Entry barriers and foreign penetration

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Entry barriers and foreign penetration

Emerging patterns of international competition in two electrical engineering industries

Örjan Sölvell

IIB
STOCKHOLM SCHOOL OF ECONOMICS
Institute of International Business

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Allt är rörelse, allt rör sig,
någon stabil punkt finns ej i
universum.
Olle Bærtling

Preface

This report is a part of the research program "Strategies in Global Competition" at the Institute of International Business (IIB), Stockholm School of Economics. The program, and the specific project which Örjan Sölvell here reports, has received financial support from a number of institutions besides IIB. Contributions from Humanistisk-samhällsvetenskapliga Forskningsrådet (HSFR), Jan Wallanders Fond and Ruben Rausings Fond för Forskning om Nyföretagande och Innovationer are here gratefully acknowledged.

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Stockholm in September 1987

Gunnar Hedlund
Director
Institute of International Business

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A doctoral thesis is one man's work and responsibility. However, it is always the product of a large number of people. In my case it did not only involve my thesis committee and colleagues at the Institute of International Business, but also a large number of managers who have devoted endless hours to my questions - to all of you, thank you.

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Finally, thank you Ingela for helping me to conclude this study.

Stora Tjörnekalv, July 1987.

Örjan Sölvell

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1. Introduction

1.1 WHY STUDY INTERNATIONAL COMPETITION?

This thesis is developed around one important theme - how industry competition becomes international. Within that theme we will look specifically into two electrical engineering industries, and examine how the nature of competition has changed in the post-war period. In these two industries, as well as in many other engineering industries, competition was geographically segmented in the early stages of development. National industries developed simultaneously throughout the Western world. These nationally segmented industries began to recover after World War II, protected by trade barriers. The reduction of trade barriers, in combination with increasingly sophisticated information and transportation systems, and the creation of international capital markets began to drive a process of increased international competition. Various impediments, in the form of demand heterogeneity, national technical standards and established distribution networks, have acted as trade-offs to potential cost reductions through increased volumes. We will look into a process where firms have entered and further penetrated foreign industries via trade and foreign direct investments (FDI), and how competition - as a result of this penetration - has become increasingly international.

But why study this process of internationalized competition? Before asking someone to read another 200 pages on the topic, it is necessary to clarify the raison d'etre of this study. Just by reading the international business press, one can recognize the significant

changes going on in the international business community. In some industries, international competition has reached such magnitude that one can talk about global competition. In academic work the changing nature of international competition is recognized among trade theorists (Helpman & Krugman, 1985) looking at intra-industry trade, and international trade within the multinational enterprise (MNE). Scholars looking more specifically at the MNE, in both a strategic and an organization context, also struggle with new empirical insights, calling existing models into question (Buckley & Casson, 1985; Hedlund, 1986; Porter, 1986; Hood & Vahlne, 1987).

Competition has become increasingly international across a large number of industries during the last decades. It is, however, true that international trade dates back centuries, and foreign direct investment at least a century, and it is similarly true that international production was more important before the beginning of World War I, than at any time until the 1960's (Dunning et al, 1986:19). However, the developments we have witnessed during the last decades, where European and Japanese MNEs challenge the US dominance (Hennart, 1982:70), call for attention from any one who wants to get a better understanding of how competition is becoming increasingly international, or in extreme cases even global.

A second reason for undertaking the present study concerns its focus on the strategic behavior of MNEs, and the importance of industry structural characteristics in forming those strategies,*/ and vice-versa how MNEs actually form industry structure through consistent strategic behavior, i.e. structural change is driven endogenously. Rather than looking at nations or individual companies, this study looks specifically at competitor interactions within oligopolistic industries, both on a national and an international level (the analysis also extends into related industries, see further Chapter 2).

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*/ "Industry structure" as used in standard Industrial Organization literature include elements of seller concentration, entry barriers and growth rate. "Market structure" also includes buyer concentration.

One central feature of internationalized competition is the penetration by foreign firms of well established national oligopolistic industries. The study of such foreign penetration is especially intriguing as these industries are characterized by very high entry barriers. This thesis deals with such foreign industry penetration, describing action-reaction patterns in a process where national oligopolistic industry structures are in important respects broken down, to be replaced by an international industry structure. Thus, the analysis of strategic behavior and industry structural change is developed both on a national and an international level. As will be further developed in Chapters 2 and 3, there are significant interdependencies between national strategic behavior and structural change on the one hand, and international strategic behavior and structural change on the other. Such an insight was delivered in the introduction to one of the seminal works in this field - "At home abroad" by Thomas Horst:

> "My original intention was to focus primarily on current foreign investments, with only secondary attention to the historical and domestic materials. But as time passed, I came to realize that these materials, far from being peripheral, were absolutely critical to an understanding of why these firms invest abroad."
> (Horst, 1974:3)

1.2 THE SWEDISH CONTEXT OF THIS STUDY

Given the title of this work "Entry Barriers and Foreign Penetration - Emerging Patterns of International Competition in Two Electrical Engineering Industries", there is no focus on the Swedish industry or on Swedish companies as such. However, industries which include at least one Swedish major competitor on international markets have been chosen. Furthermore, the focus on engineering industries is inherent in a Swedish context, given their important role in the Swedish economy. The most successful Swedish firms, at home as well as abroad, are predominantly active in engineering industries (see Hörnell & Vahlne; chapters 2, 3).

The author's interest in studying these matters emanates from earlier empirical work in a number of engineering industries, including: the telecommunication industry, the rock-drilling machinery industry, the welding industry, the air-conditioning industry, and the automobile industry. The former four industry studies were all part of a larger study, carried out by the Governmental Committee on Foreign Direct Investment (reported in Vahlne & Sölvell, 1981). The study of the automobile industry was carried out as part of an international program, "The future of the automobile", coordinated by the Massachusetts Institute of Technology (reported in Sölvell, 1981). These studies were all "rich" industry studies, including analysis of several international competitors in each industry. Although the purpose of these studies differed from the present one, they were all concerned with strategic behavior and structural change in international markets. In each industry there was at least one major international competitor of Swedish origin.

The empirical part of this thesis, presented in Chapters 5 to 7, is based on two blocs. The first bloc (Bloc A) deals with low voltage apparatus and switchgear products which are used to distribute and control electricity to industrial users and households. Basic technology is well known, and standardized products have existed on the market for at least 40 years. One actor in international markets is the Swedish electrical company ASEA. The second empirical bloc (Bloc B) is concerned with major home appliances, or white goods as they are often referred to. The white goods industry today is also based on well-known technologies, not radically different from those used 30 years ago. A major exception is the introduction of the microwave oven, which added a new product concept to the market. The Swedish company Electrolux is today one of the leading competitors in the white goods industry worldwide. Although the two Swedish companies, ASEA and Electrolux, have acted as important sources of information, the present study does not particularly focus on these companies, or on Swedish industries as such.

1.3 INTERNATIONAL COMPETITION AND THE MULTINATIONAL ENTERPRISE

Even if "national" firms do play a role in international competition, acting in their respective home markets as well as in international markets through exports,the predominant actor is the multinational enterprise (MNE). Therefore, this study is mainly concerned with the strategic behavior of MNEs. Research on the MNE has become a discipline in itself. In a recently published book on the theory and history of the MNE, it was estimated that at least five books appear on the subject every month (Hertner & Jones, 1986:1). Economic analysis of the MNE has taken on widely different perspectives, and the study of strategic behavior and industry structural change is but one area of interest (for a broad overview of the economic analysis of the MNE, see Hood & Young, 1979; Caves, 1982; Buckley & Casson, 1985).

Many of today's large MNEs belong to the product pioneers from the late 1800's (for an overview of historical studies of US and European MNEs, see Hertner & Jones 1986: ch 1). By keeping an innovational lead and introducing mass-production and mass-distribution techniques, these pioneering firms have managed to keep up dominating positions for a century or more. A steady stream of in-house generated innovations formed the basis for growth, including international growth. By going international, the market base was enlarged, permitting scale economies in R&D, and, to the extent that components and/or finished products could be exported, in manufacturing. As products matured and patents ceased, competitive advantage came to be based on well established brand names, international service organizations and a network of sales and manufacturing subsidiaries covering the world. Thus, new competitive advantages were built while exploiting old ones (for a discussion of this "Advantage cycle" see Sandén & Vahlne, 1976; Hörnell & Vahlne, 1986). Parallel to developing an efficient cost structure across countries, MNEs developed market power based on product differentiation. Product pioneers often took an active part in developing highly concentrated industries in their respective home industries. This in turn created a profitable base on which international expansion could be built (Hamel & Prahalad, 1984).

The early stages of the firm's internationalization process were associated with great uncertainties. Information about customers, competitors etc in foreign markets was often scarce, and the organization was not fit to coordinate headquarters with subsidiaries (and between subsidiaries). According to a seminal work in this field, the initial decision to enter a foreign market could be explained by a number of factors, including: the outcome of complex organizational decision processes, proposals from foreign governments, distributors or clients, the fear of losing a market, the band wagon effect (oligopolistic rivalry) and retaliatory actions against foreign competition in your home market (Aharoni, 1966:55). Often several factors interacted. Aharoni's own study focused on organizational and personal factors. This study takes a different view, focusing on market structural characteristics and strategic behavior of MNEs.

Over time, through a process of gradual learning, the potentials of foreign trade and investment have been exploited. Not only did the MNEs exploit their initial advantages (often related to superior product and process technology), but new advantages were also created from the combination of different activities, such as purchasing, manufacturing, R&D, distribution and finance, across nations. Through multinational activity, the potential for system-wide optimization, utilizing comparative advantages across nations, was expanded. With advances in both organizational design and information technology, the potential for worldwide or global coordination has increased significantly. Environmental changes, such as homogenization of demand, reduced trade barriers and the like, also increased the potential (Kogut, 1983; 1985; Porter, 1980; 1986). MNEs have built competitive advantages along the same dimensions as the national firm, the difference being that MNEs have had access to a much larger and more varied environment. They have access to an enhanced technological base, larger economies of scale and increased product differentiation, on which entry and mobility barriers are built. Dimensions of competitive advantages of the MNE include: a potential of allocating various value-added activities to countries with various comparative advantages (for a discussion of the connection between comparative and competitive advantage, see Kogut, 1985), a

potential of gaining scale advantages in various value-added activities (such as centralized component production), a potential of creating low-cost international scanning capabilities (Otterbeck, 1974), and an enhanced potential of utilizing international financial markets. The traditionally held view of the MNE was that of a firm exploiting its home-market-based competitive advantage in foreign markets. Today's understanding of the MNE has come a bit further. Through worldwide optimization and cross-fertilization, some MNEs build significant competitive advantages vis-à-vis national firms and uncoordinated multinational firms (Porter, 1986). Even the two main proponents of the product cycle in the 1960's and 1970's, Vernon (1971) and Wells (1972) foresaw such a development. Wells put it the following way:

> "With the establishment of efficient information networks among subsidiaries, the gap between introduction in the first market and a second market might be diminished." (Wells, 1972:26)

1.4 UNDERSTANDING INTERNATIONAL COMPETITION AS A FORM OF ECONOMIC INTEGRATION BETWEEN NATIONAL INDUSTRIES

The approach to understanding international competition adopted in this thesis is to look at it as a process of industry integration, i.e. integration of two or more geographically separated national industries, manufacturing similar products, satisfying similar demands. When competition in each national industry is totally independent of competition in other national industries, we will refer to this as national competition.*/ As national industries are entered and further penetrated by foreign firms, competition becomes increasingly international. In the early stages of international competition we have national firms with export activities, and MNEs with portfolio-type subsidiaries, i.e. MNEs which run each subsidiary

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*/ Competition can of course be limited to regions within a country, but for simplicity we use national competition to denote the most fragmented case.

as a separate entity and thus do not coordinate various activities such as purchasing, R&D and manufacturing across countries. As foreign firms continue to penetrate foreign industries beyond the entry foothold, especially those characterized by high barriers to entry, competition becomes truly international. When major "fortresses", i.e. major industrialized countries being home industries of leading international firms, have been penetrated by foreign invaders, competition becomes global. In the extreme case of global competition, competition in each national industry is dependent upon competition in all other national industries, whereas in the case of national competition, competition in each country is independent of competition in other countries. Thus, when competition is internationalized, the national industries are integrated into a whole - and a new international industry structure is created. The tradition of classifying national industries (and markets) into either "home" (where the MNE has its roots) or "host" becomes less valid as an international industry structure is created. The international industry is based on elements of seller concentration, barriers to entry and industry growth rate. However, the international industry is not just an average of the added national industries. Instead, structural dimensions of an international industry must be given an interpretation of their own.

In economic literature, economic integration is most often used in connection with international integration of national markets through the establishment of free trade areas, customs unions, common markets and economic unions, but the mere existence of trade between independent national economies has also been used as a sign of integration (Balassa, 1961). Although trade is a major mechanism of integration, it is only one of several integrative links. Information, which can easily be transferred across borders, is also a mechanism of integration. Often these information flows are accompanied by financial and trade flows, but not always. Especially in the case of service industries, transmission of information is often the only integrative mechanism used.

In models of economic integration, where the spatial element is introduced, two main factors, proximity and transportation costs, are included to explain the direction of economic integration. Proximity is important as: (a) the distances to be traversed are shorter, (b) tastes are more likely to be similar and distribution channels can be more easily established, and (c) neighboring countries may have a common history and awareness of common interests, and hence be more willing to coordinate policies (Balassa, 1961:40). These factors of proximity, in combination with transportation costs, have been used successfully to explain trade patterns. Beckerman (1956) and Hörnell et al. (1973) further developed the concept of economic distance, bringing in cultural and language barriers.

There are both integrative and disintegrative forces that shape international industry integration. We have already mentioned formal integration through governmental action. But governmental actions can also lead to disintegration. For example, within Europe, governmental actions (blocking trade) led to a disintegration of the European economies between the two World Wars. Competition across national markets was reduced, leading to a decrease in specialization among the countries. While production of commodities grew 32 % between 1913-1938, intra-European trade decreased by 10 % (UN Economic Commission for Europe, 1953, in Balassa, 1961:5). With the creation of the Common Market, intra-European trade increased considerably. Other integrative forces include: more sophisticated information and logistical systems, homogenized demand and improved transportation technology, bringing down transfer costs. Lowered transfer costs, in combination with economies of scale, are driving forces in industry integration. Both national and international firms drive an integration of national industries through international trading activities. Furthermore, the MNE acts as an integrator through coordinating sourcing, R&D, manufacturing and marketing activities across national borders.

In this thesis, economic integration will be interpreted on the industry level rather than on a country level. Within our mature engineering industries, we expect to find MNEs actually driving the

process of increased international competition, i.e. industry structural change is to an extent given endogenously. In order for such a process to occur, these firms must manage to enter and further penetrate national industries in the Western world, which are surrounded by high barriers to entry, especially the fortresses. This leads us into one of our research areas - how are national industries, surrounded by significant barriers to entry, entered and further penetrated by foreign firms? In order to answer that question we have developed a model of entry and further penetration behavior of foreign firms, which is presented in Chapter 3.

In order to understand internationalized competition, i.e. how national industries become interdependent, we not only need to know how foreign firms enter each other's national oligopolistic industries, but we must also consider when such a process is started. To us, the question of when foreign oligopolistic industries are entered and further penetrated by foreign firms is not a question of when in time this happens, but when in a firm's internationalization process certain national industries have been penetrated. Here we want to challenge the proximity hypothesis, and turn to explanations related to national industry structure. If certain national industries have been avoided for competitive reasons, such as a mutual understanding of avoiding each other's home industries, a form of international "equilibrium" is created, which can exist before competition is international, i.e. before foreign entry has occurred. Thus, we have two interrelated questions concerning: in which order are foreign industries entered, and once MNEs decide to enter oligopolistic national industries, how does such entry occur? By looking into these two questions we hope to gain insight into the phenomena of internationalized competition.

Furthermore, in the process of national industry integration we want to stress the process of interaction between entering firms and threatened incumbents. This leads us into our third area of research, which is to picture the rivalrous process following from entry by a foreign firm into a national oligopolistic industry. In Chapter 3 we have developed a model of such action-reaction patterns. Based on the

established literature we have classified a number of likely response patterns. Here we have both a "national game" and an "international game".

1.5 A NOTE ON THE CONCEPT OF THE INDUSTRY

Delineation of industries and markets is usually based on the concept of cross-elasticities of demand (Abell, 1980:23). Such data does not exist, and if it did, one would still have to define the value of elasticity, below which products would be considered as being separate (Gort, 1962:8). Instead, most empirical research has used standard industrial classification systems. These census product classifications are based on a mix of dimensions, such as raw materials used, the type of user, production process, and combinations in which goods are sold. As Penrose put it: "The definition of a product is at best arbitrary" (Penrose, 1963:107). Since official statistics are collected from firms, substitution in supply is emphasized at the expense of substitution in demand (Waterson, 1984).

In everyday language there exist clearly identifiable industries, such as the automobile industry, the white goods industry etc. What is included in these industries clearly varies over time. For example, in the early period of automobile production there was a clear separation between manufacturers of car bodies and car assemblers. Over time, the assemblers began to integrate the manufacturing of car bodies (often through acquisitions) into their operations, and the automobile industry now includes both these vertical stages (the manufacturing of engines and drive-trains are also included in today's perception of the automobile industry). Along the same lines the breadth of product lines and geographical scope will define industry borders, depending upon traditional scope among leading firms. Our perceptions of industry borders change slowly over time as new products and technologies are introduced (forming totally new industries), and as firms change their scope. In the short run, we look upon this as a phenomenon of multi-industry activity, but in the long run, strong interdependencies between industries erode borders, and new industries are created.

In our empirical studies, delineation does not constitute a major obstacle. Instead of drawing definite industry borders, we have described competitive interaction in a broad setting, along the vertical chain, across product borders and across national borders. Actually, the heart of this thesis is to show how national industry borders are transformed over time as an international industry emerges.

1.6 PURPOSE

The basic aim of this study is to reach a better understanding of increasing international competition, a broad and multi-facetted phenomenon. This thesis is limited to the post-war evolution of two electrical engineering industries - characterized by an almost saturated demand in the industrialized world, where basic technology is well known. Furthermore, the study concerns Western markets which have turned into oligopolistic markets surrounded by high entry barriers. In spite of these high entry barriers, foreign firms have managed to enter and establish strong market positions.

More specifically, the purpose of the study is:

(1) To describe and give tentative explanations regarding the order in which foreign industries are penetrated.

(2) To describe and give tentative explanations regarding the process by which national industries - characterized by high entry barriers - are penetrated by foreign firms, and to describe the structure of those national industries.

(3) To identify and characterize which firms take initiatives to break up the patterns of competition on a nation-to-nation basis, by entering foreign industries and to describe the reaction patterns by incumbent firms given these foreign entries.

1.7 THE STRUCTURE OF THE BOOK

After this introductory chapter, we will turn over to theoretical works regarding industry structure and strategic behavior. In Chapter 2, six dimensions of industry structure are discussed, with reference to endogenous determinants, and interrelationships with entry barriers. Furthermore, each dimension is linked to the international dimension. The discussion then focuses on entry barriers - how they differ between domestic and foreign potential entrants, and how they can be interpreted in a world of today's highly experienced MNEs.

In Chapter 3, we move over to discuss strategic behavior among MNEs with special reference to the penetration of foreign oligopolistic industries. The notion of home and host industry structure in forming such strategies is developed. We then establish model behavioral patterns regarding: country sequence, how host industry barriers are overcome and finally which reaction patterns can be expected from foreign entry. Host industry reaction patterns are divided into domestic versus international and single-product area versus multi-product area responses.

Chapter 4 describes how the two empirical studies (referred to as Bloc A and Bloc B) have evolved, beginning in 1983. Furthermore, the different data sources are presented, and their strengths and drawbacks discussed. Chapters 5 and 6 contain the two empirical studies. They follow similar structures, beginning with broad overviews of products, markets and major actors involved. Thereafter, the nature of competition within national industries is described, and finally we report on patterns of international competition. In Bloc B a detailed analysis of the US white goods industry is included. The two empirical chapters are summarized in Chapter 7, where sequence patterns, penetration strategies and patterns of rivalry are discussed. Finally, in Chapter 8 where the main conclusions are presented, we also draw important implications for managers and future research.

2. National and International Dimensions of Industry Structure

2.1 INTRODUCTION

The theoretical framework of this thesis is built around two theoretical bodies - Industrial Organization (IO) and theories of the MNE.

The IO literature is concerned with the structure of industries and its determination of firm conduct and overall economic performance. Instead of firm conduct, we will be using the term strategic behavior.1/ This literature has largely been domestically oriented, but more recently import, export and MNE activities have been included in formal models.2/ Furthermore, in recent works more focus has been put on the role of firm behavior and its impact on industry structure. This line of research is sometimes labelled the "New Industrial Organization" (Encaoua, et al, 1986:75). In addition, ideas are taken from a new area - sometimes referred to as "Industry and Competitive Analysis" - where IO is applied to strategic behavior of firms.3/

Theories dealing with international trade and foreign direct investment are central to all three purposes of this thesis. There exist several models explaining which countries are the most likely targets, and the process by which foreign countries are entered and further penetrated. Some models of FDI also take into account the competitive dynamics of oligopolistic industries.4/

By bringing the two streams of research together (without claiming to have synthesized them), we can better understand MNE behavior from an industry perspective. Furthermore, we build a base on which we can

develop our understanding of how an international industry emerges, and what that implies for national barriers to entry and international barriers to entry. The purpose of this chapter is to provide a framework on which we can interpret industry structure - with special reference to entry barriers - in a world of multinational firms. In order to do this, the chapter is divided into two sections (2.2 and 2.3). The first section presents six of the most used dimensions describing an industry structure. These dimensions are needed in order to understand the nature of entry barriers and strategic behavior of MNEs. Under each heading the following points are brought up: (a) the basic properties of the dimension and how it interacts with strategic behavior; (b) links to entry barriers; and (c) how the dimension can be interpreted in an international context. In the second section the discussion is focused upon barriers to entry, relating to our three purposes of understanding country sequence, penetration routes and oligopolistic rivalry following from foreign entry.

One major weakness of the traditional IO-paradigm is its neglect of potential international entrants and growing international competition. By neglecting the threat of foreign entrants, which often exhibit a long history within the product area, with efficient plants already in operation, etc, the understanding of entry barriers has not developed significantly. Furthermore, the concept of international competition has been overlooked. True enough, the IO literature has since the 1970's been enriched by models and empirical tests, where both import and export activities are considered. However, these studies have focused upon the performance dimension within either home or host industries. The notion of how national industries merge into an international industry, which we want to develop, has not been developed within the field of Industrial Organization, or any other field of research.

2.2 INDUSTRY STRUCTURE AND STRUCTURAL CHANGE

This section contains a description of six basic dimensions of industry structure. The purpose of this description is to show how

various structural elements are related to entry barriers, and how structural change can be influenced by consistent strategic behavioral patterns over long-time periods (Porter, 1976:74). Furthermore, we will interpret the various dimensions of industry structure in an international context.

An industry structure can be described along a number of dimensions. Microeconomics has emphasized two dimensions: degree of concentration among suppliers and buyers, and degree of product differentiation. Based on the number of firms and degree of product homogeneity, microeconomic theory has established a number of archetypes ranging from perfect competition to monopoly. Microeconomic models predict the behavior of firms (and households) depending upon the structure under which the firm is active. Structures other than perfect competition are classified as imperfect. These imperfect or oligopolistic structures have been the focus of IO. Industry imperfections have also been brought into the analysis of the MNE (Hymer, 1960; Kindleberger, 1969) referred to as the Hymer-Kindleberger (H-K) tradition. Primarily, the field of Industrial Organization has been engaged in welfare aspects following from imperfect industries, which are outside the scope of this study. However, IO research, based on the structure-conduct-performance taxonomy, has created a solid base for describing the interplay between industry structure and firm conduct. The structure-performance taxonomy was developed by Edward S. Mason and Joe S. Bain. They pioneered this approach by identifying a number of critical structural dimensions of an industry. Bain related these structural traits of an industry to market performance. In later works on entry barriers, Bain created a base for testing relationships between industry structure and performance empirically. (For a survey, see Weiss, 1972.) The structural dimensions most often used in IO-models include: number and size distribution of sellers (and buyers), degree of product differentiation, barriers to entry, cost structure, research intensity, degree of vertical integration and conglomerateness.5/ Sometimes industry growth rate is also used as a structural dimension.

As stated above, the concept of "strategic behavior" will be used throughout this study instead of "firm conduct".6/. Strategic behavior is used to stress that conduct in our model is not deterministically given, and thus the behaviour of the profit-maximizing firm cannot be deduced from structure. Instead, industry structure implies important limitations on strategic choice among incumbent firms. Furthermore, firm conduct is often tied to pricing and output decisions. Our use of the term strategic behavior involves a broad scope of behavioral patterns (these are discussed in Chapter 3). Room for entrepreneurial activities has implications for all our research purposes, especially our third purpose, where we study foreign entrants, initiating the break-up of established patterns of competition. The notion of strategic behavior is beginning to develop within the economic literature (see Scherer, 1984). Here "strategic" is used to denote firm conduct which aims at affecting overall industry structure. Most important, strategic behavior will affect barriers to entry. Through various capital investments, incumbent firms can pre-position themselves, and they can pre-empt competition (as first-movers), thereby deterring entry. Such pre-emption can involve plant capacity, product differentiation, R&D or location (see Gilbert, 1986 for a survey). Even if pricing behavior can affect overall structure, it is not central to the analysis of pre-emption strategies. Pricing is short-term and involves less commitment as price changes can easily be reversed.

