in isolation from the overall competitive strategy. Moreover, managers should follow the steps identified in the framework to carefully evaluate the presented response strategies and select the most suitable for them. Naturally governments must also review their current policies with an open mind as far as educational system, taxation, legislation and other support for enhancing the factor conditions of their country. This study examined operation-mode- and marketing-based response strategies under globalization impact utilizing four Finnish

case companies from the high-tech- and knowledge-intensive fields. Additional studies are also needed to examine the dynamic nature of response strategies from other sectors. ■

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