Each of the dimensions mentioned above can be linked to strategic behavior. Firms can grow at a higher rate than the industry, for example through acquisitions, which affect the concentration ratio. Product differentiation involves various promotion activities, adding features to the product, location, etc. Through investments in new plants and machinery the cost structure is affected for the individual firm. Output growth can lower unit costs through economies of scale and learning. Furthermore, location of plants and R&D activities (domestically and internationally) influence cost structure. The R&D dimension concerns investments in innovative activities. Entry barriers (and mobility barriers) are raised by activities of individual firms both through positioning within the industry and

through retaliation (or credible threat of retaliation) in the case of entry. We classify these five dimensions of market structure and strategic behavior we classify as single-industry behavior. On the multi-industry level - often referred to as corporate or portfolio strategy - firms enter, expand, contract or exit industries more or less related to the core business, i.e. diversification and vertical integration. Internationalization is also looked upon as a multi-industry activity as firms cross national industry borders.7/

These dimensions of strategic behavior are just a rough classification. A more detailed classification, tailored to our needs of understanding, (a) foreign industry penetration and (b) reaction patterns of threatened incumbents, is presented in Chapter 3.

Number and Size Distribution of Firms

The number of sellers, i.e. seller concentration, predicts different behavioral outcomes as it affects the potential of collusion. The number of sellers is perhaps the most important proxy for monopoly power. Monopoly power implies that firms have some degree of freedom to act strategically. Given that firms can act strategically, the task of creating deterministic models of imperfect markets is complex. Rather than determining behavior, industry structure imposes certain restrictions on strategic choice. These restrictions are highlighted in oligopolies, where firms react promptly to competitors' moves. Entry, exit, and horizontal acquisitions and mergers are examples of strategic behavior that directly affect concentration. Indirectly, changes in other dimensions, which favour large firms, drive a concentration process. For example, investments in larger scale facilities, where scale economies have not been exhausted, disfavour smaller firms which eventually are driven out of business or acquired by other firms.

There exists a rich literature on mergers and "merger waves". (For an overview see Scherer, 1980:118 pp; Stigler, 1950.) Horizontal mergers affect the degree of concentration, whereas vertical and conglomerate mergers do not. However, the two latter types of mergers have an

effect on entry barriers, cost structure etc, and thus have an indirect effect on concentration.

Degree of concentration is closely linked with entry barriers. High concentration implies high barriers to entry and vice versa. In highly concentrated industries, competitors can coordinate their activities (pricing and investment behavior) to block new entry, thereby raising the barriers. In industries where one firm is dominant, the potential to consert activities is substantially increased.

Dominant Firms

It is not uncommon that market power is unevenly distributed throughout an industry. One type of industry that has drawn much attention from researchers is where we have one dominant firm, controlling roughly 40 % or more of industry output (Scherer, 1980:232). If the share of the second firm is close to that market share, the share of the leading firm has to be even larger, to separate the industry from the duopoly (Stigler, 1968:228). The formal models built around the dominant firm hypothesis state that the dominant firm must set the price (essentially a monopoly price), and that the fringe competitors respond in the same way as they would to a competitive market price, i.e. they are price takers. Worcester (1957) made an extension by proposing that if the leader had no special advantages in cost or consumer loyalty, the fringe competitors would slowly gain market shares at the expense of the leader. In other words, in the long run the leading firm's dominant position would disappear. However, this prediction can to a smaller or larger extent be offset by growth in demand. One hypothesis states that the decline is slower the more rapidly demand grows. A counter-hypothesis states that the decline is faster the more rapidly demand grows, the rationale being the increased incentive for entry of new firms (Scherer, 1980). There exists no firm empirical evidence concerning how long periods dominant firms manage to keep their positions for. In periods when there exists a leader, the potential for stability is raised. Stigler showed that a dominant firm is in a better position to arrange collusive agreements than a set of smaller firms, together

controlling the same market share (Stigler, 1964). Thus, the dominant firm can manipulate barriers to entry.

The model of a dominant firm emphasizes the role of an individual firm in determining industry structure. In the simple model, the dominant firm can manipulate industry structure (number of firms) by its choice of price. The optimal price chosen by a dominant firm depends upon its cost advantage vis-à-vis the fringe competitors, the rate of entry, and the discount rate.8/ In more complex models, other variables can be introduced by which the leader can affect industry structure. Hence, in industries where we have a clear leader, industry structure can more directly be manipulated through strategic behavior. US industries that have drawn a lot of attention in this respect include: Steel - US Steel, Rayon - American Viscose Company, Ball Point Pens - Reynolds International Pen Corporation, Food Containers - American Can, Copying Machines - Xerox (Scherer, 1980:239). A number of empirical studies have shown a decline in profit rates over the long run among dominant firms. However, even if the profit rates of these firms decline over time, empirical evidence tends to show that they are not driven down to the competitive level (Mueller, 1977; Odagiri & Yamawaki, 1983).

In recent works, more attention has been drawn to dominant firms and their impact on competition (for a survey see Encaoua, et al, 1986). In summary, dominant firms affect both current behavior of competing firms and future behavior by altering industry structure. Furthermore, behavior of potential entrants is affected as entry can be either induced or barred.

International Concentration Ratios

The degree of concentration is defined within industry borders. If competition is becoming increasingly international, it is not perfectly clear which firms to include in the industry, and thus it is not possible to calculate the concentration ratio. The existence of international competitors adds to the complexity of understanding industry structure and strategic behavior. Until a certain point,

concentration ratios calculated within national boundaries make sense, working as a rough estimate of monopoly power. However, beyond this point, when competition is no longer national in character, concentration ratios must be calculated accordingly, within the wider international industry. The problem, however, is to draw the geographical border lines. How much trade, FDI and other cross-border activities are needed in order to wipe out national borders? Such methods and empirical bench-marks are still to be worked out (which is outside our scope). Most studies have not considered this issue, and thus researchers have implicitly assumed that the national industry is the relevant unit of analysis.

In the context of this study, it is important to understand both national structural traits and international structural traits, since the two levels of analysis overlap. We can imagine the two levels in modelling oligopolistic rivalry, where strategic behavior on both levels interacts. Competition in a national market can consist of both national firms and international firms. MNE behavior in a national market can be purely national, or can be dependent upon interactions with competing international firms in other markets.

The basic theoretical implications of international concentration ratios are the same as for national concentration ratios. Thus, the potential for collusion is raised in international oligopolistic industries as compared to more fragmented international industries (such as commodities traded on international exchanges).

Cost Structure

The cost structure is related to the production technology used by the firm, the nature of the product, and overall firm size. The cost structure is altered both through exogenous changes, such as the application of new technology developed outside the industry, and through the behavior of incumbents.

One economic rationale for the growth of a firm is to utilize economies of scale.9/ Every cost element in a firm's production

function possibly holds some fixed element. A taxonomy of scale economies is offered by Scherer. He divides scale economies into three categories: product-specific economies, associated with the volume of any single product; plant-specific economies, associated with the total output of an entire plant or plant complex; and multi-plant economies, associated with an individual firm's operations (Scherer, 1980:81). Economies coupled with several product lines - multi-product economies - (plant-specific economies, where the cost of producing two products in combination is less than the total cost of producing each product separately) are referred to as economies of scope (Baumol, et al, 1982).

In a dynamic context, the learning effect changes the cost structure as more learning is gained. The traditional concept of learning on the shop-floor level has been extended to include the whole organization - the so called experience curve.10/ Empirical work on the experience curve has not gained much support (Hall & Howell, 1985). It is also maintained that the experience curve concept mixes together two concepts - static economies of scale and dynamic product and process technological changes, i.e. learning (Porter, 1984:419). Learning and experience only constitute absolute cost advantages if kept proprietary.

In order to treat cost structure in a dynamic context, it is important to understand how unit costs vary with output. Do scale economies and learning effects continue eternally? A long-run cost function is often characterized by rapidly falling unit costs at low outputs, down to a level, usually referred to as minimum efficient scale (MES), where it flattens out. Theories dealing with inefficiencies in large scale organizations support the view that the unit cost curve at some point turns upward.11/ The movement between different output volumes is restricted by the need for new capital, management, etc in the case of growth, and the costs of closing down plants, etc in the case of volume reduction.

The distance between production and consumption, translated into transportation costs, can prevent the firm from fully utilizing scale

economies. Through multi-plant activity, a firm can create production networks with decentralized, less scale sensitive activities (such as final assembly), and centralized scale sensitive activities (such as component manufacturing).

Economies of scale related to firm size (multi-plant economies) are associated with advertising (brand recognition across a number of product lines), physical distribution, production, sourcing and management. Such economies drive firms to enter new industries once the growth potential in the core business is exhausted. The firm can either integrate vertically, diversify into new product lines, or go international. Furthermore, firm size is associated with bargaining power vis-à-vis suppliers of materials and components, capital and other services, so-called pecuniary economies (Scherer, 1980:104). The bargaining power argument can also be applied to customers (Porter, 1976; 1980).

Cost of capital is related to firm size. Large scale transactions including fixed cost elements, such as negotiating a loan, lower transaction costs. Larger firms can also lower their costs of capital due to risk reduction. Investments in large corporations are less risky as product diversity creates stability, and thus larger firms can lower their cost of capital.

Gaining Cost Advantages Through International Operations

Much of the traditional trade and FDI literature emphasizes incentives of reducing costs as a main driver of the internationalization process of the firm. Ohlin (1933) pointed out that economies of scale in production work as an incentive for international specialization, which eventually will lead to trade (Helpman & Krugman, 1985:Ch 2). The importance of scale economies in international trade was also recognized by Burenstam-Linder (1961). Typically factor market-oriented FDI has been explained by lower labour costs, and market-oriented FDI and trade by enhanced economies of scale (see Kindleberger, 1969). The MNE must attain multi-plant economies,

otherwise the export mode should be preferred. Through the coordination of purchasing, manufacturing (components and/or finished products), R&D, marketing and distribution across a number of national industries, the MNE can enhance economies of scale. Scale economies are more pronounced the more homogenous demand is worldwide, and the more freely goods can be moved. Homogeneity is typically found in upstream activities, such as component manufacturing (Porter, 1986:Ch 1). Economies of scale (at the plant level) can also disfavour the MNE if foreign plant output is below MES, and favour the exporting firm (Caves, 1982:95). A cost of capital hypothesis has been brought forward by Aliber (1970).

In an empirical investigation of US FDI into the UK market, it was shown that the US firms did profit from firm economies of scale (multi-plant economies), which turned out to be much more important than economies at the plant level (Buckley & Dunning, 1976).

Product Differentiation

The product differentiation dimension separates homogenous from differentiated oligopolies and perfect competition from monopolistic competition. Industries characterized by product differentiation exhibit significant heterogeneities in the product (and its various attributes) offered on the market.

Ever since Chamberlin's work on monopolistic competition, it has been recognized that firms can have other "parameters of action" than price or quantities. Clearly, the profit-maximizing firm strives to gain competitive advantages, and thereby an incentive for product differentiation is created. Product differentiation, meaning that each seller faces an individual downward-sloping demand curve, is connected to two phenomena: economies of scale due to some fixed cost elements, and costs of information to guide buyers' choice among brands. Scale economies prevent suppliers from differentiating according to each buyer's specific needs (Rosen, 1974). Dependent upon a number of factors, such as earlier experience of a product, advertisements, independent tests, etc, buyers perceive different

brands differently. Often the buyer faces a trade-off between the cost of information and its accuracy. (For a discussion see Caves & Williamson, 1985.) With different information sets among buyers, products are differentiated in spite of homogenous preferences.

Product differentiation involves long-term commitments in the form of investments made to increase the quality of the product, increase brand recognition and the like. Thus, product differentiation is not a variable that the firm can manipulate as easily as its pricing behavior (Scherer, 1980:375). Sellers can differentiate their products in a number of ways. The main standards for differentiation include: location,12/ service, physical differences in product attributes, and the image perceived by the consumers.13/

Clearly, firms make choices regarding different attributes of the product. In most markets, whether they be consumer goods, industrial goods or services, we find various segments ranging from high price - highly differentiated products to low price - commodity-like products. Over time, these differentiation efforts will have an impact on the overall industry structure, in that barriers to entry will increase vis-à-vis de novo entrants. However, a combination of competition among incumbent firms, where successful differentiation is imitated, and entry (or threat of entry) by new firms (domestic or foreign), will create a pressure to level out any monopoly power stemming from differentiation. Thus, to sustain differentiation, continuous investments are needed. Such investments involve service, advertising and other promotional activities (Scherer, 1980:386). Technological innovations, leading to new products and processes, serve as parameters of differentiation, which in turn is associated with a temporary monopoly power.14/ However, over time, as customers and other potential competitors get used to the new technology, the technological advantage disappears, and thus an incentive is created for the profit-maximizing firm to use other parameters, such as service, new added features, etc, to keep up the differentiation advantage. Through continuous investments in product differentiation, threats from substituting products and technologies, competing firms and potential entrants can be reduced.15/ Levelled-off demand can

also spur product differentiation. By adding new features to a product, or even introducing new products (e.g. yearly models), replacement demand can be increased (Valdelin, 1974). Total demand can be expanded through collective differentiation efforts.

In oligopolistic industries,16/ where a firm's decision to differentiate its product takes into account the rivals' moves, there is an incentive not to make such moves that would draw sales away from rivals and stir up the market. Instead, joint action, implicit or explicit, is a way to maximize collective profits. Thus, in oligopolistic markets there is an incentive to divide both the product space and geographical space into territories. This can be facilitated by choosing different focal differentiation parameters, i.e. different locations, brand image, etc.

Expected retaliation clearly differs depending upon how many oligopolistic actors there are, and how easy it is to imitate the differentiation move. In the classical case of duopolistic price rivalry, where both firms clearly see each other's moves and where price changes are easily imitated (and easily reversed), a cooperative solution is expected. Differentiation moves, on the other hand, often take some time to imitate, and involve investments which might erect exit barriers. In the case of many actors, it can take some time before the laggards realize changes in the market-place. Thus, if an oligopolist realizes that his differentiation move will be difficult to match, and if competitors have a historical record of lagged response, a differentiation move can pay off.

In the same way as continuous price wars are disastrous to collective profits, excessive advertising outlays are disastrous to collective profits (this could be called "differentiation wars"). This in turn can create an incentive for restructuring the industry through acquisitions (Cook, 1958). An alternative solution is the creation of "advertising cartels" in order to cut down on advertising expenditures (Scherer, 1980:389 ff). Fellner (1949) argued that non-rivalrous advertising would only be found in very mature oligopolies.

Exploiting Product Differentiation in International Markets

The traditional FDI literature is built around the so-called ownership-specific advantages,17/ which is looked upon as a necessary (but not sufficient) condition to explain the existence of MNEs. These ownership-specific advantages have often been connected to product differentiation, e.g. trade marks (Caves, 1971; Kindleberger, 1969). If a firm's monopoly power, created in the home industry, can be transferred to foreign industries at low cost, this would make it a likely entrant. Horst (1974) showed that firms in the US food-processing industry following a strategy of building up brand recognition, i.e. product differentiation, were much more active in investing abroad than those firms following a low-cost strategy with focus on the logistical functions.

As Caves pointed out, several of the intangible assets normally connected with MNEs are akin to product differentiation. Either these intangible assets are in the form of specific properties (such as a trade mark), or the skills are shared among the firm's employees (Caves, 1982:4). Team skills, which are not easily detachable from the firm, favour hierarchial solutions especially.

Apart from exploiting product differentiation, the MNE is often faced with the opposite problem, namely to increase differentiation in order to serve diverse needs world-wide. Demand heterogeneity is based on consumer preferences, technical standards, level of sophistication, etc. The MNE faces a trade-off between adapting products to the various geographical markets and exploiting economies of scale. The international marketing literature has addressed the question of heterogeneity versus homogeneity in demand across markets, and how this will affect product design, marketing communication, etc. International competition has often been connected with homogenous demand across markets and, hence, the sales of one product design world-wide (sometimes with only one message as in cosmetics and soft drinks). The world-wide product concept is also connected with technology-intensive producer goods. As Holton noted: "The world of advanced technology is more nearly a single world than is the

world of consumer goods" (Holton, 1970:18; see also Levitt, 1983:Ch 2).

Research and Development

Effective long-run protection against competition from incumbents and new products and processes (substituting your own technology) lies in the firm's ability to anticipate or match threatening innovations in processes, products and new marketing techniques (Penrose, 1963:113). These threats create incentives for continual investments in R&D, more efficient production structures and product differentiation, and thus industry structures will be under constant change. R&D and product differentiation clearly overlap where differentiation is a major goal of R&D. However, the product differentiation dimension also includes non-technical elements, such as location and service.

Technological change is maybe the most important driver of structural change. Schumpeter's notion of creative destruction is based on technological change and introduction of new products. Continuous technological evolution prevents industry structures from petrifying. As Schumpeter puts it:

> "The impact of new things - new technologies for instance - on the existing structure of an industry considerably reduces the long-run scope and importance of practices that aim, through restricting output, at conserving established positions and at maximizing the profits accruing from them."
> (Schumpeter, 1942)

On the one hand, we have major technological breakthroughs (computers, factory automation equipment, robots, etc) affecting a range of industries. On the other hand, we have day-to-day innovations performed by incumbent firms. The importance of such everyday adjustments in developing competitive advantage has been stressed in empirical works (Carlsson, 1979). The links between technological change and industry structure are complex. Proprietary technology such as patents create entry barriers (absolute cost advantages). Furthermore, there are several indirect links between R&D and BTEs. For example, altered methods of production and distribution affect

cost structures and also the potential for product differentiation. These changes can be favourable to some firms and detrimental to others, which in turn affects industry positions, and in the long-run, size distribution and levels of concentration. As Scherer noted:

> "Major innovations often bring new firms to the fore and displace laggards, defining the structural conditions within which price and other more static forms of rivalry are conducted for decades to come."
> (Scherer, 1980:408)

New technologies can be brought into the industry through entry of new firms, such as foreign entrants, or customers integrating backwards. Substituting products and processes can also undermine the structure of a whole industry.

The opposite causal link, from market structure to innovation activity, is usually connected with another of Schumpeter's hypotheses. According to him, some form of temporary monopoly power (such as patents, copyrights, trademarks or first mover advantages) is necessary to induce innovation activity (Schumpeter, 1942). The argument has been countered by the need for competition in order to induce firms to take risks involved in innovative activity. Galbraith (1952) advocated the idea that large firms are needed to efficiently carry out modern day large-scale research (involving high risks and large financial commitment). This argument is related to the aspects of cost structure, such as learning and scale economies (laboratory equipment, financing, etc). Large firms can also gain economies of scope by adding new products into existing distribution channels, making product development more attractive.

More recent models of industry structure and innovation take the view of a race, where the winner is awarded certain profits. Intensity of rivalry, possibilities of imitation (so called fast second) etc affect these races (Kamien & Schwartz, 1982:Ch 4; Dasgupta, 1986). An alternative to racing (as an innovator or imitator) which has not drawn much attention is to cooperate on R&D, reducing risk and need for capital (Rolander 1983; Porter & Fuller, 1986).

The notion of technical uncertainty, generating market uncertainty, has been brought into game theoretic approaches (Kamien & Schwartz, 1982: Ch 5). All innovative activity entails a random component, where chance often plays a role in the discovery of new scientific principles.

In summary, theoretical and empirical works on industry structure and innovation show two-way causality links. Important dimensions of these interdependencies include: incentives for innovative activity, how industry structure is affected by such activity and the role of technological uncertainty. According to Nelson and Winter:

> "Market structure should be viewed as endogenous to an analysis of Schumpeterian competition, with the connections between innovation and market structure going both ways. It is surprising that studies concerned with the Schumpeterian hypothesis have largely neglected the reverse causal linkage." (Nelson & Winter, 1982:116)

R&D and the Multinational Enterprise

Technological know-how is another - and maybe the most important ownership-specific advantage, on which MNEs have based their international growth (Kindleberger, 1969). Empirical studies conclude that both trade and FDI are positively related to R&D activities (Caves, 1982; Swedenborg, 1979). Furthermore, the product cycle model is based on the assumption of an innovational lead among US firms (Vernon, 1966; Wells, 1972).

The research intensity appears much stronger as a predictor of FDI activity in industrial sectors than in consumer goods sectors (where advertising appears more strongly), mirroring the fact that the importance of various intangible assets varies across industries (Caves, 1982:9).

Diversification

Even if we treat the industry as the fundamental arena on which firms compete, multi-industry activity is the rule rather than the exception among large firms. There is also empirical evidence of moderately diversified firms being successful (Rumelt, 1972). There are several explanations of diversification related to market imperfections and managerial discretion. Furthermore, risk reduction explanations have been applied (Gort, 1962). Multi-industry activity also offers new opportunities for cross-fertilization of R&D, market know-how, etc between product areas. In slow-growing oligopolistic industries, firms can overcome entry barriers into adjacent industries by transferring absolute cost advantages (such as lower cost of capital), excessive managament capabilities and the like. Skilled management may also possess the capability to screen and evaluate new market opportunities more effectively, reducing the cost and uncertainty of an entry decision (Caves & Porter, 1977:258). Horst's study of the American food-processing industry showed that diversifying firms had a comparative advantage over de novo entrants in entering industries characterized by large entry barriers. Targets for diversifiers turned out to be the less differentiated industries (Horst, 1974:67).

The limitations to growth in a single business have been emphasized by Penrose (1963) as a basis for diversification. The potential for growth is not only associated with overall industry growth. The size distribution of firms can also affect the growth potential. Thus, Gort (1962) showed that firms, in industries characterized by dominant sellers, were more apt to diversify, given the constrained growth potential.

First mover advantages through industrial innovation (e.g. patents) can attract the firm into new product areas (Penrose, 1963:115). Gort (1962:6) showed that firms diversified mainly into industries characterized by high growth and rapid technological change. Since entry into these industries requires substantial amounts of capital, it gives support to the lower cost of capital hypothesis. Rapid

technology change turned out to be the main decisive factor. There also exist tax incentives for diversification. Rather than paying out dividends to stockholders, which would be taxed, the firm diversifies its operations instead of the stockholders diversifying through their portfolio.18/

The Diversified MNE

By combining two dimensions of diversification (product-wise and geographically), the diversified MNE can be explained by risk-reduction motives (Caves, 1982:24). Thus, the MNE can earn a more stable stream of profits if it makes portfolio investments across a number of countries where economic fluctuations are less than perfectly positively correlated (Hood & Young, 1979:52). Also, changes in exchange rates and terms of trade favour profits in one country while worsening them in others (Buckley & Casson, 1985). Empirical evidence confirms that MNEs enjoy diversification gains, which are enhanced by the diversified MNE (Rugman, 1979; Hennart, 1982). However, diversified MNE activity is of little importance if compared to horizontal and vertical MNE activities (Caves, 1982).

Vertical Integration

As Gort pointed out, there is no uniform principle across industries which separates out distinctive vertical production processes. He proposed that stages of production could be identified as being separable if they could be performed successfully under separate ownership (Gort, 1962:12). Thus, the fact that there exist firms successfully performing narrow vertical activities would define these activities as separate production stages. However, this is not a clear-cut definition as market imperfections distort the picture. The transaction cost approach, on the other hand, offers a framework which is based on economic principles, rather than Gort's empirical definition.19/

The vertical chain involves a series of transactions. Such transactions involve transaction costs. Depending upon the type of transac-

tion, its frequency, etc, these transaction costs vary. According to Williamson, Teece, and others, transaction costs are generated by the absence of complete markets, due to uncertainty, bounded rationality, and recontracting hazards due to small numbers (thin markets) and opportunism (Teece, 1982:3). The transaction cost approach derives back to Coase (1937). Coase pointed out that vertical integration varies from industry to industry, and from firm to firm. The question he addressed was on what basis the choice between entrepreneurial coordination and market coordination through the price mechanism was made (Coase, 1937:389). The answer proposed was that there are different costs associated with the price mechanism and the firm (the hierarchical solution). Transaction costs are dependent upon costs of negotiating and concluding separate contracts (following from each transaction). Furthermore, the complexity of the transaction and the length of a contract influence the cost of using the market mechanism. According to Coase, we would expect the firm mechanism to be more effective than the market, where long-term contracts are needed and where transactions are complex. Also, an increase in the spatial distribution of transactions organized, in the dissimilarity of the transactions, and in the probability of price changes, would increase transaction costs (Coase, 1937:397).

In later works, aspects of market power have been brought into the analysis. With the presence of "small numbers" markets (i.e. high concentration), incentives for vertical integration are created for buyers facing inefficient input markets (Teece, 1982:23). As Williamson pointed out, transaction costs can be lowered not only through vertical integration, but also through incomplete contracting with informal enforcement (Williamson, 1975:107). Mutual trust and high stakes in business reputation strengthen a relationship, independently of the contract used. Business reputation (being important in repeat businesses) can in itself constitute an important asset (Macaulay, 1963, as referred to in Williamson, 1975:108).

The height of industry barriers are dependent upon vertical integration, as capital requirements are increased when entering into a combined integrated production process. Vertical integration can also

serve as a vehicle of price discrimination (Stigler, 1968:303). If price discrimination is threatened due to arbitrage between different sets of buyers, there is an incentive to acquire the more price elastic buyers to prevent them from arbitrage (Williamson, 1975:110). The capital requirement argument has been criticized (see Bork, 1969; Bowman, 1973), since the cost of capital is not related to the size of the investment in a well-performing capital market. However, bringing in incomplete information on the lender's side and reputation on the borrower's side (risk of opportunistic behavior), capital requirements clearly act as barriers.20/

Development of New Products and the Vertical Chain

Product development is both supply and demand driven, involving actors along the vertical chain. In many circumstances, it is of the utmost importance to the supplier to have a good understanding of the buyers' needs. This creates a strong incentive for close technical communication between the supplier and buyer. Freeman (1973) showed that successful innovation was related to a good understanding of user needs. Utterback (1974) reported that some 60-80 % of important innovations have been in response to market demand and needs.

Teece classified innovations into those that require major readjustments in the production process - systemic innovations - and those which do not require such changes - stand-alone innovations (Teece, 1982:52). According to his hypotheses, the vertically integrated company would be the most efficient to handle systemic innovations, while small non-integrated companies could efficiently handle stand-alone innovations.

Innovations clearly affect vertically related firms asymmetrically, as firms along the vertical chain need to undertake investments in changing the manufacturing process, logistical functions and marketing. These changes create uncertainty (future costs and benefits for the vertically related counterparts). Such uncertainty in turn creates incentives for vertical coordination, either in-house or through extensive networks.

Delivery Standards and the Vertical Chain

Firms sensitive to the quality of component inputs or equipment, and which are dependent upon greater reliability standards than are generally available in the market, have incentives to internalize forward and backward operations. The rationale to internalize becomes even stronger if the quality products are to be engineered and cannot be specified ex ante (Teece, 1982:7). Errors due to inferior quality of components and the like, which are critical to the success of the whole organization, create incentives for vertical integration.

In order to create efficient logistical systems, there is a need to coordinate vertical stages. Especially if a firm along the vertical chain has invested in product differentiation, related to prompt and safe deliveries, coordination becomes critical. This need for vertical coordination affects vertical relationships, depending upon how important coordination is to each individual firm's success.

The Vertical Power Balance

So far, we have discussed the merits of vertical coordination. We have also touched upon vertical integration as an entry barrier and the significance of the small numbers problem. Let us now examine the issues of imperfect markets along the vertical chain more closely. Power associated with the fewness of buyers is modelled in the monopsony and oligopsony, and if linked to the fewness of sellers, in the bilateral monopoly and bilateral oligopoly. It has been shown that vertical integration acts as a vehicle to joint profit maximization between firms in adjacent vertical stages (Scherer, 1980:300).

In a power perspective, vertical integration can be explained by the bandwagon effect. Thus, the threat of an intra-industry shift in power spurs followers to integrate vertically in self-defense. Such rivalrous behavior has been shown in the US cement industry (Allen, 1971) and semi-conductor industry (Webbink, 1977). Unlike other entrants, vertical entrants will establish in-house markets, and thus there is less fear of pricing reactions from established firms.

Threats of vertical integration can be more visible and real if a firm has some degree of integration or close cooperation (A phenomena called "tapered integration", Scherer, 1980:309; Porter, 1980:301.) The threat is also stronger if the potential entrant is large enough to reap full economies of scale from its integration move.

The existence of competitive pressures between vertically related firms, i.e. monopsony versus monopoly power, was introduced as the concept of countervailing power by Galbraith (1952). Galbraith concentrated on the rise of powerful retail chains. The power argument, however, has been countered by efficiency arguments. Hunter (1958) argued that chains were developed to exploit economies of scale. Porter argued that the major element of retailer power results from its ability to influence product differentiation. This influence in turn "flows from consumer-buying behavior reflecting intrinsic product traits" (Porter, 1976:51). Porter argued that for highly differentiated convenience goods (with strong manufacturer brand image), the power of manufacturers vis-à-vis retailers is significant, even with the prescence of chains.21/

In the negotiation process a number of tactics are used, such as bringing in second and third sources on a short-term basis, arranging misleading price quotes, etc (Scherer, 1980:308). Several factors affect countervailing power: differences in concentration in buying and selling industries, differences in firm size, size of purchases, the importance of the product to the buyer (importance to product differentiation, such as quality standards), cost of switching buyer or supplier, differences in technical and market know-how, and excess capacity.22/

The Vertically Integrated MNE

In the discussion above, we have reported on both economic and power related explanations to vertical integration. The transaction cost approach, especially, has been used to explain common ownership of production units - both horizontally and vertically - across nations. As Caves put it:

> "The vertically integrated firm internalizes a market for an intermediate product, just as the horizontal MNE internalizes markets for intangible assets."
> (Caves, 1982:16)

In the case of the vertically integrated MNE, production units are located according to locational pressures: mines are located where raw material sources are located, R&D facilities where scientists are found at low cost, labour-intensive assembly in countries with low labour costs, energy-intensive process industry in countries with low energy costs, etc. Empirical research on vertically integrated MNEs has focused on extractive industries (e.g the oil industry).

2.3 BARRIERS TO ENTRY

In the section above, we have outlined six important dimensions of industry structure. First, these dimensions interact in several ways, second, they are to some extent determined endogenously, and third, the six dimensions all have a profound influence on barriers to entry. It has not been our purpose here to make an exhaustive list of such linkages, but rather to show that these interdependencies exist. In Figure 2.1 these linkages are summarized.

Structural dimension	Implications for entry barriers
Degree of concentration	Potential for collusion
Cost structure	Economies of scale, proprietary learning
Product differentiation	Brand loyalty, switching costs
R&D	Absolute cost advantages based on proprietary technology (e.g. patents)
Diversification	Economies of scope, opportunities for cross-fertilization, cost of capital advantage
Vertical integration	Economies of joint operations, cost of capital advantage, price discrimination

Figure 2.1: Six important structural dimensions and implications for entry barriers.

Finally, each dimension was briefly linked to the MNE. Here it was shown that ownership-specific advantages developed within the home country (on which barriers to entry are built at home) can help to explain the existence of MNEs. MNEs have in their possession intangible assets permitting them to enter foreign industries. Thus, it is reasonable to expect that entry barriers imply different things for potential domestic entrants and potential foreign entrants. Below, we will elaborate on barriers to entry surrounding the international industry.

The early works on entry barriers (Bain, 1956), including the basic elements of: economies of scale, absolute cost advantages and product differentiation, only recognized such barriers vis-à-vis de novo entrants (bringing in new production capacity). In later works, the concept of entry barriers has been refined in several ways. One major contribution is the recognition of entry by established firms. These firms possess various resources, or "platforms" (Yip, 1982) from which they can enter the industry at various costs. Given various entry positions (sometimes labelled queue positions), one can talk about the "most likely potential entrant" (Williamson, 1975:169). Yip argues that these platforms, created by advantages from scale, cost of capital, risk reduction, assets in the form of technical superiority and product differentiation etc can be of such magnitude that the potential entrant in fact faces negative barriers. For example, a large established production base, which can be used in the new industry, offset scale-related barriers. Complementary technology can make patent by-passing possible, and trademarks can sometimes be transferred. The outside firm can possibly acquire capital at the same cost as incumbents. From this follows that entry is more likely for already established firms than for de novo entrants (Hines, 1957, as quoted in Encaoua et al, 1986:60). Established firms might enter from unrelated product areas (conglomerate entry), or from vertically and other related industries (vertical integration and diversification), or from other national industries (if competition is segmented geographically).

In addition to resource heterogeneity among potential entrants, Yip also introduced the concept of heterogenous competitive strategies used by the entrants, utilizing technological shifts, avoiding direct competition and directly negating barriers (Yip, 1982). Furthermore, he considered direct entry versus entry through acquisition. With these additions, the old concept of structural barriers is put in a new light, and they have been shown not to be as powerful in preventing entry as earlier predicted (Yip, 1982:130). Some economists have developed the concept of contestable markets, arguing for frequent "hit-and-run" entry if exit barriers are low. Now the entry barriers are a result of sunk costs which cannot be recovered in case of exit. The entry barrier is thus defined as: "anything that requires an expenditure by a new entrant into an industry, but that imposes no equivalent cost upon an incumbent (Baumol & Willig, 1981:408).

Porter summarized seven major sources of entry barriers, bringing in relationships along the vertical chain and governmental involvement. These sources include: economies of scale, product differentiation, capital requirements, switching costs for buyers and suppliers, access to distribution channels, cost disadvantages independent of scale (such as proprietary product technology and learning effects), and government policy (Porter, 1980:7).

Added to these structural aspects of entry barriers, we have a behavioral side. Incumbent firms perform certain activities in order to deter entry. These activities interact with structural features to create barriers. Spence (1984) proposed two quite distinct parts of entry-deterring behavior. On the one hand, firms act prior to entry, influencing potential entrants' anticipation of possible reactions, if they decide to enter. On the other hand, certain actions will be taken if entry occurs. The moves made prior to entry can be thought of as positioning, while response to entry can be looked upon as reactions (Spence, 1984:45). Positioning is a somewhat ambiguous term as it includes all behavior that will add competitive advantages to an incumbent, both vis-à-vis competing firms and potential entrants. However, even if these two effects cannot be separated, it is clear that incumbents can affect expectations among potential entrants,

i.e. entry barriers, by investing in, for example, plant capacity and product differentiation. Thus, entry barriers are partly endogenous (Caves & Porter, 1977:241). Short-run entry-deterring actions include predatory pricing and legal moves.

Scherer divided strategic deterrent behavior into: pre-positioning (investing in reserve capacity to enhance one's price-war fighting credibility), pre-emption (being the first mover) and building up expectations of irrational reactions (Scherer, 1984:17).

There is also another vein of research focusing upon the incumbents. Here intra-industry heterogeneity is recognized, and the incumbents are divided into several subsets, defined by differences in their strategic configuration.

Mobility Barriers - Strategic Heterogeneity Within Industries

The concept of mobility barriers offers a tool to separate various subsets of competitors within an industry (Caves & Porter, 1977; Porter, 1979). Such mobility barriers impede industry members from changing their strategic posture without significant costs. By introducing mobility barriers, we accept that incumbents differ in important respects other than size. Heterogenous strategies reflect firms' striving to achieve a sustainable competitive advantage (Porter, 1984:418). Industry subgroups have been termed strategic groups (Hunt, 1972). Still, industry boundaries are valid, since firms from various strategic groups compete with similar products in the same market segments (Caves & Porter, 1977:251). Thus, two firms producing similar products have different degrees of insulation from rivalry, different bargaining positions vis-à-vis buyers, etc, however, facing the same market growth and structure of suppliers and buyers.

The number and dispersion of strategic groups affect rivalry. Hunt argued that asymmetrical strategies reduce the potential for collusion in setting prices, R&D expenditures, advertising rates and the like (Hunt, 1972). Thus, the likelihood of inter-group rivalry

increases with the number of groups, and equality in size (Porter, 1976:85). If there are only few groups, or if one group clearly dominates the other groups, the potential for collusive behavior is raised. It is also important for rivalry whether several groups serve the same market segments, i.e. if there exist market interdependencies, and whether strategic dissimilarities are small or large.

Empirical research on the existence of strategic groups has shown strong evidence of such sub-groups within some industries. Different dimensions separating strategic groups have been used. The main ones include: degree of diversification (Hunt, 1972), degree of vertical integration (Hunt, 1972; Newman, 1973), and number of brands (Hatten, 1974; Hatten & Schendel, 1977). Porter also included in his list: level of fixed costs, extent and media composition of advertising, outlays of R&D to total sales, geographically served markets, nature of distribution channels employed, and presence of in-house servicing capacity (Porter, 1979:215).

If we summarize our theoretical discussion so far, we can model three building elements regarding industry structure and structural change (still in a domestic sense). See Figure 2.2.

With this model, three things are emphasized: (1) elements of industry structure are interrelated, (2) industry structure and strategic behavior are interrelated, where industry structure is partly given endogenously, and (3) barriers to entry are the outcome of strategic behavior of firms (retaliation and credible threat of retaliation) and various structural dimensions - which in turn are affected in the long-run by strategic behavior (positioning). In this model we have not accounted for exogenous disturbances (see discussion in section 4 of this chapter).

Barriers to Entry in an International Perspective

We have already touched upon the issue of entry position among potential domestic entrants and potential foreign entrants. This is an area where little research has been done. However, one study of US

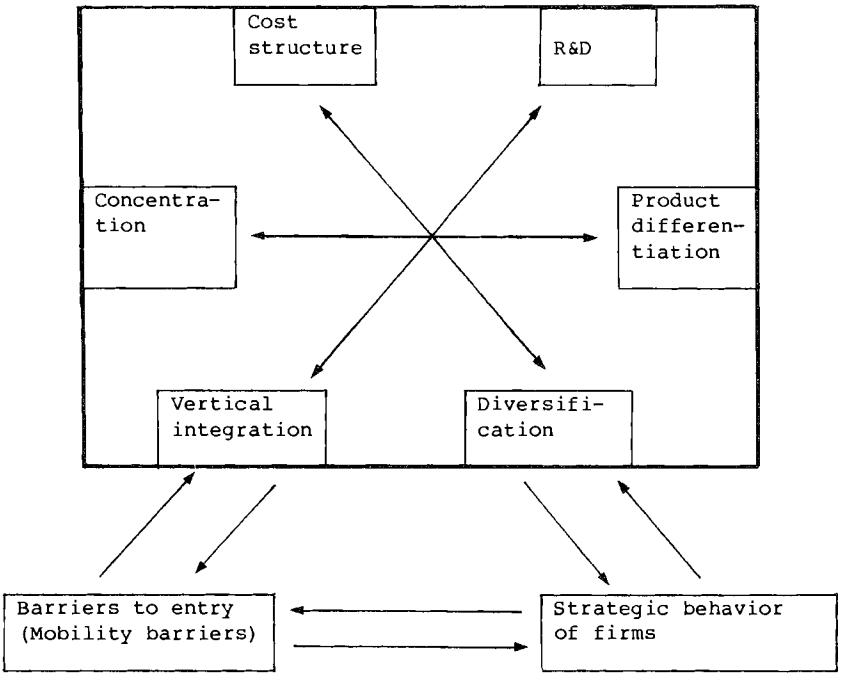


Figure 2.2: A framework - elements of industry structure and structural change.

MNEs in the United Kingdom, carried out by Buckley and Dunning (1976), revealed that some entry barriers are more formidable to indigenous firms than to foreign firms having access to parent resources. The foreign entrants turned out to have a comparative advantage in overcoming entry barriers vis-à-vis indigenous firms based on skilled labour, entrepreneurial resources, R&D and control of know-how, and a concentrated market structure (Buckley & Dunning, 1976:10). This hypothesis about foreign firms facing lower entry barriers than domestic firms is quite clear-cut. However, emerging international competition adds a new dimension to national industry barriers, namely the erection of entry barriers around the emerging international industry. Now we face two levels of analysis - the national and the international level. To be able to grasp the international dimension of competition, we must first make clear that

firms active in an international industry possess competitive advantages which are intrinsic to their international operations. Traditional ownership-specific advantages make the international growth process possible - a growth process that will eventually lead to new experiences and new intangible assets.23/ By locating various activities in various countries, the MNE can add competitive advantages by exploiting comparative advantages connected to certain countries (Dunning, 1981). Thus, R&D activities can be located in close connection with the world's leading universities within a specific scientific discipline, assembly operations to countries with low labour costs etc.24/ FDI decisions among highly internationalized MNEs are based on new types of competitive advantage (Hedlund & Kverneland, 1984:48; Johanson & Mattsson, 1985:172), rather than on exploiting initial advantages built up in the home country. This search for new advantages involves both worldwide optimization and the creation of new advantages from combining information (e.g. technical information between laboratories in various countries or market intelligence) from several sources (Vernon, 1979) - a sort of cross-fertilization.

The lack of such an understanding, in traditional models of FDI activity, has been conveyed especially by Kogut (1983, 1985) and Porter (1986). Kogut noted:

> "Recent models of direct foreign investment have tended to down-play these advantages of a coordinated multinational system; rather, they have stressed the motivational behavior arising out of essentially national factors and market imperfections, e.g. proprietary knowledge, domestic industrial structure, and product differentiation. The neglect of the advantages of multinationality obscures, though, an important distinction between the original motivations to establish plants in foreign countries and the subsequent investment decisions."
> (Kogut, 1983:38)

We have already touched upon the eclectic theory.25/ The concept of creating competitive advantage through international optimization and cross-fertilization could be included in this general framework. Dunning's classification of ownership-specific advantages, i.e. better access to: market information, input markets such as raw

materials, capital and management, distribution and trade marks, and finally economies of scale and vertical integration (Dunning, 1973), is broad enough to include both these concepts. However, the eclectic framework does not help us to sort our competitive advantages created in the home country and competitive advantage stemming from international operations.

As noted by Kogut (1983), the potential of optimization and cross-fertilization comes in rather late in the internationalization process of the firm, and is the result of a sequential growth process. It is thus important to understand the creation of competitive advantage in a dynamic perspective. The dynamic approach offered to our understanding of FDI has traditionally been the product cycle model.26/ But again, this model does not help us to understand how firms can reap new competitive advantages from extensive international operations.

Dunning and Cantwell made what they considered a dynamic interpretation of the eclectic paradigm in an empirical study of US post-war activities in Europe. Here it was shown that values of ownership, locational and internalization advantages changed over time (Dunning & Cantwell, 1982). However, they did not explore how competitive advantage changed among US firms, as they were building up networks of manufacturing and sales subsidiaries throughout Europe. Thus, the eclectic theory does not analyze the new opportunities generated by multinationality (Kogut, 1983:42).

The question of how firms can reap advantages from their international operations is now receiving more attention in the literature. Kogut made a distinction between operational flexibility within a multinational system, and the structural elements of plant location and the elimination of transactional costs (Kogut 1983:42). Along the same lines, Porter (1986) has argued that the MNE in its search for competitive advantages makes strategic choices regarding configuration of activities and coordination of activities within the multinational system. Certain choices are more or less favoured depending upon structural characteristics, such as economies of scale, propri-

etary learning in the activity, comparative advantages, and advantages of co-locating linked value activities (Porter, 1986:29). The choice of how many sites an activity is performed at and where they are located involves trade-offs between international integration and local responsiveness (Doz, 1985).

Multinational optimization cannot be viewed as a static concept, and thus the MNE must constantly review the fit of the two key dimensions to changes in exchange rates, shifting comparative advantage, new information-tools of coordination, etc. Thus, Kogut concluded that a critical element in formulating an international strategy is to create organizational flexibility and incentives in the organization that respond to changes in the environment (Kogut, 1985:27). We will not go into the organization literature here, but one can expect that internal structure of the firm and control systems usually have an impact on whether MNEs really utilize the true potential of their multinationality.

To summarize the discussion, we have brought in a new level of analysis - the international industry - to make the understanding of industry structure more complete. The international industry structure is created by MNEs which are building up competitive advantages based on their multinationality. Through world-wide optimization and cross-fertilization these firms create a potential of reducing costs, improving and extending R&D activities, enhancing the base for product differentiation and reducing overall risk. With such competitive advantages, i.e. ownership advantages based on multinationality, barriers to entry are created around the international industry. From this discussion it is reasonable to expect that as international competition becomes more pronounced, the national structural traits and entry barriers will play a diminishing role. Competition and rivalry will no longer be a country-to-country phenomena. National industry barriers are replaced by international industry barriers, degree of concentration must be understood in an international context, as will minimum efficient scale, investments in R&D and product differentiation. Mobility barriers will also receive a new dimension. Within the international industry one can

now include geographical scope to discriminate between strategic groups. Within the international industry we might find economic forces or imperfections, which make it possible for national firms and un-coordinated MNEs (which do not gain competitive advantage based on multinationality) to compete alongside coordinated MNEs over extended time periods.

The period between a truly national state of competition and a truly global state of competition involves structural as well as strategic aspects on two levels - the national and the international - which both have to be considered in parallel. This intermediate period we believe to be long-lived, and thus we think it is important to develop the notion of an international industry structure, and international barriers to entry in a world where national structural traits still have an impact on firm behavior.

2.4 EXOGENOUS DRIVERS OF INTERNATIONALIZATION

In the discussion above, we have left out exogenous forces which have long-run consequences for structural change. In certain periods, such forces have a large impact on strategic behavior, while in other periods, structural change is predominantly driven endogenously.27/ These basic forces can be divided into several categories: technology, public policy and buyer and supplier characteristics.

Saturation of demand in the home market is an often used explanation as to why firms begin to look abroad for new markets. A decision to go international can serve a twofold purpose: first, it offers an opportunity for continued growth, and, second, it can solve problems with overcapacity in domestic plants. Trade barriers are commonly used to explain why firms increase their commitment from export trade to local production (Dunning, 1973; Horst, 1974). Another public policy issue is anti-trust regulation, which is national in character and can prevent firms from related diversification and vertical integration. Other types of regulations can also spur internationalization. MacNamee argued that important driving forces behind Du Pont's decision to expand abroad during the 1970's were to escape

increased unionization and regulation (MacNamee, 1983:210). The formation of trade unions and the like (e.g. the Common Market) affects location decisions (Buckley 1985:14). Technological change can emanate from sources not related to the industry under study. Some technologies, such as factory automation computerization, and other information technologies, have a large impact on the whole business community. New technologies can undermine tightly structured markets, change cost structures, the potential for product differentiation etc. Such changes in turn change the prospects of international trade and investment. Empirical evidence suggests similar patterns of concentration across industrialized countries (Bain, 1966; Horowitz, 1970), which supports the view of technology as a main determinant of industry structure.

Another set of exogenous forces is exchange rate fluctuations (which in turn are exposed to public policy). Exchange rate fluctuations change the cost positions of local production units within the MNE, affect trade patterns, and the prospects of overseas acquisitions. The MNE with a certain configuration of coordinated plants and intra-firm trade, can see its competitive advantage seriously threatened by major changes in exchange rates. This also goes for changes in tariff barriers, subsidies, rates of inflation, political stability and the like.

NOTES TO CHAPTER 2

1/ Strategic behavior is used rather than firm conduct to emphasize the view that industry structure does not fully determine the behavior of incumbent firms.

2/ Several references on this point were made in a speech delivered by Professor Richard E. Caves for the European Association for Research in Industrial Economics, Bergen, August 1983. An early study is Esposito and Esposito (1971). IO originates from the United States (developed for anti-trust purposes) which can explain its domestic orientation.

3/ The application of IO to business policy/strategic management is mainly connected with the works of Professor Michael E. Porter (1980; 1985). For a discussion of the contributions of IO to strategic management, see Porter (1981).

4/ Kindleberger (1969) and Hymer (1960) made clear that MNEs were associated with oligopolistic industries. However, they did not develop the notion that oligopolistic industry structures affect MNE behavior in various ways. A seminal work here was Knickerbocker (1973).

5/ For an introduction, see Scherer (1980).

6/ Strategic behavior is considered ex-post, i.e. what the firm actually has done. Whether a certain strategy was planned or not, or whether the company had a strategy at all, is not considered here. For a discussion of realized strategy versus unrealized strategy and deliberate and intended strategy versus emergent strategy, see Mintzberg (1978; 1984), and Mintzberg & Waters (1983).

7/ In the extreme case of global competition, where we only have one global industry, it is reasonable to classify international activities within a product area as single-industry behavior.

8/ For a discussion of different expected pricing strategies, given differences in cost advantages, entry rate and discount rate, see Scherer (1980) and Cowling (1972).

9/ Another driving force was introduced by Penrose (1963) who emphasized internally generated growth based on slack as resources tend to be obtained in discrete amounts.

10/ The experience curve concept was introduced by the Boston Consulting Group (see "Perspectives on Experience", The Boston Consulting Group, 1972).

11/ Early works on diminishing returns to management include Kaldor (1934) and Robinson (1934). See also Leibenstein's discussion of X-inefficiency (Liebenstein, 1976).

12/ The concept of location as an action parameter besides price was first modeled by Hotelling (1929) in "Stability of Competition".

13/ Robert Dorfman and Peter Steiner introduced a model of the firm optimizing quality and advertising, the so-called Dorfman-Steiner Theorem (Dorfman & Steiner, 1954).

14/ An incentive stressed by Schumpeter (1942).

15/ See Mickwitz (1959) for a discussion of product differentiation under various forms of competition.

16/ For an overview of oligopoly models, see Waterson (1984).

17/ The concept of "Firm-specific advantage", "Monopolistic advantage" or "Ownership specific advantage" originates from the works of Dunning (1958; 1977; 1979) and Hymer (1960). For a discussion on this concept, see Buckley (1983), and Hood & Young (1979).

18/ See George Stigler's foreword in Gort (1962).

19/ Gort (1962) used 4-digit SIC industries in his study.

20/ For a discussion, see Williamson (1975:Ch 6).

21/ Which fits Adelman's observation, see Adelman (1959).

22/ See Porter (1980:Ch 1).

23/ Sandén and Vahlne (1976) referred to this as the "advantage cycle".

24/ These ideas are developed by Kogut (1985) and Porter (1986).

25/ The eclectic theory is modelled around three questions: how can firms succeed in foreign markets where they initially have a disadvantage, are those advantages exploited internally or through arms-length transactions, and which countries receive FDI. See Buckley & Casson (1985).

26/ The product cycle model was developed by Vernon (1966) and empirically validated by Wells (1972). See also Vernon (1979).

27/ Some economists have proposed that industry structure is determined stochastically. Regarding degree of concentration, Gibrat's law postulates a log normal size distribution (Scherer, 1980: Ch 4).

3. Penetration of Foreign Oligopolistic Industries

3.1 INTRODUCTION

According to our model outlined below, international strategic decisions are in important respects dependent upon a set of external conditions, both in the home country and in host countries. As is recognized in the trade theory,1/ country-specific factors, such as the size of the market, its demand structure (stage of development), factor endowments (raw materials, labour skills, etc), regional economic ties (such as the Common Market), and governmental policies (including trade barriers, labour policies, subsidies, etc), are important explanatory factors behind international trade and foreign direct investment. The host country characteristics have a major impact on the MNE's decision to enter it or not. Some host industries/host markets may look more attractive than others. The degree of attraction depends on a number of factors. The notion of nation-specific advantages in the eclectic theory considers favourable output or factor markets such as market size and market growth (Dunning, 1979). In factor markets, labour costs have been emphasized.

Even though country specific-factors are important inputs to the understanding of international strategic behavior of firms, this is not our main focus. Instead, coming from a microeconomic tradition, we bring in both home and host industry characteristics. The entry and further penetration into a host country is thus dependent upon entry barriers and mobility barriers in the host industry. Furthermore, in truly oligopolistic industries, an international move by a

dominant firm may cause competing firms in the home industry to follow (see discussion below on such models). In our research we will highlight industry structure in the host country, in order to give tentative explanations regarding which national industries are avoided while others are entered and further penetrated (purpose number 1). We also expect to find entry and further penetration strategies to be shaped by the industry structure in the host country (purpose number 2). Furthermore, entry and further penetration by a foreign firm is expected to provoke retaliatory actions by incumbent firms in the host industry, which in turn affect the strategies of the entrant (purpose number 3).

Within a certain product area, for example white goods, the early periods were characterized by national competition, i.e. a large number of national white goods industries developed independently. Later on, a few firms embarked upon strategies of establishing positions in foreign white goods industries. To understand such a process we will look into the industry structure in the home country as well as in host countries (see Figure 3.1).

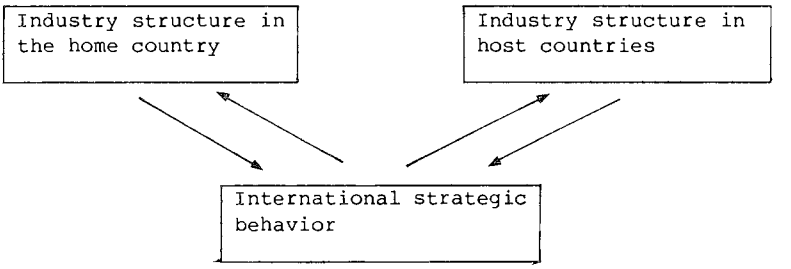


Figure 3.1: Important drivers of international strategic behavior when competition is national in character.

As we discussed in Chapter 2, industry structure involves a number of elements which all relate to barriers to entry. International strategic behavior is understood in two respects: the sequence in which countries are penetrated, and how they are entered and further penetrated (see section 3 of this chapter).

Over time the picture becomes more complicated. Instead of being independent, competition in the various national industries becomes increasingly interdependent, i.e. competition becomes increasingly international. Now the growing MNEs do not only have to consider industry structure on a nation-to-nation basis (home and host country), but must also bring in international considerations involving third countries. Part of the game is now played within a growing international industry, instead of as before, in one country at a time.

Closely related to this phenomenon is the changing base of competitive advantage among the MNEs. In early periods, firms develop competitive advantages akin to the home industry and other home country characteristics.2/ Over time, as the MNE builds up a network of subsidiaries around the world, competitive advantage will be based on the multinational network rather than on any home country factors. Indeed, the notions of home country and national industry barriers become blurred (see discussion in Chapter 2). As Buckley noted:

> "How far do the barriers to entry to a foreign market decline as the international spread of the firm widens?"
> (Buckley, 1985:4)

From the discussion above, we can distinguish three elements - all interrelated. Thus, international strategic behavior of MNEs have implications for: the national industries involved, the evolving international industry, and the build-up of competitive advantage within the MNEs themselves. In turn, these three elements have effected earlier behavior and will affect future behavior (see Figure 3.2).

In the following sections we will make a literature excursion into three areas: first, we will look into what is written about the role of home and host industry structure in shaping the strategic behavior of MNEs, second, patterns of strategic behavior will be discussed as regards country sequence and how foreign markets are penetrated, and third, possible reaction patterns following from entry by foreign firms. Finally, we will put together these pieces into a conceptual

model, together with a brief discussion of expected results from our empirical studies.

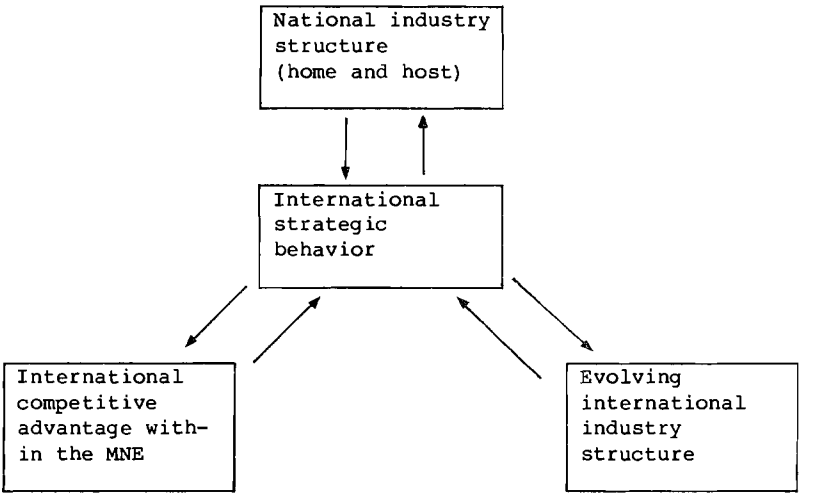


Figure 3.2: Important drivers of international strategic behavior when competition is becoming international.

3.2 INTERNATIONAL STRATEGIC BEHAVIOR SHAPED BY INDUSTRY STRUCTURE IN HOME AND HOST COUNTRIES

Home Industry

The industry-imperfections hypothesis uses the structure of the home industry to explain why MNEs exist at all. Thus, imperfect industries are associated with firms that possess some rent-yielding asset and thus can earn supra-normal profits. These assets, or firm-specific advantages,3/ can sometimes be transferred to foreign markets at a low marginal cost through exports of goods and services, licensing foreign producers to utilize the asset, establish foreign subsidiaries, or through various forms of cooperative solutions.

The traditional theory of FDI emphasizing home industry structure emanates from the works of Hymer (1960), Kindleberger (1969) and

Caves (1971, 1982). FDI activity is expected in industries with high seller concentration which in turn is related to entry barriers based on advertising intensity, capital-cost barriers, scale economies and R&D (Caves, 1982:95).

Another aspect of home industry structure is related to oligopolistic behavior. Karsten (1965) noted that the decision of leading US firms to invest abroad was countered by their US rivals who feared losing a new growth potential. In Knickerbocker's (1973) study of post-World War II foreign investment patterns of US manufacturing enterprises, this was shown to be true for oligopolistic industries. By countering each other's moves, the oligopoly members made sure that no one firm established a superior position. He showed that narrow product-line firms were more active defensive investors than diversified ones, and that low-technology firms were more active defensive actors than high-technology ones. Knickerbocker also showed that industry profits and defensive FDI were closely associated. However, he did not try to sort out whether profitable firms are in a better position to make prompt checkmating moves, or whether such moves lead to supra-normal profits. Another important finding was that imitative moves were more significant in loose-knit oligopolies, which is what oligopolistic-reaction models predict (for a discussion see Caves, 1982:Ch 4; Flowers, 1976:46). Even though Knickerbocker's study brought in oligopolistic behavior of MNEs, it did not fully take into account the international picture. The departure of the study is the behavior of US firms. Thus, the study did not unveil international oligopolistic behavior of non-US firms. The oligopolistic reaction hypothesis was later confirmed in studies of counter-investments by European and Canadian firms into the US market (Flowers, 1976; Graham, 1978).

Falling profits, due to increased competition in the home industry, can spur overseas investment in more promising markets (MacNamee, 1984). Such increased competition can be created by an unpredictable drop in demand (creating overcapacity) or entry by new firms, domestic or foreign. Demand in the home market has been used as a factor in theories of trade and FDI, to predict which industries will turn to export markets. The product life cycle model considers home

market structure by emphasizing the domestic demand structure. The model which was introduced by Vernon (1971) takes its departure in the research efforts made by US firms to satisfy domestic needs. The closeness (both in a physical and cultural sense) between US sellers and buyers was important in explaining why newly created demand was supplied from US soil by US producers. This was shown to be especially true for new technologies, where both parties face major uncertainties. The need for rapid and close communication between the buyer and the seller in early stages of product development has been confirmed in several studies (for a discussion see Hägg & Johansson, 1982). In later stages, US firms exploited their technological advantage in foreign markets, first through exports and later through local production. Finally, when products had matured, the products were imported back to the US market. Increased demand elasticity in the US market, resulting from customers becoming more sophisticated buyers, was shown to be an important factor forcing US firms going abroad in the growth stage (Wells, 1972:10).

The product life model has in important respects been influenced by works in trade theory, emphasizing home and host market demand. Burenstam Linder (1961) brought forward the notion that potential export products were developed according to home demand.4/ Furthermore, with potential imports being determined by host market demand, trade is expected between countries with similar demand structures (Burenstam Linder, 1961:91 ff).

Linkages between home market/home industry structure and FDI are well developed. However, intra-industry differences in FDI propensity have not received much attention. Horst (1974), in his study of the US food-processing industry, found that industry members differed in their propensity to establish subsidiaries overseas. The "marketers", skilled in branded goods, expanded abroad, while the "distributors", emphasizing low cost distribution of undifferentiated goods through nation-wide integrated distribution systems, stayed at home (Caves, 1980:69).

Host Industry

An imperfect host industry structure acts both as a deterrent force (entry barriers) and an attraction (supra-normal profits). The height of entry barriers varies between countries. We expect to find the highest entry barriers in industrialized countries, where national industries have undergone far-reaching concentration processes. The entrant must relate the costs of entering these national industries to expected post-entry profits. These profits in turn are dependent upon both the local price level (and how that is affected by the entry), and how the internal cost structrue is altered as a result of entry (increased economies of scale, learning, etc). Different entry and penetration routes will exhibit different costs and revenues (see discussion below). A high profit level may attract entry,5/ in spite of substantial barriers to entry, if the potential foreign entrant can overcome these barriers at a lower cost than potential domestic entrants. Thus, some entry barriers vis-à-vis domestic entrants do not constitute barriers for foreign entrants, and vice versa i.e., there are barriers specific to foreign entrants and other barriers specific to domestic entrants. For example, proprietory product technology can serve as an entry barrier to domestic firms, while foreign firms may have similar technological know-how to incumbent firms. Entry deterring behavior (such as building excess capacity, see Spence, 1977) might deter domestic potential entrants but not foreign ones. Entry barriers specific to foreign entrants also vary according to entry mode. For example, government subsidies can constitute a barrier to the exporting firm but not to firms with local production. The same is true for markets protected by tariffs and other barriers to trade. Furthermore, product differentiation, such as local brands, can bar entry through greenfield investments, but not entry through acquisition or cooperation.

If intra-industry groups exist in the host industry, the "entry fee" will differ depending upon which strategic group is chosen as a target. Finally, host industry barriers are dependent upon multi-industry activity.

Exactly how oligopolistic national industries have attracted or discouraged entry, and how entry behavior has been shaped by host industry structure, has been rendered little attention in the literature. In the next section we will treat these two issues in more detail, bringing in research that has touched upon these matters, although not made it a central purpose.

3.3 A DYNAMIC INTERPRETATION OF INTERNATIONAL STRATEGIC BEHAVIOR

When looking at patterns of MNE behavior, we will focus upon three interrelated questions: first, in which order are foreign industries penetrated, second, how are they penetrated over time (with focus on fortresses), and third, what reactions follow from penetration by foreign firms (see next section on action-reaction patterns).

Which Foreign Industries are Penetrated?

Literature on expected patterns of trade and FDI is well established. We have already touched upon country factors related to differences in factor endowments, technology, income, and income distribution. Several forces are at work. Sometimes these forces favour trade, while disfavouring FDI, and vice-versa, and sometimes trade and FDI combine. For example, trade barriers and geographical distance favour FDI over exports. However, there must be other forces at work, given the empirical evidence of combined exports and FDI. Thus, Swedenborg (1979) showed that Swedish FDI has been directed towards large markets, and so have exports. Furthermore, exports have been attracted to high-wage countries, but so has FDI (see discussion in Caves, 1982:60). Studies of early internationalization patterns among Swedish MNEs also show that establishment of subsidiaries was directed towards large markets with great growth potentials. In 1914, four of the five leading Swedish MNEs: SKF, LM Ericsson, Separator (later Alfa-Laval), AGA and ASEA had subsidiaries in the US, Great Britain and Russia (Lundgren 1975:86).

Target nations will differ depending upon which type of market - factor markets or goods markets - is sought. Our discussion will

focus on goods markets. Goods-market-oriented FDI seems to have played a much more important role than factor-market-oriented FDI. A US study revealed that only 9.5 % of the manufacturing subsidiaries in the sample exported more than 50 % of their sales in 1975 (Curhan, et al., 1977). This is similarly true for Swedish MNEs (Hörnell & Vahlne, 1986).

Studies of FDI patterns among US MNEs show a sequence, starting with Canada and proceeding with the UK, West Germany, Mexico, Australia, France, Brazil, Japan etc. This sequence shows a significant rank correlation with total GNP and GNP per capita (Caves, 1982:63; Davidson, 1980b:12). Another test put UK in the top, followed by Canada, Australia, France, Japan, West Germany, and Mexico (Davidson, 1980a:21). The former test covered the period 1900-1976 (for 180 US based MNEs), while the latter covered the period 1945-1978 (for 954 individual products). The two sequences are not fully consistent with the proximity hypothesis. Thus, there seem to be other forces at work, which sometimes overrule proximity. International experience is one such factor (Davidson, 1980b:18).

Proximity has also been brought into the analysis of internationalization patterns among Japanese MNEs (focusing upon Southeast Asia), Australian MNEs (focusing upon New Zealand), French MNEs (focusing upon French-speaking countries) and Swedish MNEs (focusing upon the Nordic countries) (Caves, 1982:Ch 2). A study, based on 414 foreign establishments (including both sales and manufacturing subsidiaries) by Swedish firms, led to the conclusion that the hypothesis of proximity could not be rejected (Hörnell, et al., 1972:207). However, case studies have tended to show erratic relationships between economic distance and entry sequence. In a study of four leading Swedish firms, proximity could not be shown to explain establishment patterns of subsidiaries. In this study it was mentioned that one company avoided several European markets (while investing in such distant markets as Argentine and Brazil) until the 1950's for "competitive reasons" (Johanson & Wiedersheim-Paul, 1974:45). These competitive reasons were not further investigated.

Davidson's work on licensing activities is a further piece of evidence that sequence patterns are not fully consistent with the proximity hypothesis. Davidson argues that licensing will be preferred in distant and unfamiliar markets (Davidson, 1980a:42). However, Japan, West Germany, and France turn up as licensing-intensive countries for US firms (countries which also turned up early in the FDI sequence, see discussion above). Japan has been a special case with its legislative restrictions. Concerning France and West Germany, Davidson presented oligopolistic reasons, where licensing is preferred in order to maintain international industry equilibrium.

In oligopolistic industries the choice of country (and timing) is thus more restricted. In the extreme case, the explanation as to why firms choose not to enter certain national industries is associated with tacit conclusion, or so-called territorial exclusions. Such territorial exclusions have been documented, for example in the electrical industry (Newfarmer, 1980). In industries where such territorial exclusions are prevalent, the choice of entering foreign industries is obviously restricted, and cartel members would certainly avoid each other's home industries. Newfarmer alleged that patterns of international trade in power transformers in the 1960's reflected mutual forebearance among member firms, and would thus explain the insignificant exports of these products to the US market (Newfarmer, 1980:94). Furthermore, the two major US actors: GE and Westinghouse, had some control over European manufacturers through licensing ties. The author also concluded that there was some evidence that this trading behavior carried over to FDI behavior as well. In the case of the electrical industry, these cartels were explicitly negotiated. However, the same pattern of market avoidance can be implicit in that competing firms realize threats of retaliation (which Davidson also concluded could explain FDI patterns between the United States, West Germany, and France).

How are Foreign Industries Penetrated?

The commonly used taxonomy of foreign industry activities is tied to legal and ownership entities. Entry routes are usually classified into either licensing, trade through agents, or foreign direct investment in the form of sales subsidiaries, manufacturing subsidiaries, or joint ventures. For our purpose of understanding entry into foreign markets, we have developed a list of various penetration routes, emphasizing five dimensions.6/

(1) Is the entrant's product offer comparable to existing product offers on the host market? The question here is whether the entrant offers a comparable product, a somewhat improved product, or brings in radically new technologies (entry through substitution), compared to what is offered by established firms in the host market. The product offer can also be differentiated by its foreign brand image, service degree and other attributes. Another aspect of product offer is the scope of the product target of the entering firm. Does the entrant target a specific niche (product-wise or geographically within the host country), or is the whole market penetrated simultaneously?

(2) Is it a first-time entry into the host country, or is it a product-broadening entry, i.e. an entry into a new product area? Product broadening entry has important implications for the cost of entering. In some instances, the product-broadening entrant faces lower entry barriers than the first-time entrant. This phenomenon can be looked upon as a case of excess capacity. Firms with under-utilized assets, tangible or intangible, will face a lower internal opportunity cost of entry than a de novo entrant. As Caves and Porter (1977:258) argued, intangible assets provide the extreme form of excess capacity, where brand names, goodwill, knowledge and management systems can be used in new markets, without providing less service in their current use. The Harvard Multinational Enterprise Project revealed that existing subsidiaries (as opposed to acquisitions and newly formed subsidiaries)

accounted for a rapidly increasing share of new product entry, beginning in the mid 1960's. Thus, by broadening the product line, existing facilities could be better utilized (Davidson, 1980a:14). Reduced uncertainty, learning benefits and scale economies also increase the propensity to invest in foreign nations, where the firm is already established (Davidson, 1980b:13). De la Torre, et al., reported product broadening strategies among foreign entrants into the US apparel industry (De la Torre, 1978:Ch 2).

(3) Does the entrant enter with a new brand in the market place, or are products sold under private label arrangements through local firms with already established brand names? In the case of private label entry, this can either occur horizontally or vertically. In the case of horizontal private label entry, the foreign entrant delivers unbranded products to local firms active in a horizontally related industry, while in the case of vertical private label entry, the foreign entrant delivers unbranded products to a local buying industry. A case in point would be when a foreign manufacturer enters with a range of unbranded components, to be included in products assembled by local firms and sold under local brand names.

(4) Which activities (purchasing, R&D, manufacturing, marketing, storing, servicing) are performed in the host country and how deep is the involvement? There exist numerous international configurations ranging from extremely centralized strategies (minimizing value added in the host country) to extremely dispersed strategies where every activity, such as R&D, manufacturing, sourcing, etc is performed locally. Empirical research on MNEs has confirmed that establishment of local production has been forced by trade barriers, demands by government and costs of transportation (Lundgren, 1975:88). Thus, centralized production (utilizing economies of scale at the plant level) has been the alternative preferred but sometimes impossible. Economies of scale at the firm level, on the other hand, related to overall firm size, permit dispersed MNE

structures.7/ Research on Swedish MNEs has shown patterns of slowly increasing commitment in host countries (Johanson, 1966; Hörnell, et al., 1973; Johanson & Vahlne, 1977). Furthermore, earlier international experience was shown to have a large impact upon continued internationalization (Johanson & Wiedersheim-Paul, 1974). Four phases were recognized: no regular exports, exports via agent, establishment of sales subsidiary, and establishment of manufacturing subsidiaries (Vahlne, 1974:33). Other studies have confirmed this stage process in foreign markets, where both US firms and UK firms have followed the same patterns (Wilkins, 1970; Nicholas, 1982). These studies have focused upon early internationalization patterns. Studies of internationalization patterns among today's highly experienced MNEs are rare.8/ Johanson & Wiedersheim-Paul (1974) found some evidence of a significantly faster internationalization process for those companies starting their internationalization in later periods. According to Aharoni, a common triggering force, moving from exports to local manufacturing, is found in the threat of losing an export market. Such a threat can emanate from competitive pressures or from government decrees (Aharoni, 1966:64).

(5) Are the various activities performed in the host country built up greenfield, acquired, or are they performed in conjunction with local firms in some form of coalition? Several studies have confirmed the switch from greenfield establishments to the use of acquisitions (Wilson, 1980; Forsgren, 1985), and various forms of coalitions for entry into oligopolistic industries. Through acquisitions the MNE can get quick access to a locally established business, including brands and established distribution channels, manufacturing plants, etc, without having to outperform already established firms. The acquisition route can look favourable to an MNE if it can reap some economies of scale from the acquisition. Furthermore, the acquisition involves an element of surprise, which lowers the chances of effective retaliation. On the other hand, if the foreign entrant is aiming to transfer its own management systems,

management philosophy, etc, a greenfield establishment can be favoured instead of paying a price for a going concern.9/

Entry through acquisition has important implications for timing. the entrant must wait for the right moment to turn up, such as when the stock market is depressed, the domestic ownership structure of the acquisition candidate is altered, or the acquisition candidate is in temporary difficulties, depressing the stock price. Larger acqusitions, especially in the United States, are subject to approval from anti-trust authorities. Thus, anti-trust legislation has an impact on the choice between greenfield investment and acquisition. Furthermore, anti-trust considerations can prevent host industry incumbents from competing for the bid.

In oligopolistic situations, defensive strategies - either follow-the-leader (Knickerbocker, 1973), or exchange-of-threat strategies (Graham, 1974) - can favour acquisitions as a rapid response is required (Dubin, 1976). Finally, Wilson (1980) brought forward a home-country cultural factor to explain the propensity of using acquisitions.

Coalitions, which are formal long-term alliances between firms (Porter & Fuller, 1986:315),10/ linking activities while not merging them, are based on various motives, such as risk sharing, increased economies of scale in different activities, access to proprietory technology, brands and other market power related activities, and response to government pressures (Porter, 1986:Ch 10; Hertner & Jones, 1986:10). Buckley noted that cooperative entry forms can look more attractive than wholly owned subsidiaries if incumbents in the host industry may resort to entry-deterring behavior, such as price cutting and political actions (Buckley, 1985:57). Stopford and Wells (1972) connected the use of joint ventures with entrants in need of marketing know-how and large amounts of local resources.11/

These five dimensions of foreign industry penetration are summarized below:

1. Product offer
2. Corporate and business unit scope
3. Brand policy
4. Activities performed locally
5. Entry form.

3.4 FOREIGN ENTRY - ACTION AND REACTION PATTERNS

In this section we will take a look at what is written on reaction patterns following from entry by foreign firms. Traditional models of oligopolistic industries predict prompt reactions to major strategic moves by incumbent firms. Before an international oligopolistic structure is established, rivalry is confined to national industries. In early periods of internationalization, entry into host industry X2 by a firm from home industry X1 (where X denotes the product area, and index i the country), would only provoke reactions by incumbents in country 1 or 2. In a more developed international oligopolistic industry this no longer holds true, and reactions can be expected from incumbents in country 1, 2 .....n. Furthermore, reactions can be implemented in country 1, 2 .....n.

Our focus is upon response patterns following from penetration into foreign oligopolistic industries. We will study reponse patterns both on a national and on an international level (Figure 3.3). The more competition becomes international, the more international response patterns will emerge.

The initial action - penetration of a foreign industry - varies considerably (along the five dimensions developed above), and thus we expect response patterns to vary accordingly. These variations are accounted for by two factors: the real threat to oligopolistic equilibrium in the host industry (and possibly the international industry), and the perceived threat by incumbent firms. As we do not

account for perceived threats by managers in incumbent firms, we cannot fully explore these action-reaction patterns. However, by looking at the penetration process in detail ex-post, we hope to reach an understanding of these action-reaction patterns (for a methodological discussion, see Chapter 4).

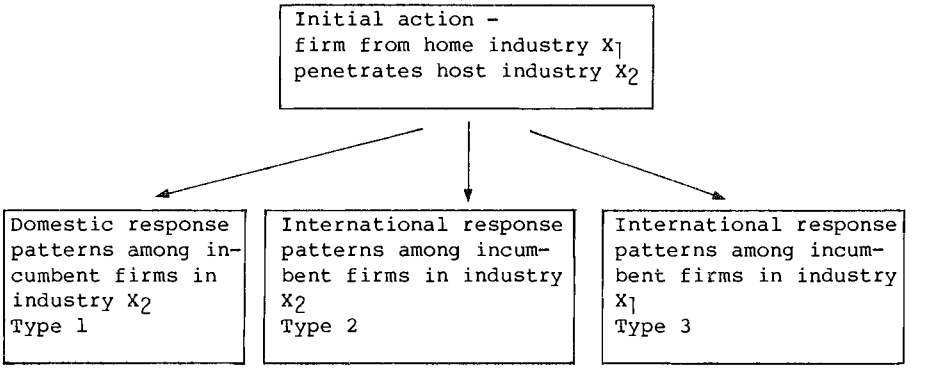


Figure 3.3: Action-reaction patterns in international competition.

Empirical Studies of Action-Reaction Patterns in International Rivalry

We have already touched upon a few empirical studies concerning international oligopolistic rivalry. These studies, based on large statistical samples, concluded that there is evidence of type 3 response patterns (see Figure 3.3), where domestic oligopolists follow the initiative taken by one firm to enter a certain foreign industry (Knickerbocker, 1973). There was also evidence of type 2 response patterns, where UK firms, as a response to US firms penetrating the UK market, started penetrating the US market with a three-year lag (Flowers, 1976; Graham, 1978). Regarding type 1 response patterns, Graham hypothesized three types of reaction patterns: retaliatory pricing behavior, acquisitions and mergers between incumbents, and aggressive product differentiation (Graham, 1978:89).

Except for statistical studies, there also exist industry case studies which have explored action-reaction patterns in more detail, and not just which country was entered and timing of entry. These studies have identified a number of type 1 response patterns.

Let us for a moment consider the US consumer electronics market.12/ The entry of Japanese firms into radios, black-and-white TV sets, and colour TV sets is well known. If we look at the response patterns by threatened US firms, their first choice was whether to withdraw, fight back or form some form of coalition. As one would expect, single-business firms like Zenith (a leader) decided to fight back. One important theme in fighting back was to file complaints in US courts, with the Treasury Department, and the International Trade Commission (ITC). Many of the diversified companies decided to withdraw from consumer electronics (often in a step-by-step fashion withdrawing from the most troubled product lines first). It is important to note that these exits were not unconditional, but rather negotiated with the Japanese competitors. Westinghouse, when deciding to withdraw from consumer electronics, strengthened its ties with Mitsubishi, where Westinghouse began a series of subcontracting operations for heavy power equipment together with Mitsubishi. GE had well-established plans to form a joint venture with Hitachi (which was blocked by US authorities) and established closer ties with Toshiba through licensing agreements (a company with which GE has equity ties as well). Warwick, a private label manufacturer to Sears (the leading retailer), was sold out to Sanyo. Warwick's major owners, Whirlpool (75%) and Sears (25%) (which had and still have very close ties: see Chapter 6), decided, in conjunction, that Whirlpool's share should be sold out to Sanyo in order for them to upgrade the plant.

Withdrawals or part withdrawals, sharing the business with a foreign firm, have thus been negotiated, sometimes bringing in unrelated product areas (see Figure 3.4). As Newfarmer concluded:

"After a period of intense competition, the single-line producers reacted with legal action. In sharp contrast, the US transnational conglomerates moved to fortify relationships with the Japanese leaders through licensing, joint ventures, trade, and cross-equity investments. Many of these were in unrelated markets, such as Westinghouse's technology exchange with Mitsubishi or GE's arrangements with Hitachi and Toshiba in heavy equipment."
(Newfarmer, 1980:106)

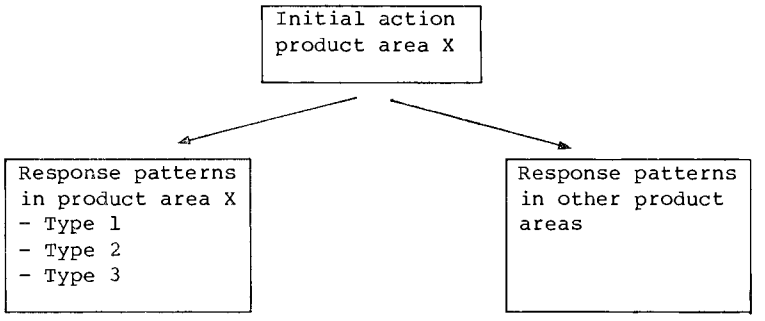


Figure 3.4: Action-reaction patterns in industries with diversified incumbents.

In a study of action-reaction patterns in a few industries, including the tyre industry and the TV-set industry, companies were classified into three types of actors (Hamel & Prahalad, 1984 and 1985). Type A firms were the ones that took international initiatives. These firms were characterized by a strong striving for global dominance. From a strong home base (which turned out to be Japan) where scale economies were gained, these Japanese firms began to penetrate the largest foreign industries - in the United States in the 1960's and later in Europe. To successfully penetrate foreign industries, private labeling was used. Later on, heavy investments were made in distribution facilities, brand proliferation, vigorous featurization and imaginative resegmentation. Moreover, the Japanese firms were said to crosssubsidize foreign market penetration from a profitable home base.

Among firms threatened by the Japanese penetration, two reaction patterns evolved. First, type B firms defended their domestic dominance, however responses were lagged. For example, US tyre manufacturers failed to recognize Bridgestone's (a Japanese company) competitive intentions until it had established its own distribution network in the United States. The US firms did not realize the large after-market that was created for Bridgestone through imports of Japanese cars, which created a base for further penetration. Typical features of type B firm reactions included: matching costs through rationalization, domestic investments, sourcing from low-cost countries, modest investments in foreign markets to gain retaliatory capability, and petitions to governments for protection.

Second, type C firms, which were typically European firms with uncoordinated multinational operations (subsidiaries with a high degree of strategic autonomy), responded as a collection of type B firms. Thus, each national subsidiary reacted to foreign penetration as a type B firm. Later on, integration and coordination between subsidiaries took place.

In another set of industry studies, focusing upon strategic response patterns in Europe, Doz (1986) pinpointed the integration strategies of European-based MNEs (the type C firm discussed above). Instead of manufacturing complete products and product lines in each country, MNEs began to specialize their subsidiaries, so that each subsidiary only produced a part of a product, but for a larger market than the host market. This development of "focused" factories led to a significant increase in intra-MNE trade (Doz, 1986:3). This changing role of European subsidiaries has been reported in earlier studies of Swedish MNEs (Vahlne & Sölvell, 1981) and for US-owned subsidiaries in the United Kingdom (Hood, 1983). In the steel industry some European manufacturers tried to copy the Japanese strategy of large-scale, commodity production (often unsuccessfully), while others moved to higher value-added product lines (Franko, 1983:108). A study of reaction patterns in the US apparel industry, following from increased import penetration, reported several types of reaction patterns. Strategic change was divided into internal activities,

including organizational structure, plant configuration and coordination, distribution structure and various measures of cost rationalization, and external activities, involving marketing policies (shifting to less price-sensitive, more fashion-sensitive garments), improved styling and design, and more aggressive financial management. To lower manufacturing costs, new plant investments were made in the Southeast region of the United States, as well as in low-cost countries in Asia and South America (De la Torre, et al., 1978).

In a Swedish study, a comparison was made between reactive patterns of a foreign-owned subsidiary and a competing domestic firm in the tyre industry. In a time of changing technology and increased competition, the reactions by the domestic firm were to diversify and increase exports. The foreign-owned subsidiary, on the other hand, struggled with its only option, namely to cut costs since their mission was confined to the Swedish tyre market. The inability of adjustment later forced the subsidiary out of business (Forsgren, 1981).

In summary, we have reported some empirical insights into domestic and international reaction patterns. A rough way to classify long-run strategic reaction patterns (given the initial foreign market penetration) is to divide them into home and host industry reactions. The ones that we have come across in the literature are summarized below:13/

Home Industry Reactions:
Follow the leader

Host Industry Reactions:

	Domestic	International
Reactions within single product area	Industry consolidation Cost rationalization Changed product focus Product redefinition	Counter-investment International sourcing Subsidiary coordination
Reactions in other product areas	Diversification	Negotiated withdrawal

3.5 A CONCEPTUAL MODEL OF INTERNATIONAL STRATEGIC BEHAVIOR OF MNEs

To summarize this chapter, we have discussed three elements of international strategic behavior of MNEs: first, in which sequence foreign industries are entered, second, how these industries are entered, and third, which reaction patterns we can expect from incumbents in host industries in the case of foreign entry. Regarding the second question, we developed five dimensions of entry and further penetration behavior. For the third question we developed a number of possible reaction patterns, within the product area in question - where three types of reactions were distinguished - or involving other product areas.

To give tentative explanations to the first two questions, we began this chapter by developing the notion of home and host industry structure as explanatory factors driving behavior of MNEs. Here we made a distinction between early periods of internationalization and later periods of internationalization. In later periods, the experience of doing international business has increased within the MNE, and competitive advantage is based upon multinationality. Furthermore, the notion of home and host industries becomes less significant as an international industry evolves. Our conceptual model is summarized in Figure 3.5.

In our empirical studies we want to further investigate the three issues discussed above. We believe entry sequence to be impacted by industry structure in host countries. In the initial stages, we believe that national industries surrounded by high barriers to entry will be avoided (overruling proximity forces). However, in later stages of the internationalization process, we expect to see these "fortresses" invaded (see discussion in Chapter 1, section 4). When leading industrialized countries like the United States, Japan, West Germany, France and the United Kingdom are penetrated by foreign firms, competition becomes truly international.

Regarding the penetration of these fortresses, we expect to find strategies that will minimize retaliation by threatened incumbents.

The costly and risky strategies of head-on competition we believe to be a rare phenomenon. Instead, entrants will use various penetration routes, such as entering into niches, beginning with a narrow set of products, and furthermore, private label arrangements will play an important role in initial stages. Over time, local activities will increase, and branded products will be pushed alongside private label products. Mature industries usually house acquisition candidates, and we therefore expect the acquisition route to be commonplace where local brands and distribution networks are needed. Regarding reaction patterns, several exogenous forces are at work, and thus it will be hard to separate reactions tied to foreign entry. For example, increased product differentiation as one type of reaction, is also tied to mature businesses in general, regardless of foreign entry. As a trend, we would expect more third country reactions as competition becomes increasingly international.

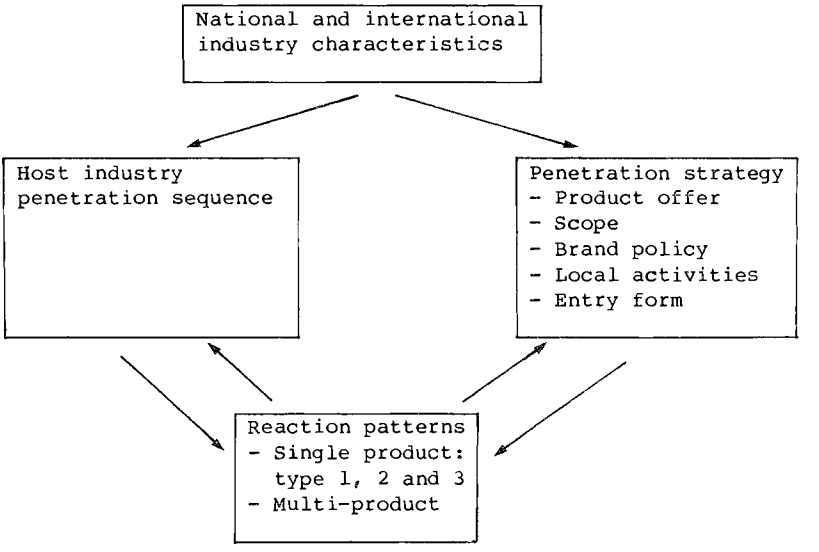


Figure 3.5: A conceptual model of international strategic behavior of MNEs.

NOTES TO CHAPTER 3

1/ For a good overview of trade theory, see Helpman & Krugman (1985). For FDI theory, see Hood & Young (1979); Caves (1982); Rugman (1982); Casson (1983) and Buckley & Casson (1985).

2/ The main thrust of the FDI literature is based on the idea of MNEs as exploiters of competitive advantage developed at home. See Hymer (1960); Kindleberger (1969); Dunning (1958; 1977).

3/ The concept of "Firm-specific advantage", "Monopolistic advantage" or "Ownership-specific advantage" originate from works of Dunning (1958; 1979) and Hymer (1960). For a discussion on this concept, see Buckley (1983).

4/ For a discussion of whether Japanese firms bring out products only for exports, or if product development is driven by home demand, see Burenstam Linder (1961:91).

5/ Due to information barriers, trade barriers, refusal to honour warranties and the like, demand elasticities can vary across countries over extended periods. These barriers will bar highly elastic buyers from acting as middlemen to less elastic buyers. Thus, host markets with less elastic buyers will attract foreign entry.

6/ When using the term penetration route, we both consider initial entry into and expansion in the host industry.

7/ For a discussion of various MNE configurations, see Porter (1986).

8/ For a study of entry by Swedish MNEs into Japan, starting in the mid 1970's, see Hedlund & Kverneland (1984).

9/ Tsurumi (1976) claimed such a preference among Japanese MNEs.

10/ For a list of ten various modes of cooperation, see Buckley & Casson (1985:Ch 3).

11/ Caves (1982:85 ff) gives a good summary of control aspects of joint ventures.

12/ Sources used for the Television-set industry include: Newfarmer (1980); Franko (1983), and the US Television-Set Market 1970-1979, Harvard Business School (Case 1-380-181).

13/ Excluding short-term tactics such as: price cuts, promotional campaigns and legal tactics.

4. Research Design

4.1 CHOOSING THE METHODOLOGY

In order to fulfill the three research purposes outlined in Chapter 1, one can think of various research designs. Such choices have been made continuously along the research process. However, before the first empirical study commenced, a basic choice was made, namely to work with rich in-depth industry studies. Furthermore, a choice was made to focus upon more recent data (where data could be collected through interviews, and through other activities in close connection with managers who are actively engaged in the decision-making) rather than on historical data (focusing upon in-depth studies of various documents from company archives).

The rich details we have sought outrule traditional statistical studies. Purpose number two, especially (outlined in Chapter 3, section 3), where we want to establish patterns of penetration (as a process over time) into foreign oligopolistic industries and describe the structure of such industries, requires large amounts of firm-level data relating to companies from various national industries (in the United States, Japan and within Europe) and vertically related industries. In our second study - the white goods industry (referred to as Bloc B) - trade statistics have been used to complement company data, while such data was not available due to aggregation problems in our first study - the low voltage switchgear and apparatus industries (referred to as Bloc A). (See further discussion below.)

Purpose number one is more easily solved by establishing simple lists of entry sequences for a large number of firms. However, as we do not intend to verify any hypotheses, but rather to establish well-grounded hypotheses, such sequence statistics have not been collected. Instead, market share data collected for a large number of countries, combined with timing of various entry and further penetration moves (such as establishment of local production capacity, acquisitions, etc), add pieces to our overall puzzle, where penetration sequences among other things can be discerned. As we are interested in penetration over time, data only considering initial entry (such as the year when the first subsidiary was established) is of less interest to us (cf the methodology of Knickerbocker, 1973; Graham, 1974; Flowers, 1976).

Data needed to fulfill our third purpose, regarding early actors and action-reaction patterns is not readily available. Reaction patterns described in more qualitative terms (not just bunching in time which has been used in statistical studies), as outlined in Chapter 3, can only be traced through close relationships with firms within the oligopolistic industry. If the industry in question is "popular" enough to be extensively analyzed in the business press or in other written documents (teaching cases, brokers' reports, research reports and the like), pieces of evidence can also be found there. However, one should remember the subjective issues involved in establishing the causal link between actions and reactions. Here, perceptions differ as to why a certain firm made a retaliatory move, or if it was an act of retaliation at all. As we later found out, even with close relationships with industry participants, it was a very difficult task to establish action-reaction patterns, especially when multi-point competition is involved (referred to as multi-product area responses in Chapter 3). Given these methodological issues, the focus of purpose number three turned to identify and characterize early actors.

To summarize, we have chosen an in-depth longitudinal approach in order to understand the process of increased international competition in much detail. Such empirical studies require large amounts of

data regarding strategic behavior of individual firms over extended time periods. This study covers the post-war period. Over time, the many bits and pieces collected through interviews, internal reports, published reports, etc fall into place, and the full picture takes shape. This picture has been altered along the way and finally translated into the two industry reports presented in Chapters 5 and 6.

The need for longitudinal research when studying interdependencies between industry structural change and strategic behavior has been stressed by both business historians (Lindgren, 1979), economists (Porter, 1981) and business policy scholars (McGee & Thomas, 1984). Scherer noted that the theory of strategy in oligopolistic situations is unlikely to be tested with much success, if using conventional statistical methods (Scherer, 1984).

McGee and Thomas emphasized:

> "... that further 'rich', fine-grained (Harrigan, 1983), in-depth, industry studies should be carried out with the aim of developing richer hypotheses and theories about strategic interaction, competitive strategy and global competition." (McGee & Thomas, 1984:4)

4.2 TWO EMPIRICAL PHASES

When the empirical work was begun in late 1983, we had one guiding question: how the driving forces behind a trend of increasing international competition be understood, and how does such a process evolve? Two important findings which followed from the first study (Bloc A) facilitated the carrying-out of the second study (Bloc B) in a more focused way. Two phenomena were found which did not fit conventional theory. First, in their international growth, MNEs seemed to avoid some close countries (geographically and culturally), while they were expanding in more distant markets. The reasonable explanation for this behavior, seemed to be found in the industry structure of foreign industries. Second, the post-war internationalization patterns differed markedly between the old, so-called major electrical firms, and newcomers starting their internationalization

process in the 1960's and 1970's. These newcomers seemed to have a profound effect on competition, both on a national and an international level.

During the work with our second study, a more exact research purpose began to take shape. Again, national industries surrounded by high entry barriers seemed to have been avoided initially. Newcomers were also found to be active on the international scene. As a first part of the second study, extensive material about one national industry, dominated by domestic firms, was collected - the US white goods industry. Here foreign penetration could be studied in much detail.

The design of the inquiry was not very well planned ahead. Instead, the first step - contacting ASEA - led to subsequent steps. Thus, when we decided to study the low-voltage switchgear and apparatus industries - both in mature product areas - the work was naturally geared to mature industries. As we later realized, this gave us a splendid opportunity to study structural change, in this case increased international competition, as driven by individual firms. Every industry is of course affected by exogenous changes such as improved transportation technology, homogenization of demand, liberalized trade, etc, but a slow evolution towards maturity made it possible to study the endogenous determinants of change in industry structure and strategic behavior.

When choosing our second study, we decided to pick another mature industry with similar basic properties. To gain more insight into the question of which firms actively drive the process of increased international competition, it was important to find a mature product area where a Swedish firm played such a role (which was not the case with ASEA). One such company - Electrolux, mainly active in the white goods business - came to mind. The company is well covered in the Swedish business press, and has built a reputation of reshaping competition on an international scale. When the company was approached in early 1986, a study of the US white goods industry had already been conducted, which it was felt might open up the doors to Electrolux. By coincidence, Electrolux made a take-over of the third

largest competitor in the US market, WCI, just a few weeks after we had approached the company. With managers at headquarters having limited knowledge about the US white goods industry, our study made a good fit.

Common denominators of the two empirical studies include:

- Product areas characterized by national competition in the early post-war years. Thereafter competition has become increasingly international.

- Stable industry evolution without major shifts in technology.

- A Swedish firm among the world's leading MNEs.

- The Swedish firms agreed to participate in the study, and have been the main sources of primary data.

4.3 DATA COLLECTION

To fulfill our three purposes, a number of data sources have been used. Interviews have been conducted with industry participants (mainly ASEA and Electrolux), and industry observers (US stock market analysts). Furthermore, secondary data from a wide range of sources has been collected. In this type of case analysis, we have been able to work with a broad range of variables and relationships (Normann, 1976). The more focused questions have evolved over time, and thus data gathering could be handled more efficiently in our second study.

For our first purpose regarding country sequence, data has been collected regarding internationalization patterns among MNEs. By comparing market share data for individual countries over time, it has also been possible to build a picture of country sequence.

For our second purpose - penetration patterns of national industries surrounded by high entry barriers - we have developed one in-depth

study, the US white goods industry. Here we have looked into five dimensions of penetration behavior (see Chapter 3). These five dimensions include a broad description of various entry and further penetration routes.

The third purpose regarding action-reaction patterns has been the most difficult one to achieve. Information regarding the initial action to enter foreign oligopolistic industries is contained in the data regarding the first two purposes. However, reaction patterns which are directly related to foreign entry have been hard to detect. Little is written about this oligopolistic game in published material. Our main insights into this issue have come from interviews with participating firms.

In Bloc A, the main sources used include interviews and internal reports especially prepared for this thesis. In Bloc B, published sources covered Japan and the United States (supplemented with interviews), while internal material and interviews within Electrolux (supplemented with secondary data) covered Europe.

First Empirical Phase - Bloc A

In late 1983, after ASEA had agreed to cooperate, we began carrying out interviews as well as collecting internal reports regarding the international activities of ASEA Distribution (the division active in medium-voltage, MV, and low-voltage, LV, switchgear and apparatus), as well as industry and market data and competitor profiles.

The first interviews were geared at understanding ASEA as a company, with emphasis on product areas related to power transmission and distribution. Given the background, it was also necessary to develop some technical knowledge in order to understand the products involved. Furthermore, it was important to gain insight into the internal organization of ASEA such as internal flows of information and products, between divisions within the parent company, and between the parent company and foreign subsidiaries. Within ASEA Distribution, the General Manager of the division, as well as the

General Managers of three of the four subdivisions (excluding medium-voltage products) were interviewed. Technical, strategic and organizational issues were mostly discussed with the General Manager of the LV switchgear operations and his staff. After the preparatory phase, a second phase began, where data about foreign markets and foreign competitors was collected. Interviews were carried out in the United States, Japan (a company named Terasaki, with which ASEA was about to establish a cooperative agreement, where ASEA would source LV apparatus from the Japanese company), Singapore and Malaysia. Furthermore, the international picture was built up as we participated in internal yearly meetings with participants from the parent company and some 20 subsidiaries from all over the world. Four such conferences were attended: Denmark in 1984, Malaysia in 1985, Sweden in 1985 and Norway in 1986. Except for the conference held in Sweden, which only covered sales managers within the LV apparatus subdivision, these meetings involved staff active in all of the four subdivisions in the parent company, as well as staff from power distribution departments within subsidiaries. Managing directors of most subsidiaries also participated. During these 3-day meetings we had the opportunity to listen to presentations and to participate in informal discussions. Presentations involved new product introductions, budget and performance revisions for the division as a whole, and for individual subsidiaries, reports on major competitors, and reports of chosen national markets. The conferences held in 1985 and 1986 included workshops on "Global Competition". We were involved in this work, and we also gave presentations on the international transition of the LV switchgear and apparatus industries at these occasions.

In September, 1985, the General Manager of Asea Distribution sent out an inquiry to 20 subsidiaries. The inquiry was put together by us, except for part A3 which was added by the Divisional Manager for internal purposes. Part A includes a general overview of the local industry and market, while part B, which was sent out in five copies to each subsidiary, includes a profile of each of the five main competitors in the LV apparatus field (as discussed in Chapter 5, leading LV switchgear competitors are local firms, and thus part B

focused on LV apparatus where competition has become international). A reminder was sent out in December. In March 1986, there were 16 respondents (out of 20) including: Denmark, Finland, Belgium, West Germany, France, Italy, Greece, USA, Saudi Arabia, South Africa, India, Thailand, Malaysia, Philippines, Indonesia and Australia. The inquiry is shown in Appendix 1.

Throughout 1984 and 1985 continuous contact with the General Manager of the LV switchgear subdivision was maintained. In June, a preliminary report was submitted and presented to the top management of ASEA. During 1986 and 1987, a few interviews were conducted to follow up developments in the industry. The final report was presented and accepted (with some minor technical changes) for publication in April, 1987. The chronology of the research process is shown in Appendix 1.

Interviews lasted from 2-3 hours, while follow-up meetings lasted half a day. Most follow-up meetings have been with the General Manager of the LV switchgear subdivision. The work with interviews has been supplemented with internal documents from ASEA, the internal inquiry and some published material. Published material has been very scarce, and very few studies have been detailed enough (down to the level of different types of LV switchgear and apparatus) to be of use to this study. Sources of data in Bloc A are summarized below.

Data Sources - Bloc A

Interviews:

ASEA	-	Sweden
	-	United States
	-	Singapore
	-	Malaysia
Terasaki	-	Japan
Merlin Gerin	-	Singapore

Internal documents from ASEA:

Formal strategic plans - divisional level
Memos by divisional board
Travel reports (to subsidiaries and exhibitions)
Reports from subsidiaries
Presentations from world-wide divisional meetings
Competitor profiles

Internal inquiry - ASEA:

Inquiry regarding local competition in 16 countries in Europe, North America, Africa, Asia and Australia (see Appendix 1)

Internal meetings - ASEA:

ASEA Distribution world-wide meetings, total of 11 days

Published reports:*/

US brokers' reports
Annual reports
Company magazines (only ASEA)
Product pamphlets
Industry report by the British consulting firm O.A. Goulden & Partners

*/ For a complete list, see Appendix 1.

Second Empirical Phase - Bloc B

During the spring of 1985, a start was made on collecting secondary data for a second study - the white goods industry (for reasons discussed above). At this stage magazine and newspaper articles covering Europe were collected. Later that year, in September, extensive material regarding the US industry was obtained in the United States. As well as trade magazines, teaching cases, brokers' reports, annual reports, etc, a very good insight into the industry was gained through interviews with two stock brokers, both vice presidents at the Wellington Management Company in Boston, and the Director of Financial Relations at Sears Roebuck & Co headquarters in Chicago.

In early 1986, a first contact with Electrolux was made, and they agreed to cooperate. As it turned out, our study of the US white goods industry made a neat fit when Electrolux in March announced that they were taking over the third largest US manufacturer - White Consolidated Industries (WCI). At the time we had returned to the United States to conduct interviews with the Major Appliance Business Group of General Electric. However, those interviews were cancelled by General Electric, and instead we turned to collecting additional secondary material.

During the spring, follow-up discussions took place with various staff at Electrolux headquarters, including the General Manager of the white goods division (incorporated as Electrolux Major Appliance Group, January 1987). At these meetings our US study was presented, which was discussed as a contrast to the developments in Europe. In August, we attended an internal conference held in Sweden, which involved managers in the white goods area from headquarters, Zanussi, WCI and a few subsidiaries. In the fall, a few interviews were conducted to increase our knowledge of Electrolux. In November, a three-day trip was made to Zanker - a company Electrolux had acquired in West Germany (now responsible for Electrolux' white goods operations in West Germany). Interviews were conducted with the President, the Marketing Manager, the Export Manager, as well as other staff. A few months later, a final report was presented to Electrolux' headquarters. In April 1987, it was accepted, without modifications, for publication. The chronology of the research process is given in Appendix 1.

Both interviews and follow-up meetings lasted 1-2 hours. These interviews and meetings have worked as check-points, as collecting and interpreting published material and company material continued. The white goods industry is much written about, and it was necessary to sort out relevant data from a wealth of information. The data sources are summarized below:

Data Sources - Bloc B

Interviews:

Electrolux	-	Sweden
	-	West Germany
Sears	-	United States
Wellington Management Company	-	United States

Internal documents from Electrolux, WCI, Zanussi and Philips:

Market reports
Competitor reports

Internal meetings - Electrolux:

Electrolux-Zanussi-WCI meeting, 1 day

Published reports:*/

Teaching cases - Harvard Business School
US brokers' reports
Annual reports
Product pamphlets
Trade statistics from official sources
Industry reports by various Japanese organizations
Industry report by the British consulting firm E.R.C. Statistics International Ltd
Dissertation by M.S. Hunt (1972)

Magazines and newspapers:

Appliance Manufacturer
Major Appliances
Merchandising
Fortune
International Management
Business Week
Financial Times

*/ For a complete list, see Appendix 1.

4.4 VALIDITY AND RELIABILITY

In order to reach valid and reliable conclusions, much time has been spent on collecting data concerning post-war structural evolution in a great number of national industries, and international strategic

behavior, where a large variety of sources have been used. This we think of as a major strength of this study. The weak points regarding supply of data have been on earlier data, and data regarding the Japanese industries and market. The bias towards more recent developments followed from our research design which involved interview work with today's managers (see discussion above on early methodological choices). Another major strength we believe to be the close relationships we have built up with our two main responding companies over a few years. This strength has been more pronounced with ASEA than with Electrolux. Over time, relationships have been built on mutual trust and respect. A sign of this is that both companies invited us to attend internal conferences. At these meetings we had plenty of opportunity to discuss various topics with managers from all over the world in an informal setting. Afterwards we took down important notes. In follow-up meetings, written drafts were presented or made orally, which were commented upon. The results in Bloc B are less reliant upon interviews, which primarily have been used to check facts and interpretations. Generally, interviews in Bloc B have been only half the length compared to Bloc A interviews.

In Bloc A, most data originates from ASEA. Some company bias has been avoided as staff at both headquarters and subsidiaries have been interviewed. However, both interviews, internal reports, and internal data obtained through group works at ASEA Distribution world-wide conferences, and the inquiry sent out in late 1985, have given us a somewhat biased set of data. Most information has covered countries where ASEA Distribution has strong market positions. Thus, data concerning important markets like the United States and Japan has not been available. Interviews conducted in these two countries offset some of that deficiency, but not totally. In Bloc B, where published sources were readily available, such company bias did not pose a problem. As a result of this, the second study is more reliable in that it gives a more complete picture. Therefore, Bloc B has received much more space than Bloc A. Furthermore, to satisfy purpose number two, a full study of one national industry is included in Bloc B.

Regarding the use of interviews, researchers in the social science field face reliability problems. The interviewed person might give answers that he/she thinks are expected, or he/she might present a biased picture of his/her organization, etc. Most of the questions we have asked regarding foreign markets and foreign competitors are not loaded with subjective judgements, and thus the answers should be of relatively high reliability. Of course, answers can be wrong if the person is misinformed. But often the respondents have made clear if they do not know the answer, or if they are not exactly sure. On these points we have repeated the question to other respondents or checked with secondary sources. In a few instances, we have given up and left the questions unanswered.

The reliability of interview data is dependent upon the respondent's level of knowledge, various biases, myths, etc, and how precisely and correctly the interviewer records and elicits responses. The search for facts rather than judgments required in this study is a strength in interview work.

In Bloc A, much time has been spent on follow-up meetings. At these meetings we have projected our view of the structural developments in the industry, as well as up-dated our information. Our experience is that these meetings, however time consuming, are important in order to secure reliability (see discussion in Brodin, 1976). To put together a rich industry study is a huge puzzle, where the many pieces have to be checked and re-checked before they fall into place. When the final industry reports were presented, they were accepted with only a few changes in technical details.

Published material was scarce in Bloc A and massive in Bloc B. Thus, in Bloc B there has been an opportunity to cross-check sources, but not in Bloc A. Statistics regarding trade,*/, market size, etc have been very poor in Bloc A, and thus I have chosen not to present such figures will not be presented here. Tables 5.3 and 5.4, taken from "The World Manufacturers of Motor Control and Distribution Components and Panels", we consider to be of low reliability (due to lack of internal consistency in the document, and lacking table specifications), and are only included to give rough estimates of the ranking of firms. The ranking order has been checked through interviews. In Bloc B, a dissertation written in 1972, and later updated as a teaching case in 1984, constituted a solid base when writing the case on the US white goods industry.

As to the various sources used, they of course differ in their reliability as they involve various biases, possibly false statements and subjective interpretations. The secondary data we have collected on both firm and industry levels have been geared towards clearly identifiable structural characteristics, such as market shares and strategic moves (ex post), instead of judgments about various strategic moves. Especially in Bloc B, it has been possible to cross-check data from several sources. In a few cases minor discrepancies have been noted in, for example, market share data (not of such magnitude that it alters the picture). When collecting primary data through interviews, reliability is more of a problem since the manager's knowledge is clearly biased, and knowledge about competitors is somewhat limited (especially regarding countries where the interviewed company is not a major actor). Furthermore, in the close relationships built up with the companies (especially ASEA), management perceptions have probably been altered along the research process as they are influenced by the researcher (which was actually

*/ SITC (rev 2) codes are too broad. Subgroup 772.1 includes: electrical apparatus for making and breaking, for protecting and for making connections to or in electrical circuits (e.g., switches, relays, fuses, lightning arresters, surge suppressors, plugs, lampholders and junction boxes); switchboards (other than telephone switchboards). (Source: Statistical Papers, Series M, No 34/rev 2, Department of Economic and Social Affairs, Statistical Office, United Nations, New York, 1975.)

the purpose of the two workshops arranged for ASEA; see discussion above). However, such drawbacks we believe to be outweighed by far by the advantages following from such a research design, given our purpose of understanding a process over time in much detail.

Data gathered for our first two purposes is based on clear facts - describing strategic behavior and industry structure - ex post. There is no judgement involved in data such as: company X acquired company Y, or in year X, company Y increased its commitment in foreign industry Z by establishing a green-field plant with a certain capacity. Such phenomena are quite clear-cut and should not involve strong feelings among respondents. The problem of reliability is therefore related to the level of knowledge among respondents, and not to a conscious or subconscious bias. Regarding secondary sources, we have not used subjective interpretations, but picked out the facts. Most such facts are not confidential in nature, and thus we believe business magazines, trade magazines, brokers' reports, etc to be highly reliable when it comes to the facts we have picked out.

Regarding our third purpose of describing action-reaction patterns, subjective judgement comes in as rivalry is described. This is a most sensitive area, and it is fair to say that the results on reaction patterns are the weakest part of this thesis. It has been almost impossible to separate reaction behavior which is directly related to foreign entry, from strategic behavior being part of everyday adjustments related to exogenous changes, and behavior among competing domestic firms. Furthermore, by focusing on the business unit level in the interview work, it has not been possible to detect reaction patterns involving other product areas. Such decision-making made at the corporate level is sensitive in nature, and therefore researchers are not likely to obtain or publish such information.

5. The Low Voltage Apparatus and Switchgear Industries

5.1 INTRODUCTION - MAIN PRODUCTS, MARKETS AND INDUSTRY MEMBERS

The electricity network is basically composed of three steps: generation (diesel power stations, hydro power stations, fossil-fuelled power stations and nuclear power stations), transmission (alternating current or direct current, ranging from 66 KV up to over 1500 KV) and power distribution.

Power distribution represents the part of the electricity network that is closest to the consumer. The distribution area includes both step-down transformation and supply of various voltages in the low-voltage (LV) ($\leq$1 KV) and medium-voltage (MV) range. In industrial power systems these products control and energize the production process, heating, air treatment, lighting, etc. The products perform start/stop functions, enable safe service of machinery and protect machinery and personnel against overload and short circuits. Other areas of LV distribution include: commercial power systems (airports, hospitals, office buildings, etc.), urban and residential distribution, rural distribution (e.g. farms), offshore and marine applications. This chapter will focus upon both major components, termed low-voltage apparatus, and assembled products, termed low-voltage switchgear. Adjacent products such as transformers, medium-voltage switchgear, controlgear, such as control desks, and subdistribution products (miniature circuit breakers (MCB), diazed fuses, etc) are not included in this study. Furthermore, of all the different kinds of apparatus installed into a switchgear, only the major ones are considered here.

Assembled Products

Assembled products for industrial processes are termed motor control centers (MCC). For pure distribution, the products are termed distribution boards, distribution panels, panel boards, load centres or switchboard apparatus.

As a generic name, low-voltage (LV) switchgear is used to cover both motor control centres and distribution panels.

Apparatus

The main low-voltage (LV) apparatus assembled into the switchgear include:

Apparatus	Function
Air circuit breaker (ACB)	To break main incoming current and short circuits
Load switch/safety switch	To break the current for one specific purpose, e.g. servicing a motor
Moulded case circuit breaker (MCCB)	One unit including the loadswitch and fuse functions. The tripped fuse can be reset
Contactor/starter	Perform on/off functions

Other LV apparatus, which are not put in focus, include: industrial fuses, earth leakage circuit breakers (ELCB), thermal relays, solid state relays, motor starters, and programmable control units (PLC).

These products put together into a distribution system execute two main tasks, namely to allocate electrical current to motors, lighting, air conditioning, etc, and also to protect both personnel and equipment. See further Appendix 2 for a more detailed description of a low-voltage distribution system.

The Markets

LV apparatus and switchgear are sold on various types of markets, each with its own competitive characteristics. LV apparatus is mainly sold within the larger electrical firms to in-house switchgear manufacturing units. One source estimated the "closed" market to around 80 %.1/ This figure is probably somewhat high, and has diminished over time as the large electrical firms have begun to externalize the manufacturing of some apparatus.

The main external markets for LV apparatus include: panel builders (manufacturing switchgear), OEMs active in other industries, including compressor manufacturers, white goods manufacturers, etc (such as smaller contactors), wholesalers, and directly to end-users. In the case of Sweden, the after-market is somewhere around 25 % of the total apparatus market.2/

LV switchgear is mainly sold to four types of end-users: utilities, manufacturing industry (ranging from light assembly industry to heavy process industry), commercial and public buildings, and off-shore. Sales are either direct or through wholesalers, electrical contractors or construction firms. Switchgear manufacturers sell switchgear on a product basis, or on a project basis, ranging from small packages up to larger turnkey projects (common in developing countries). Construction and erection of complete distribution systems demand know-how in engineering, civil work and project management. These functions are organized in many different ways. Sophisticated buyers who have developed in-house competence will bargain on a product-by-product basis or on sub-systems. Buyers without this competence will either bargain for a turnkey delivery, or buy the products from one source and let another firm take on the project responsibility.

Figure 5.1 shows the different actors and their relationships.

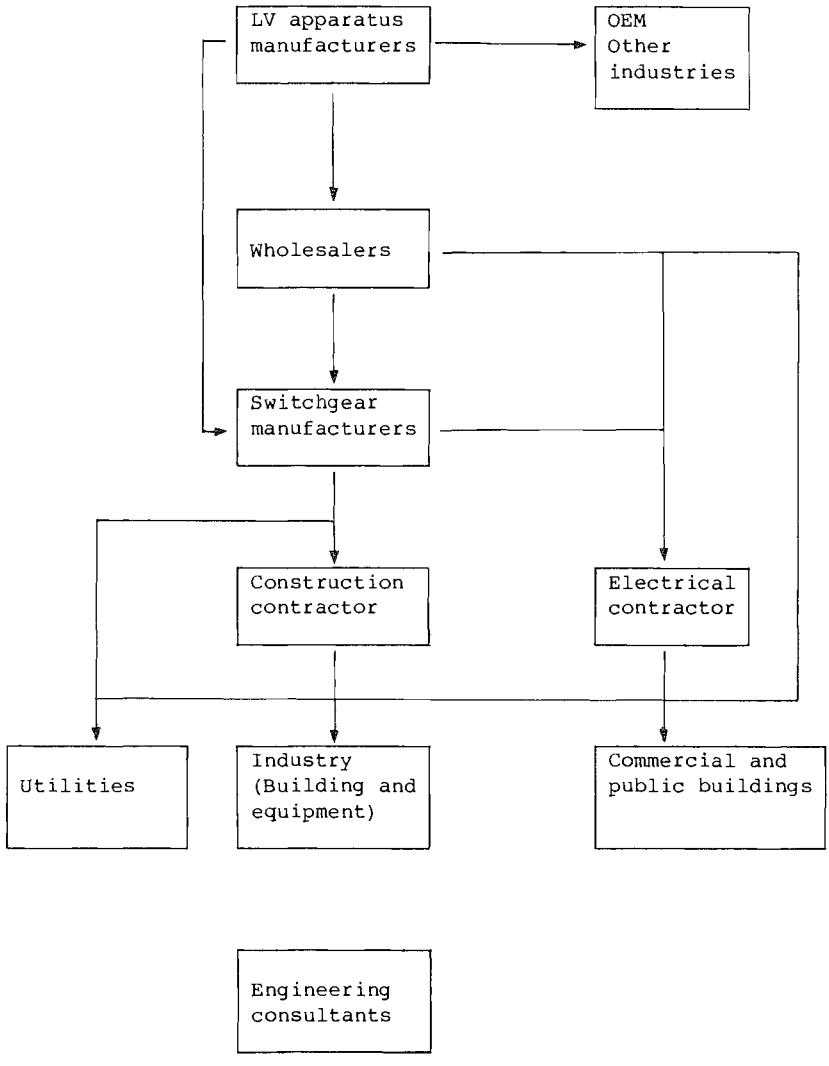


Figure 5.1: The vertical structure - low voltage switchgear and apparatus.

Furthermore, the market can be divided into segments according to product quality, technical standards and order size. There are several product quality segments. Through different kinds of type-tests, products are categorized into different groups depending upon

the level of security the customer wants, or what the contractor in collaboration with consultants has prescribed. The MCC-market is much more surrounded by type-testing regulations than the market for pure distribution panels. Distribution panels are often sold as kits which are assembled by various types of end-users, wholesalers and contractors. Technical standards vary between national markets (and the existence of non-type test products makes them even more heterogenous). For LV switchgear these national standards are clearly pronounced, while for LV apparatus the world is moving towards global standards. The US and Japanese markets are dominated by the NEMA standards, and Europe by the IEC standard. The IEC standard is now slowly being accepted in the US market.

Order size is another ground for segmentation force. For example, an industrial project of some 500 MSEK to 1 billion SEK would normally include some 3-5 MSEK in LV distribution products, which is over a hundred switchgear units. Only the very large suppliers can handle such large orders.

Very low market growth has prevailed throughout the world for the last decade (except for the Middle Eastern markets). The market size is closely linked to the overall level of installed electricity capacity, which in turn is linked to the overall size of industry and infrastructure.

The size of LV switchgear markets in selected countries is given in Table 5.1.

Key Factors in the Various Markets

As described above, there is a host of different buyers, all of which have their specific set of purchasing criteria. Demand characteristics in terms of different preferences for hardware, delivery time, service capacity, price, etc are the basis for product differentiation among sellers. Many of these purchasing criteria will favour switchgear manufacturers with strong local ties, and apparatus manufacturers producing at low cost. The local switchgear supplier is

superior in terms of product adaption, prompt service and delivery, and nas close personal ties with end-users, contractors and consultants. All these differentiation potentials are of high strategic significance in the switchgear market. With a production function that does not put small local businesses in a disadvantageous position cost-wise, product differentiation is a key success factor. However, for the more standardized switchgear, economies of scale are found in the processing of sheet metal. Thus, increased volumes are needed to justify investments in new capital intensive production methods. In the apparatus markets, scale economies in design, type-testing and manufacturing are key success factors (see section 5.3).

Table 5.1: Major LV switchgear markets in 1982

Country	MSEK
USA	11,000
West Germany	4,000
Great Britain	2,300
France	2,300
Brazil	1,600
India	1,000
Canada	1,000
South Africa	700
Sweden	700
Saudi Arabia	600
The Netherlands	590
Norway	560
Belgium	350
Finland	350
Denmark	200
Portugal	120

Note: Figures are approximate.

Source: ASEA internal material.

The larger an LV distribution project is, the larger the demand for a wide product range. Wholesalers also demand broad product lines. Flexibility in the choice of apparatus to be included in the switchgear is important. In larger construction projects, it is not uncommon that consultants or end-users specify brand on switchgear

and/or apparatus. A very heterogenous demand puts pressures on manufacturers to offer switchgear that are easy to modify and expand. There is also a demand for including a larger number of functions into the switchgear, which can be satisfied by more compact apparatus and more efficient design.

Due to heterogenous demand around the world, different technical solutions have been developed for each local market, most often on a national level. A sign of this strong heterogenity is the fact that manufacturing subsidiaries within multinational switchgear manufacturers have developed clearly modified versions for their respective local markets. Sometimes these modified versions have little resemblance to the home country versions.

Within heavy industry (such as the process industry), where costs of a stand-still are enormous, demand is put on availability, reliability, easy servicing and maintenance. Instead of the traditional fixed apparatus groups, manufacturers have developed switchgear with withdrawable apparatus groups for these customer segments. Other demands on hardware include safety aspects and ease of installation. Industrial users, together with utilities, are the technically most sophisticated ones. The manufacturing industry, however, demands the more complex switchgear (motor control centers, MCC), while utilities demand the lower technology distribution boards.

In large industrial projects, the power distribution part is often the last one to be negotiated (as a reflection of its small importance to the whole project), and thus pressure is put on delivery times. For the after-market, the higher the cost of a stand-still, the more emphasis is put on prompt delivery. It is also important for the customer to know that the manufacturer is committed to his market (geographically and product-wise) so that future deliveries of spare parts are secured. A way for the supplier to keep up good relations, especially with expanding customers, is to offer smooth deliveries. The same is true for servicing.

Consultants tend to favour brands (and type tested products) that they have had good and long-lasting experience of. In larger projects in LDCs, there is a clear correlation between the home country of the consultant and the suppliers. Often, brand is specified. The dominant position that indigenous manufacturers have in the home markets in the industrialized world can to a large extent be explained by long-lasting ties between suppliers, buyers and consultants. Products have often been developed in joint efforts between switchgear manufacturers and major end-users, such as utilities.

Competing Firms

Competition includes a wide variety of firms, either specializing in LV apparatus, LV switchgear, or active in both apparatus and switchgear manufacturing. LV apparatus manufacturing is surrounded by entry barriers, and thus there is some stability in the number of firms active in that industry. In the LV switchgear industry, on the other hand, firms move in and out depending on business cycles. Firms which are basically wholesalers contractors or end-users, act as switchgear assemblers from time to time, using their own assembly shops or contracting outside firms. (This is common for the more simple distribution boards.)

Major Electrical Firms

The so-called major electrical firms (a term used in the industry) have a similar history, beginning some hundred years ago when the use of electricity began to gain in importance. From a core technological base in electricity, these firms developed products ranging from electricity generation to electricity powered products. Over the years, the firms became more and more diversified as new applications were developed. Outside the electricity network, including generating plants, transmission, transformation, distribution, cables, etc, they went into industrial motors, trains, elevators, household products (ranging from lightbulbs, fuses to laundry machines) and so on. The majors are all active in the LV distribution field. They have a high

degree of vertical integration, are highly diversified (including electrical goods, industrial machinery, electrical consumer goods, electronics etc), and have extensive international operations. The major ones are listed in Table 5.2. (See also Appendix 3.)

Table 5.2: Turnover in major electrical firms and proportion of foreign sales, 1978 and 1981 (USD million)

	1978	1981	Foreign sales 1981 (%)
General Electric (USA)	19,654	27,089	34
Siemens (D)	13,865	14,857	56
Hitachi Ltd (J)	7,188	8,250	28
Westinghouse (USA)	6,663	9,321	27
Toshiba Corp (J)	5,905	6,558	23
GEC (UK)	4,214	7,911	55
AEG Telefunken (D)	5,998	6,500	43
BBC (CH)	n.a.	5,446	85
Mitsubishi Electric (J)	n.a.	5,179	19
ASEA (S)	2,282	3,458	61

Source: Internal material ASEA; "Industrial Groupings in Japan" (rev. ed. 1980/81), Dodwell Marketing Consultants, Tokyo, Japan; Japan Company Handbook, 2nd half 1984, Oriental Economist.

In the LV distribution area, the major electrical firms offer broad ranges of apparatus, switchgear and project engineering. Competition between these firms is complex, as it involves multipoint competition. Strategic moves in one product area are interdependent with competitors' corporate strategic behaviour. As a result, overall corporate behavior should be taken into account when analyzing business units active in LV distribution within these firms.

The role often played by the LV distribution departments (or separated as business units) has been, during the last decade or so, what is usually referred to as "cash cows". Profits and cash flow have been accumulated in oligopolistic home industries and transferred to growing businesses, such as electronics or higher voltage equipment, nuclear generation plants etc).

A recent phenomenon among the majors is the externalization of apparatus manufacturing, which is becoming increasingly sensitive to economies of scale. Apparatus like MCCBs, ACBs, and contactors are thus sourced from competing firms. These sourcing activities involve international trade and are described below, in section 5.9.

The size of in-house production of motor control components and MCCBs among the majors is given in Table 5.3.

Table 5.3: Major electrical firms, sales (internal and external) of LV apparatus, 1982

Company	Nation-ality	Motor control components, MSEK*/	MCCB, MSEK
Fuji	J	1,200	100
Mitsubishi	J	600	475
BBC	CH	760	160
Westinghouse**/	US	770	360
GE	US	430	330
Siemens	D	825	20
AEG	D	675	0
Toshiba	J	250	50
Hitachi	J	300	50
ASEA	S	90	0

*/ Mainly contactors and switches.
**/ Includes Metzenauer & Jung in West Germany, acquired in 1981.
Note: Figures are approximate.

Source: The World Manufacturers of Motor Control and Distribution Components and Panels, O.A. Goulden & Partners, 1982.

Second-Tier Electrical Firms

Second-tier electrical firms (sometimes called national electrical firms due to their home market orientation) usually offer a broad range of electrical products and services, but are rarely diversified outside this area (like the majors). LV and MV switchgear are two of their major business areas. In Europe these firms are particularly strong and often dominate the national markets. The brand image is often on par with the majors.

Among the group of second-tier electrical firms are those who specialize in manufacturing LV apparatus. As we shall see later on, these firms, referred to as apparatus specialists, have played a very significant role in international competition during the 1970's and 1980's. Second-tier electrical firms with extensive switchgear manufacturing (and transformers, medium voltage equipment, installation, service and project engineering) are usually less vertically integrated backwards into apparatus than the majors, and therefore more flexible in the choice of apparatus assembled into the switchgear. Being heavily dependent on the LV switchgear market, these second-tier firms have reacted strongly during downturns, and have tried to keep up sales of their bread and butter business through aggressive pricing. Many of these firms have also gone out of business during downturns.

National firms do not take part in some markets and market segments where the majors are active. First, they do not have the resources to take on the very largest electrical projects (sometimes involving transmission and generation). Second, they cannot sell to the more sophisticated end-users if they demand in-house made apparatus from the switchgear manufacturer. Third, they cannot cover those multinational buyers who coordinate their purchases across national markets. Thus, the production base is smaller for the nationals than for the majors.

A list of leading second-tier electrical firms in the industrialized world is given in Table 5.4.

A number of other somewhat smaller and more home-market-oriented second-tier firms are mentioned in section 5.5. Since these figures were published, both Merlin Gerin and Terasaki have moved up the list. In international markets these apparatus specialists only offer a few product lines (however with covering programs within those product lines), including LV apparatus like MCCBs, ACBs or contactors. As many of the majors move more and more into electronics, factory automation, etc - slowly harvesting their LV businesses - the apparatus specialists are taking over the leading role in the LV

apparatus market, acting as external suppliers to the majors who continue to manufacture switchgear (which is important in offering large electrification projects). At least three of these apparatus manufacturers are moving towards a global coverage: Telemechanique (contactors), Merlin Gerin (MCCB, ABC) and Terasaki (MCCB, ACB). Harmonization of technical standards, in combination with increasing minimum efficient scale, have been the drivers of such global strategies.

Table 5.4: Second-tier electrical firms, sales (internal and external) of LV apparatus, 1982

	Nationality	Motor control components, MSEK*/	MCCB, MSEK
Telemecanique	F	1,230	0
Square D	US	820	235
Klöckner&Moeller (K&M)	D	690	10
Allen Bradley (AB)	US	590	0
Cutler Hammer (CH)	US	500	0
Merlin Gerin (MG)	F	0	260
Federal Pacific	US	0	120
Terasaki	J	0	100
Sprecher & Schuh	CH	n.a.	n.a.

*/ Mainly contactors and switches.

Note: Figures are approximate.

Source: The World Manufacturers of Motor Control and Distribution Components and Panels, O.A. Goulden & Partners, 1982.

Panel Builders

Finally, we have a group of specialized LV switchgear manufacturers. Compared to competitors discussed above, the panel builders are very small, they rarely assemble type-tested switchgear, and they work in niches (such as a region within a country, or towards a specific set of users). Often, panel-builders are hooked up to larger manufacturers through licensing agreements. Such cooperations can both include switchgear design and sourcing of apparatus. The frequency of entry and exit is quite high as both entry and exit barriers are relatively

low. Panel builders have very strong local ties. Some 40-60 % of total sales value derives from apparatus sourced externally.3/ High apparatus prices can to some extent be offset by low overhead costs.

5.2 TECHNOLOGICAL CHANGE - INCREASED STANDARDIZATION AND HOMOGENIZATION

During the early years of the electrical industry, different technical designs emerged in the most advanced industrialized countries. By the 1930's, four major systems had developed: the British system which was used in the United Kingdom, Eire and throughout the British Empire, the French system which was used in France, Belgium and throughout the French Empire, the German system (the DIN system) which spread around Europe (except Italy) and also to China, and finally the US system (NEMA, National Electrical Manufacturing Association) which spread throughout North and South America, and after World War II was adopted by Japan. In each of the four areas (divided by technical barriers), industries grew up around a stream of electrical products. Outside the four main systems, Scandinavia developed its own system, although heavily influenced by the German DIN standard. Italy also had a system philosophy of its own. But over the years, increased efforts were put into establishing an international standard. Through the body of IEC (International Electrical Code) this work has led to a unification of the different European standards, and as of today two basic standards remain: NEMA (USA, Canada, South America and Japan) and IEC (rest of the world). This homogenization has come a long way for LV apparatus, while national standards still prevail for LV switchgear. The latest development is that the IEC standard is being applied in the US market.

In parallel with a rapid industrialization process, the demand for more sophisticated products grew. The industry for low voltage apparatus developed as a response to the increased need for electricity control and protection that grew in all sectors of industry. In the 1950's and 1960's demand for electricity grew somewhere around 10 % p.a., and demand for motor control grew even more, with the increased motorization of industrial manufacturing.

With the US leading the development in automation, their motor control apparatus and panels grew in size and complexity far ahead of the rest of the world. Early on, a US no-fuse concept was developed, the so-called Moulded Case Circuit Breaker, MCCB (in its infant stage fuses were used as a back-up to cover high rupturing capacities).

The United Kingdom developed the so-called BS 88 fuse and Germany the NH fuse. The French designs did not keep up with the technical development (lacking in high rupturing capacity), and after World War II Merlin Gerin, now a leading French manufacturer, acquired a Westinghouse license for the MCCB.

The MCCB technology has gained in acceptance throughout the world ever since its first development in the United States. Until today the UK (and India) has remained loyal to the BS 88 fuse, while Scandinavia, West Germany, The Netherlands, Austria, Turkey and Iran have remained loyal to the NH fuse. However, when leading firms (dominating the choice of design) in West Germany (Siemens and AEG) developed MCCBs, the use of MCCBs in the home market began to spread. Even in Sweden, one of the very last fuse markets, ASEA is now slowly introducing the MCCB on the home market.

Contactors originate from the block-type contactor which was developed by the Austrian firm Benedikt and Jaeger (around 1938). During World War II, Siemens, AEG and BBC developed a block-type contactor based on the DIN-standard. In the United States, NEMA type contactors were developed. A substitute for the block contactor is electronic switching. However, discussions about this substitution began as early as in the 1960's and still nothing significant has happened.

During the 1970's a new step was taken in the area of motor control, as solid state Programmable Controls (PLC) were introduced. The technology originates from the US, but Japanese and European firms are catching up. One of the first large end-users was the US automobile industry.

5.3 ENTRY BARRIERS

The LV apparatus industry is characterized by large economies of scale in manufacturing. Over the years, components and apparatus have become increasingly standardized. As mentioned above, standardization is also sweeping across the world, homogenizing demand worldwide. Of the two remaining basic standards, IEC and NEMA, the IEC standard developed by European manufacturers seems to be becoming dominant global design. Increasing investments in R&D, using new materials, designing more compact apparatus and introducing more electronics, in combination with significant scale economies, put pressure on manufacturers to increase their volumes. Scale economies put pressure on the manufacturers to sell apparatus to a broad range of customers outside the switchgear industry. Other large customer groups include engineering industries, such as the automobile industry, the white goods industry, and the airconditioning industry. Significant differences in manufacturing costs between small and large operations have brought about a concentration process. Today, only some 20 major producers exist world-wide. The industry is surrounded by relatively high entry barriers which are continuously rising as R&D and other fixed investments increase. Proprietory technology, large scale plants, brand images, etc add up to these significant entry barriers.

The underlying economics of switchgear manufacturing act as a fragmenting force. First, it is a product with a low value/weight relation and, furthermore, it is bulky to transport and store. Second, two switchgears are rarely assembled alike, with every cubicle made to customer specifications. Third, demand characteristics differ between national markets due to differences in technical standards, local preferences, degree of technical sophistication, etc. Fourth, low fixed investments in R&D, production and marketing do not lead to any significant scale economies. Fifth, entry and exit barriers are low (low technology, capital and scale barriers), which favours entry whereever a pocket of demand is created. Sixth, minimum efficient scale (MES) in assembly is low, although the introduction of new factory automation equipment increases MES in this type of assembly operation. With increasing

standardization (especially for MCCs), the potential for scale economies is now increasing.

The economic factors behind switchgear manufacturing have favoured local businesses. Local firms create close ties with local customers (contractors, end-users), consultants, etc. They also develop products that fit local demand perfectly. For the more advanced switchgear, technical standards raise some entry barriers as somewhat larger firms are in a better position to take on type-testing programs.

For the major electrical firms, operating several national assembly plants, there are few advantages in coordinating switchgear assembly world-wide (overhead costs of coordination are not motivated by extensive world-wide synergies), as markets are too heterogenous. However, coordination of sourcing apparatus world-wide offers a growing potential as apparatus standards are homogenized. Given the cost structure, with some 40 % represented by apparatus (25 % materials, 10 % direct labour, 20 % overhead, and 5 % sales),4/ such coordination policies can become a key cost factor for the majors to offset their higher overhead costs.

With low levels of international trade of switchgear and low levels of coordination between subsidiaries within the large multinationals, competition is fragmented into national industries (for a few neighbouring countries such as Sweden and Norway, national industry borders have almost eroded).

5.4 HISTORICAL EVOLUTION IN THE INDUSTRIALIZED COUNTRIES

The LV Apparatus Industry

Due to several factors, including the size of a country, the infrastructure and the structural characteristics among end-users, the apparatus industry and its adjacent industries have developed in different ways in different countries.

In the United States, wholesalers (referred to as distributors) developed as major actors in the vertical chain. Due to a heterogenous demand for apparatus, there were important advantages in having wholesalers do some assembly and testing. As LV apparatus became larger and more complex, there was a joint interest, both among the manufacturers and the distributors, in keeping the number of items down. This led to modulization, where the distributor, with only a few items in stock, could assemble a wide range of apparatus according to customer specifications. The assembly was a one-man back-room operation that could process orders within a few hours.

The German manufacturers established their own networks of small local assembly shops around Germany, and later in neighbouring countries such as Norway, Sweden, Belgium and Holland. The French manufacturers, on the other hand, fostered local independent panel builders. The leading French manufacturers concentrated on apparatus production, which still holds true for the two main manufacturers, Telemecanique and Merlin Gerin.

By 1950 there were somewhere around 1000 apparatus manufacturers, most of them small private firms specializing in making a narrow range of apparatus. There were a few large electrical firms - the majors - which had become full-line producers with a high degree of vertical integration. Over the years they also developed in-house assembly facilities for switchgear (locally at first but later with an international scope), project, installation and service departments. The large firms came to dominate electrical standards in their respective home markets. They led the technical development, and they offered full product lines. This market dominance made large margins possible, and a price umbrella was kept up for the smaller firms. With increasing economies of scale, a concentration process followed. Also, as bargaining positions changed over time, with buyers and consultants becoming more sophisticated, and LV distribution technology maturing, a large number of manufacturers were forced out of the market. (In Europe there has been a clear trend over the last decade of buyers dissolving the project packages offered by electrical suppliers.)

Creation of the Switchgear Industry

Until the 1950's, switchgear assembly was a mere handicraft, mainly carried out by end-users in industry and among utilities. There were also small panel-builders active with their own designs, mainly for urban and rural distribution. Manufacturers of electrical components than began to develop more standardized designs, which better fitted industrial manufacturing techniques. This move of vertical integration forward created a new industry, i.e. the manufacture of standardized switchgear, with new markets and market segments.

Once the new market was created, new firms entered (often pure panel builders) as technology was diffused (through licensing and copying). Except for the manufacturing function, service, maintenance and installation functions were also taken over by the switchgear manufacturers. Electrical contracting continued the development from a product concept into a systems concept.

The new products and systems changed the whole concept of electricity distribution and control. In industrial use, the different apparatus installations were centralized into one "heart" for control of machinery, lighting, etc. A mutual interest between buyers and sellers to develop standardized, more reliable, and safer equipment pushed a rapid market growth during the 1950's and 1960's. Furthermore, most industries were in a process of rapid growth. However, there were marked differences among the different market segments. Industries under severe cost pressures readily adopted the new, more costefficient equipment. Also, the more sophisticated industrial buyers would push for the centralized concept of control, as this led to increased reliability and easier and faster maintenance. For example, in the process industry, where costs of a stand-still in the production were significant, the new concept was readily adopted. Profitable utilities, on the other hand, were slow to adapt.

During the 30 years that followed, the industry experienced a rather slow evolutionary development. The development of a dominant design, better fitted to efficient production routines, emerged in parallel

in the industrialized world. Technical progress was made as different apparatus, busbar systems and casings were type-tested as combined units. Production costs were cut and personal safety increased. Modulization permitted a production process where different apparatus could be added up within a switchgear according to customer specifications. The old well-established firms kept their leading positions as the industry grew in size, both on the traditional markets and in the third world. Behind these leading firms, an array of small and medium-sized firms entered the scene. By 1980, it is estimated that some 5000 panel builders were active world-wide.5/ Very few of these firms are active outside their home country (or even a regional part of the country). Many of the thousand or so apparatus manufacturers active in 1950 are today included in the group of panel builders as they have entered the assembly stage. Over the years, the smaller ones have externalized apparatus manufacturing, not being able to cope with the increasing costs of R&D and large scale production. Instead, they have become pure panel builders, sourcing apparatus externally from the remaining 20 or so major apparatus manufacturers.

5.5 INDUSTRY STRUCTURE AND FOREIGN ENTRY INTO SELECTED EUROPEAN COUNTRIES

Here we will briefly describe competition in selected European countries. Europe, taken as a whole, is still very fragmented, with most countries dominated by indigenous firms. Historically, European markets with powerful indigenous firms have been protected by barriers based on technical standards, as well as established distribution channels and brands. Countries without a strong indigenous industry have used trade barriers to protect local firms, and to attract inward foreign direct investment. As described earlier, three main technical systems evolved in Europe: the British, the French and the German system. Both the West German and the French markets are still little affected by foreign competition. During the 1950's and 1960's, the British market was invaded by US firms. However, as national technical standards are slowly eroding, and international apparatus standards are emerging (such as IEC contactors, MCCBs and MCBs), competition is becoming more

international in character. In the late 1970's and early 1980's, two US firms entered the West German market through acquisitions. Switchgear assembly is still a very local business, although a more homogenous supply of apparatus will homogenize switchgear design as well.

The Nordic Countries

Due to technical similarities and close transportation distances, the Nordic countries could be looked upon as one market area.

The Swedish market traditionally has been dominated by the domestic ASEA. As for most other European markets, with strong domestic switchgear and apparatus industries, technical standards and well-established distribution channels have acted as significant entry barriers. However, Swedish standards have similarities with German standards, lowering the technical barriers for German firms.

Foreign competition includes: Siemens, BBC, AEG, Strömberg (a Finnish company acquired by ASEA in 1986), LK-NES and Lögstrup (the latter two from Denmark). After years of slowly eroding market shares, ASEA is now fighting to get back its dominating position. During the 1960's and 1970's, several small firms built up positions, including: Eldon, Sandblom & Stohne (agent of Klöckner & Moeller) and Elektro-montage (projects only). Danish and Finnish firms also entered the Swedish market and managed to get strong footholds. Strömberg especially became a major threat to ASEA throughout the Nordic markets. Strömberg, which employed some 200 peple in Sweden, with a turnover of some 150 MSEK (35 MSEK in LV apparatus and switchgear) was acquired by ASEA in 1986.

The Norwegian market is largely controlled by foreign firms. Siemens, ASEA and BBC (NEBB) are the main competitors. Siemens, AEG and Telefunken were all confiscated in 1946 and renamed Proton, EGA and NERA. However, once the German industry had recovered and competition grew too strong, Proton and EGA were sold back in the 1970's.

The Danish market is dominated by domestic LK-NES. From time to time, German manufacturers, such as Klöckner & Moeller, enter the market, so far without any major success. LK-NES is the result of a merger in the 1960's. They offer a full LV product program. A domestic market decline forced them out on foreign markets in the 1970's. With a switchgear plant in Singapore they cover a few Asian markets. The Middle East has also been a target market. Within Europe they have entered Sweden, The Netherlands and West Germany.

Other domestic firms include Lögstrup, a panel-builder (turnover 200 MSEK) and Danfoss, manufacturing motor control components. Furthermore, ASEA and BBC have manufacturing units.

Finally, the Finnish market is dominated by the domestic Strömberg. Strömberg employs around 8000 people and has a turnover of some 1.5 billion SEK, of which 25 % is exported. The company controls 80 % of the loadswitch market, 60 % of the contactor market and somewhere around 40-50 % of the switchgear market. MCCBs are sourced from BBC and Siemens, PLC from Alan Bradley and ACBs from Merlin Gerin. In 1985, a new contactor plant was opened in Vasa. In 1986, the company was acquired by ASEA. Three domestic companies: Strömberg, SLM (electrical contracting) and Uhro Tuominen dominate the switchgear market. Only a year before Strömberg was acquired, ASEA had acquired SLM in order to strengthen its position vis-à-vis Strömberg.

West Germany, Switzerland and Austria

The West German market is tightly controlled by indigenous firms. The major ones include: Siemens, AEG-Telefunken, Klöckner & Moeller and Brown Boveri & Cie, BBC (a Swiss firm with extensive German operations). Significant technical entry barriers have been set up by VDE - the specification body - together with DIN. Two US firms, Square D and Westinghouse, have acquired second-tier firms, Starkstrom (Square D) in 1979, and Metzenauer & Jung, using the Fanal brand name (Westinghouse) in 1981. Metzenauer & Jung is known as a technological leader. Rittal is a firm specializing in enclosures, often sold as kits.

Siemens, with a turnover of some 75 billion SEK, is one of the major diversified electrical firms in the world. In the LV area they have major positions in Europe, Asia, South America and are now investing heavily in the US market. After a long history of fuse technology, Siemens went into MCCB and MCB production in the 1970's. Licenses for contactor technology have been sold to Fuji in Japan. Siemens is strong across all product lines, including: MCCB, ACB, contactors and PLC.

AEG, with a turnover of some 45 billion SEK, is also one of the major diversified electrical firms and is fighting its way back from two major financial crises in the 1980's (in 1985 the company was taken over by Daimler Benz). In the LV market they are large in motor control, MCBs and industrial fuses.

Klöckner & Moeller (K&M), established in 1911 (Mr Klöckner had already begun production in 1899) through a merger, is still a privately held company. Production is concentrated in West Germany, but sales are spread world-wide. During the 1950's and 1960's, sales subsidiaries were established throughout Europe and North America. They have a notably strong position in Canada. Foreign plants are located in the UK and Canada. In the home market, K&M control 40 % of the MCCB market and 30 % of the contactor market, and are also strong in load switches.

German systems are used in Austria, and German firms have strong positions in this market. Domestic Benedikt & Jäger, founded in 1920, has some 300 employees. They are a full-line manufacturer of LV apparatus and switchgear. Benedict & Jäger is number one in motor control with some 40 %, followed by BBC, Siemens, Klöckner & Moeller and AEG. The MCCB market is dominated by Klöckner & Moeller, Siemens and AEG.

BBC, founded in 1981, is active in power generation, transmission and distribution. The company is based in Switzerland, but it has extensive operations in West Germany which is looked upon as a second home market. BBC is active on all major markets except Japan and the United States. In West Germany, BBC is strong in contactors.

The Netherlands

The Dutch market, especially the market for distribution panels, is dominated by domestic Hazemeyer (HOLEC). The company employs some 600 people. Hazemeyer is limited to LV apparatus and switchgear. The market share is somewhere around 50 %. Another domestic firm, De Hoop Groenpol, is strong in motor control centers and installation. The company employs some 400 people. Main foreign competitors include: ASEA, BBC and LK-NES.

Belgium

The Belgian market is dominated by domestic ACEC. The company was acquired in the 1960's by Westinghouse and then sold back in 1977-78. Except for switchgear, ACEC manufactures transformers and motors. Foreign competition includes: Siemens, Telemecanique, Klöckner & Moeller, ASEA and AEG. Siemens employs some 6000 people, Telemecanique some 250.

France

The French low-voltage market, third in size in Europe, is controlled by indigenous firms. The leading firms are Telemecanique and Merlin Gerin (MG). These two leaders do not compete in the home market as they have focused on different apparatus. Telemecanique, with a turnover of some 5 billion FFR in 1984 (of which 1.5 billion in LV apparatus) have focused upon contactors (with a 75 % share of the home market), supplying MG and other panel-builders. The export share in 1984 was 58 %. MG, on the other hand, have focused upon MCCBs and ACBs. In the contactor market, two foreign firms have managed to establish second and third source positions behind Telemecanique. BBC and K&M, both with local manufacturing, have 15 % and 5 % each of the market.

Telemecanique has some 25 subsidiaries world-wide. Foreign plants are located in the US, Brazil, Spain, Eire and Belgium. Licenses are sold for example to the USSR. From a very small base in the US market,

Telemecanique took a major step in 1985 by acquiring Gould's control division (part of Gould-ITE). Merlin Gerin has some 70 % of the French ACB market, 65 % of the MCCB market and 60 % of the MCB market. Through acquisitions, MG now has plants in Italy, Belgium, Switzerland and Spain. In Europe, MG is number one in MCCBs, and number two in MCBs after BBC.

The largest French panel-builder is CGE (a loose consortium of companies of which several act as panel-builders). Alsthom, a French manufacturer of medium and high-voltage electrical apparatus and switchgear, sold off its LV switchgear operations to Telemecanique. Alsthom strengthened its position in the medium-voltage field when the Swiss firm Sprecher & Schuh decided to focus upon its LV range, and therefore sold its medium-voltage business to Alstohm in 1985.

United Kingdom

Until the 1950's, the UK had two of the largest switchgear and apparatus manufacturers in Europe - Brookhirst-Igranic and Allen West - and a number of other leading manufacturers of oil circuit breakers, fuses and fusegear (Crabtree, GEC, MEM, etc). When the US firms - GE, Westinghouse and Cutler-Hammer - entered the UK market, no-fuse technology (MCCBs and MCBs) grew in importance. These apparatus were either imported or made under license by local firms.

The leading domestic firm is General Electric Company (GEC). GEC is more active in high-voltage products and projects than in the LV business. However, they do manufacture industrial fuses and they also assemble LV switchgear. Other leading domestic firms include: Crabtree, Midland Electric Manufacturing (MEM, buys AEG apparatus), George H. Scholes & Co, MK Electric Ltd (buys Siemens apparatus) and the BICC group.

Foreign competition includes: GE (Simplex-GE Holdings Ltd), Westinghouse, Cutler-Hammer, Alan Bradley, Square D, Merlin Gerin, Telemecanique, Klöckner & Moeller, Siemens, BBC, Sprecher & Schou, AEG, ASEA, Terasaki and Danfoss.

Cutler Hammer acquired Brookhirst-Igranic in 1972. In 1974, GE and Simplex jointly bought Allen West. GE later divested its Simplex holdings to the Simplex top management team in 1984. In the late 1950's and early 1960's, US firms began to build up strong positions in the UK market. In the late 1960's, European firms like Telemecanique, Klöckner & Moeller, Siemens and BBC entered with the IEC standard.

Italy

BBC, Telemecanique and Siemens have entered and established strong positions in the Italian market. Main domestic manufacturers include: Bassani Ticino, Elettrocondutture and SACE. Bassani Ticino, formed in 1946, has off-shore plants in Thailand (MCBs) and in several South American countries. In Italy, Bassani offers a wide range of LV apparatus and switchgear. Turnover is around 1 billion SEK. Elettrocondutture has a long history of association with BBC (including licenses). SACE, active in both HV and LV switchgear and apparatus, was acquired by BBC in 1968. BBC exports the SACE-manufactured MCCBs.

Summary

These short country and company descriptions tell us two things: first, that major European countries are dominated by indigenous firms, and second, that these national industries are characterized by oligopolistic market structures (especially as regards LV apparatus), and are thus surrounded by significant entry barriers. In Table 5.5 below, the market leaders in contactors and MCCBs are shown.

From this table we can see that only a few firms - Telemecanique, Merlin Gerin (MG), Klöckner & Moeller (K&M), BBC and Siemens - have managed to establish leading positions across several European countries. Only one non-European company - Terasaki from Japan - is on the list.

Table 5.5: Dominant Firms in LV Apparatus, selected European countries, 1983

	Contactor	MCCB
Sweden	Telemecanique (F) ASEA (S)	K&M (D) BBC (CH)
Norway	Telemecanique (F)	BBC (CH)
Denmark	Danfoss (DK) Siemens (D)	K&M (D)
Finland	Strömberg (SF)	MG (F)
Great Britain	Telemecanique (F)	MG (F) Terasaki (J)
West Germany	K&M (D) Siemens (D)	K&M (D) Siemens (D)
France	Telemecanique (F)	MG (F)
Belgium	Telemecanique (F)	MG (F)
Austria	Siemens (D) Telemecanique (F)	MG (F)
Italy	Siemens (D) Telemecanique (F)	BBC (CH)

Source: Internal material, ASEA.

In the switchgear business, even the national markets are fragmented, hosting a large number of local panel builders. Manufacturers with extensive switchgear operations across European markets include: Siemens, BBC and ASEA. But again, their European strongholds outside their home markets are characterized by weak competition. The only foreign positions of significance in Sweden, West Germany and France are Siemens' and BBC's positions in Sweden. Siemens is the number two competitor and BBC the number three competitor after ASEA-Strömbergs in many regions across Sweden. Before Strömbergs was acquired by ASEA, they had a position almost as strong as Siemens.6/

In the LV apparatus market, inter-firm sourcing is common across Europe although in small quantities. One reason is that such sourcing is the result of end-users specifying which apparatus should be assembled into the switchgear. But sourcing also takes place as switchgear manufacturers have avoided developing a full range of apparatus, or externalized some apparatus manufacturing. An example of such inter-firm sourcing is ASEA sourcing small volumes from MG (including MCCBs and some medium-voltage apparatus) and Telemecanique. Klöckner & Moeller sources from Telemecanique, and MG and Telemecanique cross-source.

With increasing competition from both Japanese and US manufacturers, discussions on cooperating on R&D for the next generation of apparatus (a compact unit, the so called integral, combining the MCCB, contactor and thermal relay) began in the early 1980's. Siemens, Klöckner & Moeller, Merlin Gerin and ASEA participated in these discussions, but only K&M and MG decided to begin such a cooperation (which later failed). Telemecanique has invested in developing their own integral, and in 1983 a first version was introduced at the yearly exhibition in Hannover.7/ Still, in 1986 no competing products had reached the market.

5.6 INDUSTRY STRUCTURE IN THE US AND FOREIGN ENTRY

The US market has been totally dominated by domestic firms until the early 1980's, although European firms have been active in the market for over 20 years. Japanese competitors (Mitsubishi, Fuji, Terasaki) have entered the market more recently. Aggressive overseas competition has made the market more price sensitive, and US firms have been active in countering the foreign threat during the 1980's (traditionally LV apparatus and switchgear have been high-margin products).

Leading firms in the LV apparatus and switchgear markets include both major electrical firms, such as General Electric (GE) and Westinghouse and more specialized companies like Alan Bradley (AB), Square D, Cutler-Hammer, Federal Pacific and RTE. Behind these leading firms there is an array of medium and small sized firms with varying focus

both product-wise and geographically. Distributors play an important role as 80-90 % of all LV apparatus and switchgear sales is done through distributors. These distributors are usually independent firms, serving several brands or one brand exclusively (GE, Westinghouse and Square D have in-house distributors, Gesco, Wesco and Graybar). Larger distributors act as panel-builders. All in all, there are close to 7000 independent distributors. In 1984, 96 distributors had over 100 employees, and only 30 had more than 10 locations throughout the United States. Electrical contractors accounted for some 55 % of distributors' sales, and industrial users for some 30 %.

In Table 5.6 the positions of leading manufacturers are shown.

Table 5.6: Leading competitors in the US market, 1975 and 1985.

Competitor number	LV apparatus		LV switchgear	
	1975	1985	1975	1985
1	Alan Bradley	Alan Bradley	GE	Westinghouse
2	Square D	Square D	Westinghouse	GE
3	GE	Cutler-Hammer	Cutler-Hammer	Square D
4	Cutler-Hammer	Westinghouse	Square D	Alan Bradley
5	Westinghouse	GE	Alan Bradley	Cutler-Hammer

Source: Internal Material ASEA.

Most notably GE, in LV apparatus, and Cutler-Hammer, in LV switchgear, have lost their market positions since 1975. Alan Bradley is the market leader in PLC (40 %) and Contactors (30 %). Square D is number two with 10 % of the ACB market, 15 % of the MCCB market and 15 % of the contactor market. GE and Westinghouse are strong in the ACB market (20 % and 25 % market shares respectively), and the MCCB market (20 % and 40 % respectively).

Due to the recession in the early 1980's, switchgear and apparatus manufacturers began to suffer. However, in 1984 when the market picked up again, over-capacity problems in combination with increased foreign competition increased the level of competition. Domestic firms now embarked upon quick delivery programs, they began to be more flexible in their price setting, etc. In the contactor market, Siemens-Allis, the leading foreign entrant, began the price cutting.8/ Both Square D and GE, with 20-25 % market share each, reacted aggressively with even larger cuts. Among foreign entrants, Siemens has put the most emphasis on establishing a strong market presence. Through 85 % owned Siemens-Allis, Siemens acquired Gould's Distribution and Control division in 1982, which had sales that year of about USD 300 million. Siemens bought a full product line of circuit protection products, panelboards, switchboards, bus systems, motor control centers and residential products, and most importantly, a distribution network, including electrical distributors and regional assembly plants.9/ In 1985 they were close to acquiring Alan-Bradley. The price Siemens offered was close to Rockwell's, and shows Siemens' ambition of getting established in the US market. Siemens also acquired a part of Challenger from GTE-Sylvania, manufacturing PLC products. In 1985, Telemecanique acquired Gould's electrical controls operations, which had sales of about USD 70 million in 1984. Production consisted of contactors, switches, relays and starters. Through these acquisitions, Siemens and Telemecanique have gained footholds much stronger than the other European companies - Klöckner & Moeller, ASEA, Strömbergs (acquired by ASEA in 1986) and Sprecher & Schou (S&S) - selling through sales subsidiaries. Merlin Gerin acts as a supplier of breakers to Square D, S&S of IEC contactors to GE, and Strömbergs of IEC contactors to AB. A major barrier to entering the US market is the technical differences between the NEMA standard (US) and the IEC standard (Europe). In the contactor market, the European companies have pushed the more compact and lower priced IEC standards in the US market, and have thus put pressure on the higher-margin NEMA products.10/

US manufacturers and distributors have well-established ties. A manifestation of these ties is the so-called sales policies that all leading manufacturers have adopted. These policies include:11/

- Contractors must order from distributors - not direct.

- Manufacturers should sell only to authorized distributors.

- Parts must be ordered from distributors.

- Standard distribution equipment (load centers, safety switches, etc) must be ordered from distributors.

- Motor control centers can be sold directly to end-users.

- Manufacturers should discourage direct shipments outside the accepted market area for the distributor, in order to encourage the local distributor to obtain and support business locally.

Leading competitors 12/

General Electric, GE, is by far the largest electrical company in the world. The company today consists of three main product areas: high technology businesses (5 businesses), services (4 businesses) and core businesses (6 businesses). In addition, Ladd Petroleum provides feedstock for USD 2 billion a year of materials business and supplies, a semi-conductor business supplies electronic components, and, finally, GE Trading Company takes care of Barter Trade.

According to Chairman Jack Welch, the strategy is to be dominant or close to dominant in the 15 main business areas. GE is actively engaged in both divestures and acquisitions. Main divestures in 1984 were: Utah, sold for USD 2 billion, Housewares, sold for USD 300 million, and Family Finance Second-Mortgage Business sold for USD 600 million. Acquisitions included: Employers Reinsurance Corporation for USD 1.08 billion and Patrick Petroleum for USD 197 million.

In the LV area, GE has a domestic market share of close to 20 %. GE entered the PLC market in 1981 and reached a 7-9 % market share in 1984. More recently, GE has become more active in sourcing LV apparatus externally.

Westinghouse is going through a major restructuring phase, having closed down several plants around the world (mothballed six of nine Brazilian plants). The East Pittsburgh Switchgear Operation as well as the Motor Control Operation in Chicago have been relocated. In total, six switchgear and apparatus units have been reduced to four within the United States. Westinghouse is the leading domestic MCCB manufacturer. A new series of MCCB (series C) has been developed. Both MCCBs and MCBs are sold to competing firms such as Cutler-Hammer and Alan Bradley. In 1981, Westinghouse established a foothold in the West German market by acquiring Metzenauer & Jung.

Westinghouse has managed to get a foothold on the Chinese market in several areas: turbine technology, low-voltage circuit breakers, and motors and panelboards. Joint ventures are established both in China and Japan. The Japanese venture with Mitsubishi will produce gas circuit breakers for use in power plants and substations. Foreign plant locations include: Canada, Mexico, Brazil, West Germany, Australia, Taiwan, Korea and Japan.

Gould is active in several electronic businesses, such as test and measurement equipment, factory automation, electronic components and materials, defense products, medical products and high-performance minicomputers. In 1980, turnover was some USD 2.2 billion, with 43 % electrical equipment, 35 % electronics and 22 % industrial equipment.

Gould had a 35-40 % market share of the PLC market (leading supplier to the automobile industry), out of a USD 450 million market in 1984. The long-term goal is to upgrade the product line of industrial control with solid state devices, which fits Gould's strategy of becoming a pure electronics company. Gould-ITE's LV businesses have been sold off to Siemens-Allis and Telemecanique.

Eaton is a major electrical company and supplier to the auto industry. In 1979 they acquired Cutler-Hammer (CH), a switchgear manufacturer founded in 1893. The product line includes: contactors, starters, relays, indicators, switches, motor control centers and PLCs. CH uses both distributors and its own OEM sales force. CH is

more oriented towards heavy industry than Square D and Alan Bradley. Except for CH, Eaton also acquired a pushbutton manufacturer - Master Specialties Company.

Square D, with a turnover of USD 1.1 billion in 1983, is one of the technological leaders in the LV area. They are also active in various electronics businesses, factory automation, etc. They are active on foreign markets, such as Great Britain, Spain, West Germany, Australia, Brazil, Mexico and South Africa. In 1978, they acquired German Starkstrom-Gummersbach. Some breakers are sourced from Merlin Gerin.

Alan Bradley (AB) is a leader in the industrial automation business with a superior technology image. The company had revenues of USD 942 million in the fiscal year 1984. They dominate the PLC market with a 40 % share. In 1985, it was announced that Rockwell International had acquired Alan Bradley for a price of USD 1.65 billion.13/ Several European manufacturers, including Siemens and ASEA, also took part in the bidding contest for AB.

Over the last 30 years, GE and Westinghouse have slowly lost market shares, while Cutler-Hammer, Gould and Alan Bradley have all gained market shares. In the MCCB market, Westinghouse controls 30-40 %, GE and Square D 15-20 %, Federal Pacific 10 %, Gould-ITE 10 % and others 10 %.

5.7 INDUSTRY STRUCTURE IN JAPAN

The two preceding sections have contained short descriptions of industry structural characteristics in major industrialized countries and entry of foreign competitors. One major national industry has been left out - Japan. Industry structure in Japan resembles the other industrialized countries in its oligopolistic structure. However, European and US firms are almost absent in the Japanese market.

The Japanese market is tightly controlled by domestic Mitsubishi, Hitachi, Fuji and Toshiba. US electrical standards were adopted after World War II. Mitsubishi is by far the largest in the LV business, except for contactors, where Fuji has a 40 % share (Mitsubishi 20 %, Hitachi and Toshiba 10 % respectively). K&M and MG hold minor positions in the MCC market.14/

Mitsubishi Electric is a member of the Mitsubishi Group, one of the largest in Japan. It is the third largest of the electrical equipment companies and ranks 11th among Japanese industrials. It is the strongest exporter of electrical power equipment, and has a strong position in the office automation market. Although its semiconductor operations are smaller than Hitachi's or Toshiba's, it is making heavy investments in the area and has stronger positions in defense electronics and satellites. Mitsubishi is the dominating force in the LV distribution and motor control markets. Their old ACB generation resembled Merlin Gerin's line, and the new generation is close to Terasaki's (a smaller family-owned Japanese company). Mitsubishi dominate the MCCB and MCB markets with market shares of around 50 %. In the motor control market Mitsubishi is not among the top three.

Fuji employs over 13,000 people and has an annual turnover of some 7 billion SEK. The company is primarily involved in HV switchgear, generators, transformers and heavy electrical machinery. Fuji is the leading competitor in motor control, and has some 10-15 % of the MCB and MCCB markets. Fuji supplies several Japanese companies with contactors, among them Terasaki.

Following these four leading firms is a number of small and medium sized apparatus manufacturers and panel builders. Most noteworthy is Terasaki, a family-owned company, going for the world MCCB and ACB markets. Terasaki has a 15 % share of the Japanese MCCB market. Furthermore, they supply Mitsubishi with ACBs. Switchgear has mainly been sold to marine users. After the second World War Terasaki began to develop switchgear adapted to marine usage. With the boom of the Japanese shipyards Terasaki experienced a period of rapid growth. The

company began to export switchgear to shipyards around the world, and within some niche products virtually developed a world monopoly. With the decrease in shipbuilding, Terasaki found it necessary to develop its "second leg" - ACBs and MCCBs. Export channels, built up for selling marine switchgear, were used initially to export its breakers. Various kinds of private label and supply arrangements were established throughout the world, excluding the US market.

The Japanese manufacturers are active throughout Asia. Mitsubishi is gaining position throughout the whole area, with strongholds in the Philippines, Thailand, Malaysia and Indonesia. Fuji has strongholds in Thailand and the Philippines. Mitsubishi also has strong positions in Saudi Arabia and Greece.15/

5.8 ENTRY AND PENETRATION PATTERNS ACROSS THE OCEANS

In spite of high entry barriers, especially in distribution and brands (as technical barriers are eroding), the commitment of foreign competition is rapidly increasing throughout Europe and in the United States, while the Japanese market is basically untouched.

Entry of US Firms into Europe

Following the tide of US foreign direct investment in Europe after World War II, US manufacturers of LV apparatus and switchgear also established European positions. The first plants were built in the United Kingdom. These plants mainly produced for the local market and were used as export platforms only to a limited extent. Square D erected manufacturing facilities in UK in the mid 1950's. Competing US firms followed suit. In 1963, GE established a 50/50 joint venture with a UK firm, the TI group (named GE-Simplex). Westinghouse acquired two UK firms - Ottermill and Chilton - in 1964. Cutler-Hammer acquired Brookhirst-Igranic in 1972. The US companies gained strong positions in the UK market, but were almost absent in other European markets with indigenous manufacturers. Over the long run, penetration of the UK market was facilitated by the no-fuse technology invented by US firms. It is important to note that the US

manufacturers were heavily influenced in their design by the US automotive industry. The US suppliers of LV apparatus and switchgear thus had an advantage in selling to US-owned companies in the UK, such as Ford, GM/Vauxhall, Cummins Diesel, and Caterpillar. However, resistance by the market was fierce. In 1964, two UK firms - Reyrolle (with a Westinghouse license) and ECC (a joint venture with a US company, Federal Pacific) - presented MCCBs for the first time.16/ Slowly the MCCB market took off, with 10 % penetration in 1970 and 40 % in 1981. When US companies had opened up the market, other European firms like Merlin Gerin from France entered, and later Japanese firms. In 1982, four US firms together controlled around 55 % of the MCCB market in the United Kingdom.17/

In the contactor market, US firms also managed to establish strong positions in the United Kingdom during the late 1950's and 1960's, by introducing a new modularized concept (substituting the unit starter concept). Again, European firms followed suit, however, with another more compact technical design. A large number of these foreign entrants entered through agents, although a few companies like Klöckner & Moeller, ASEA, Danfoss, Siemens and Sprecher & Schou had already established sales subsidiaries before 1970.

In the 1970's, the leading US companies began to feel increased competition, both in the UK and the US markets (see section 5.6) and several countermeasures were taken. Square D, with a strong position both in the home market and in the UK market, acquired Starkstrom in 1978. The acquisition gave Square D a position in the West German market, a production base in Europe, as well as the IEC based technology. Westinghouse followed original suit in 1981, acquiring Metzenauer and Jung, recognized as one of the technological leaders in West Germany. Westinghouse had already entered a few continental markets in the 1960's, including Belgium (acquisition of ACEC), Portugal (acquisition of EFACEC) and Spain. GE in its joint venture with TI, acquired the market leader in the UK - Allen West - in 1972, and later in 1978, GE bought out its joint venture partner, taking full control of GE-Simplex. However, in 1984 GE divested the company.

US entry into foreign industrialized markets has not been through private label arrangements. Instead, they have tried to establish their own brand names or used acquired brands. Westinghouse is here an exception, selling MCCBs under private label (they also supply AB and C-H in the home market).

Entry of Japanese Firms into Europe and the United States

Japanese companies have entered Europe and the US very cautiously. So far, they have not invested in local manufacturing (neither greenfield investments, joint ventures nor acquisitions) in the industrialized world. Instead, they have built up networks of agents and sales subsidiaries covering the whole of Europe and the United States. Mitsubishi (contactors, MCCB, ACB and PLC) and Terasaki (MCCB, ACB) have been the most active throughout Europe. They sell both branded apparatus and under private label. Branded apparatus is sold to panelbuilders, while the large firms negotiate private label contracts. A case in point is Terasaki, manufacturing ACBs for ASEA (sold under the ASEA brand). Terasaki sells branded and unbranded apparatus to several of the other majors, including: GE (for the Middle East market), BBC (for LDC markets) and Siemens (for the US market). Fuji and Siemens have had ties with each other, where Siemens licensed contactor technology to Fuji, and Fuji supplied Siemens with MCCBs. However, with Fuji being too aggressive competing with Siemens (for example in the US), this cooperation dissolved.17/

5.9 INTERNATIONAL GROWTH - TWO DIFFERENT PATTERNS OF INTERNATIONALIZATION

Two patterns of internationalization can be observed. A few major electrical firms became multinationals more than 50 years ago. If we take a closer look at the internationalization of their LV apparatus and switchgear businesses, we see a few clear patterns. Major industrialized countries have been avoided, i.e. the home markets of other major electrical firms. Instead, industrialized countries without strong indigenous manufacturers or developing countries have been targeted. Entry into developing countries has largely been

through large electrification projects, with LV apparatus and switchgear being only a minor part of the total project. If repeated businesses have occurred in a country, small workshops have been established. These workshops, requiring only small investments to start (and to close down), possess several advantages. They add to the flexibility in delivery, reduce transport costs for bulky panels and create a local image. Some of these assembly shops have continued to manufacture outside the large projects, the rationale being that extra switchgear sales would increase the manufacturing base of apparatus in the home country. With negligible transport costs and significant economies of scale, such production increases would add to the overall cost situation. However, LV apparatus, developed in the parent company for the home market, rarely fits the needs of subsidiaries (in terms of price, quality etc), especially not in developing countries. In spite of this, some apparatus and switchgear developed in the home market can be sold through projects to developing countries (as the competitiveness of each individual product is not tested against those offered in the local market). If we take a closer look at the foreign strongholds of one major electrical firm - ASEA - we can include: Norway, Denmark, Portugal, Malaysia and New Zealand. Sales to the US, West Germany, Japan, France and the UK are negligible. The major threat in the Nordic market - Strömberg from Finland - was acquired in 1986, and thus ASEA established a strong position in Finland as well (the number two competitor in Finland was also acquired a year before the Strömberg acquisition). Foreign strongholds of other major electrical firms also include a few neighbouring markets and distant third world markets.

Even if the major electrical firms have developed extensive international networks of sales subsidiaries and local assembly shops, internationalization has been limited to countries without strong indigenous competitors. The strong national fortresses (home industries of international competitors) have been almost untouched. Competition has largely remained national, with separate competitive games in each national industry (which have developed into national oligopolies). However, during the last decade or so, another type of

firm showed up in international markets, exhibiting different internationalization patterns.

Apparatus Specialists Going for the Global Market

A few undiversified companies, facing limited growth in their respective home markets, started an internationalization process of a new magnitude over a decade ago. These firms, facing different home industry structures, made heavy commitments in this mature business by investing in research and development and factory automation, developing broad procuct ranges (within narrow product segments) and establishing positions, not only in third world markets, but also in major industrialized countries. To be able to enter industrialized countries, the specialists have invested in getting approvals throughout a large number of markets, such as UL approvals (underwriters laboratories) in the United States. As a result of such investments, the specialists have established themselves as technological leaders. At first, LV apparatus could only be sold to panelbuilders without in-house apparatus production, but they slowly broke into the large vertically integrated electrical firms. The inroad into those firms was facilitated by the fact that their purchases of LV apparatus were not coordinated across markets. Thus, subsidiaries around the world made their own decisions about whether to purchase from the parent company, or from the local agent (or sales subsidiary) of an apparatus specialists. With a focus on a few types of apparatus (however, with a full range), the apparatus specialists have become low cost producers and they have managed to outperform transfer prices asked by headquarters in the large multinational firms. The uncoordinated purchasing policies also meant that local companies, acquired by major electrical firms, could continue with their own purchasing policies. At a later stage, some parent companies also started to source part of their apparatus line from the apparatus specialists for their home markets. Several major electrical firms neglected to invest in new apparatus, while the specialists made heavy investments, which led to a form of unintended harvest. By comparing in-house manufacturing costs with apparatus prices offered by the specialists, externalization decisions became a

reality. Such externalization resulted in the breach of a long-standing tradition of in-house made apparatus.

In cases where a technological shift was involved, which would require even more investments by the majors and second-tier electrical firms to catch up, the incentive to source these products externally was even more pronounced. Two examples include: the introduction of IEC contactors on the US market and the introduction of MCCB technology in the Swedish market.

To establish themselves in the industrialized world, the apparatus manufacturers have used two major routes: first, the products were introduced to panelbuilders under the specialists' own brands and second, large manufacturers were offered private label arrangements (such as ASEA's new ACB, manufactured by Terasaki). Telemecanique, as the dominant force in the contactor market, also acquired a US company to gain control of a local brand and distribution network. Telemecanique was the first specialist to become an international force, beginning some 20 years ago. In the MCCB and MCB markets, Merlin Gerin and Terasaki did the same thing, beginning in the 1970's. These three companies act aggressively throughout the developing world and Europe, and are slowly establishing themselves in the US market. Furthermore, both Telemecanique and Merlin Gerin have now established a first foothold in the Japanese market (MG has a Japanese partner - Omron). Klöckner & Moeller from West Germany is also trying to build up an international position in both contactors (technology partly acquired from Telemecanique) and breakers. Outside its home market, K&M has strongholds in Canada, UK, the Netherlands and Denmark.

One important home industry related factor is common for all the apparatus specialists: their dominating position in a narrow range of apparatus, which in turn has been translated into yields that have been used to subsidize foreign expansion. In the case of Terasaki, there are also two home market related factors specific to Japan that have spurred the company to expand abroad. First, Terasaki had found a niche in supplying the Japanese ship-builders with marine switch-

gear and control systems, and the company had become very dependent upon that market. When the Japanese shipbuilding market began to decrease, there was pressure on Terasaki to increase its sales of breakers, which could not be done in a mature home market. Second, Terasaki is a family-owned company, and to keep its independence from the larger industrial groups, and still grow to become a large company, markets have to be found outside Japan.

A few major electrical firms have shown that they want to be competitive with the specialists in major markets. In the MCCB market, Westinghouse, Siemens and Mitsubishi have invested in new product programs, and are active across a large number of markets. Interestingly enough, Mitsubishi received its first license to manufacture MCCBs from Westinghouse (after World War II). In the contactor market, Siemens and Fuji (based on a Siemens license) are building up positions, although they are far behind Telemecanique.

NOTES TO CHAPTER 5

1/ O.A. Goulden & Partners, 1982. Estimate.
2/ Interview data, ASEA.
3/ Ibid
4/ Ibid
5/ O.A. Goulden & Partners, 1982. Estimate.
6/ Internal material, ASEA.
7/ Ibid
8/ Interview data from sales manager in the U.S.
9/ Dean Witter "Equity Research", 1985.
10/ Ibid. Interview data also confirms this development.
11/ Internal material, ASEA.
12/ Taken from various brokers' reports, see Appendix 1.
13/ Appliance, February 18, 1985.
14/ First Boston research (1983) and internal material, ASEA.
15/ Internal enquiry, ASEA.

16/ O.A. Goulden & Partners, 1982.

17/ Ibid

18/ Interview data, ASEA.

6. The White Goods Industry

6.1 INTRODUCTION - PRODUCT CHARACTERISTICS AND INDUSTRY MEMBERS

This chapter encompasses a product area usually referred to as major home appliances, or white goods. White goods include the following product lines: kitchen appliances, such as ranges (electric and gas),1/ refrigerators, freezers, microwave ovens and dishwashers (products mainly found only in the US market include compactors and disposers) and laundry products, such as washing machines and dryers. Product design and features vary a lot between each national market. Also, within these national markets various product segments exist, ranging from high-end colour coordinated built-in appliances, including all possible features, to low-end standard free-standing appliances devoid of any frills. Apart from differences in capacity (compact appliances versus standard size appliances), quality, technical sophistication, appearance, etc, white goods are offered in an almost unlimited number of combinations (various refrigerator-freezer, convection-microwave oven, washer-spinner-dryer combinations).2/ The basic designs of all these products, except the microwave oven, were developed before the Second World War.

Continuous development efforts have led to better-featured and more energy-efficient appliances. Product standardization, the use of new materials, etc have also led to products which are more efficient to manufacture. Metal has been substituted for plastic, fiberglass insulation for foam, flat steel for coiled steel, etc. To speed up replacement demand and to reduce price elasticity, firms have pursued strategies of product differentiation as markets have saturated.

Several studies have also confirmed the importance of brand loyalty in purchases of household appliances.3/ Typically new features have been introduced on more exclusive products and, a year or two later, on brands with lower quality images. Today, major competitors throughout Europe, Japan and the United States pursue multibrand strategies to effectively combine manufacturing economies with branding strategies. In some cases, manufacturers have chosen to concentrate the range of products in production, but kept or expanded their number of brands and models, by sourcing from competing firms. Tnis practice is much more developed in the United States than it is in Europe or Japan.

White goods are manufactured in plants with specialized assembly lines. Plants are often specialized for only one product line, such as a refrigerator plant. However, with increasing plant automation in combination with strategies of increasing product differentiation, the number of models produced in a plant has risen sharply. Between 1980 and 1986 the average factory in Europe increased its range fivefold.4/ Most input goods, such as motors and pushbuttons, are standardized components which are sourced externally to a large extent. Historically, however, the appliance manufacturers developed and manufactured most of their components in-house. Strategically important components, such as compressors, are manufactured by the leading firms, which supply their in-house assembly plants as well as the many small assemblers that still exist, especially in Europe. With new plant machinery, such as robots and CAD/CAM equipment, the major firms are putting renewed interest into large scale component manufacturing. For example, GE and Matsushita, two of the largest actors, have made large investments in new lines of rotary compressors during the 1980's. In this "component race" even some of the larger firms have fallen behind, both in terms of volumes and technical sophistication, and have been forced to source components externally. For example, in the United States, WCI (the third largest actor) decided to source rotary compressors from Sharp and Sanyo, two Japanese manufacturers. In Europe, Electrolux acquired a licence from Mitsubishi, another Japanese player.

The main cost driver, scale economies, can be found in both manufacturing and distribution. A trade-off exists between centralized production versus transportation distance. However, within the two continents, USA and Europe, production scale seems to outweigh shipping distances. Trade between the three continents (excluding microwave ovens and compact appliances) is almost non-existent. This phenomenon is also due to different technical standards and tastes.

In manufacturing, long series are important to keep costs down, while in distribution, a broad product mix is important to gain economies of scope in advertising (brand proliferation), sales force utilization (as many buyers purchase more than one type of appliance) and transportation (especially to smaller customers who do not utilize a full truckload of one product line for each delivery). Shared costs across product lines are important to distribution costs, where economies of scope can be found in the distribution of both white goods and other consumer durables, such as consumer electronics (often referred to as brown goods). An important case is the microwave oven market, where brand images have been tranferred from the brown goods market (TV sets, hi-fi equipment, etc) to the white goods market. Furthermore, broad-line manufacturers can reduce the cost of purchased goods by coordinating purchases across several product lines, using the same input goods (sheet metal, motors, compressors, etc). Broad-line manufacturers can also differentiate their products with service offers at a reasonable cost. Finally, the existence of powerful retailers put the large low-cost manufacturers in a better bargaining position than the smaller ones. In the retail sector, the exposure of the product is important in proliferating a brand. Full-line brands receive a much better exposure than the narrow-line brands. Distribution costs vary depending upon the product and the channel through which it is sold. For example, a top-of-the-line laundry machine, sold through an appliance store, presupposes a gross margin to the retailer three times that of a standard chest freezer sold through a supermarket or discount store.

Homogenizing Component and Product Standards

Both product standards, such as safety standards, and tastes differ between nations. For some products these distinctions are significant, while other products are sold across national markets with only minor local adaptions. The trend is towards international standardization of components and basic designs. However, through adding various features, changing configurations (refrigerator-freezer, single-double door, washer-dryer), changing colours, etc, products can be differentiated to fit local tastes at low costs. As of today, only microwave ovens are manufactured on a global basis. Within Europe refrigerators, freezers and dishwashers are hauled across national borders to an increasing extent. In washing machines some national markets prefer top-loading, others prefer front-loading machines and some markets are mixed. The proportion of free-standing versus built-in appliances also varies across national markets. Standards and tastes regarding ranges are the most heterogenous. Except for microwave ovens, only small quantities of white goods are shipped between the United States, Europe and Japan. A parallel can be drawn with the automobile industry, where US, European and Japanese cars have differed significantly. However, just as Japanese compact cars have found a market in the United States and Europe, Japanese compact appliances have slowly gained market shares on behalf of larger, less energy efficient appliances.

Component standards are homogenizing world-wide. The extreme case is the Magnethron (the main component in the microwave oven), where a few Japanese and Korean manufacturers act as suppliers to all established brands world-wide. In the latest generation of compressors to refrigerators (rotary compressors), global standards are evolving. The same is true for electronic controls.

Actors in the Vertical Chain

Between the final customer and the manufacturers of different raw materials and semi-finished goods, there are a number of industries involved in the process of manufacturing and distributing the

products. In Figure 6.1 we have outlined the major actors involved. The vertical structure differs widely across national markets.

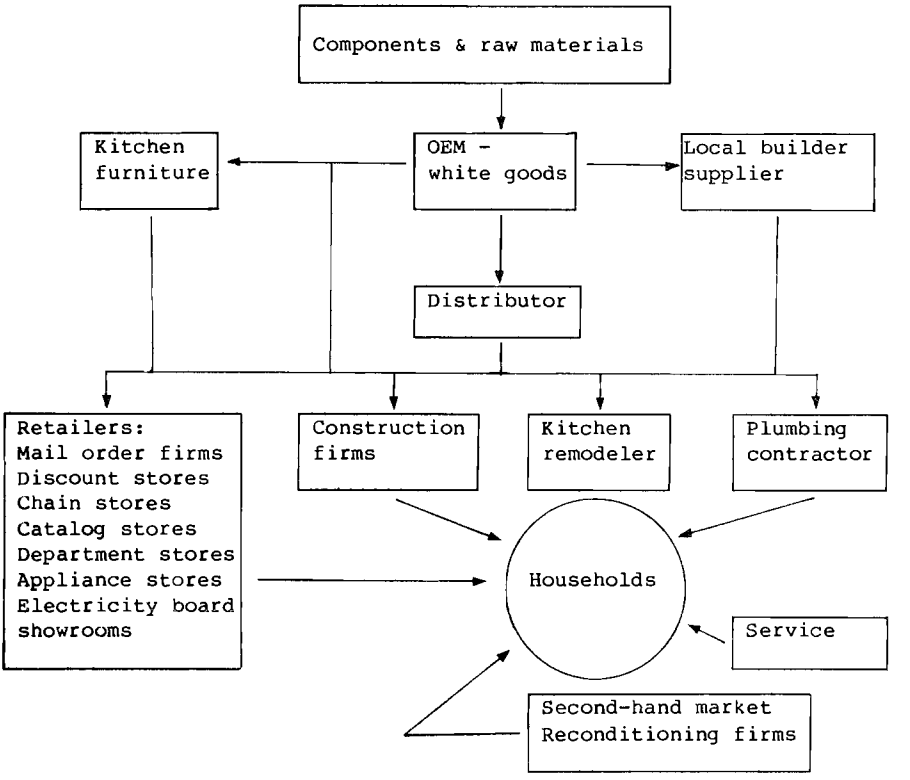


Figure 6.1: The vertical structure - white goods.

In the marketplace there exist both manufacturers' brands and retailers' brands. National retailers' brands have, for example, prominent positions in the United States and West Germany.

Manufacturers of white goods (OEM) include a large variety of firms in terms of size, degree of diversification, vertical integration and internationalization. Major electrical firms - highly diversified, vertically integrated and active in international markets - compete alongside non-integrated single-product firms, only active in the home market. In Table 6.1, the major electrical firms active in white goods are listed.

Table 6.1: Major electrical firms active in the white goods industry 1987.

Company	White goods brands
General Electric, GE (USA)	General Electric
	Hotpoint
Siemens*/ (D)	Siemens
	Bosch
	Constructa
	Neff
	De Dietrich
AEG (D)**/	AEG
General Electric Company, GEC (UK)	Hotpoint
	Cannon
ASEA (S)	Cylinda
	Asea-Skandia
Philips (NL)	Philips
	Bauknecht
	Ignis
	IRE
Thomson (F)	Thomson Frigeco
	Brandt
	Vedette
	Sauter
	Thermor
Mitsubishi (J)	Mitsubishi
Matsushita (J)	National
	Panasonic
Toshiba (J)	Toshiba
Hitachi (J)	Hitachi

*/ In a joint venture with Bosch (D), Bosch-Siemens Hausgeräte (BSHG).

**/ AEG owns 3.2 % of Thomson Grand Public, with an option to raise that to 10 %. AEG was taken over by the Daimler-Benz group in May, 1986.

Source: Compiled by the author.

A few diversified companies (not belonging to the major electrical firms) have minor white goods operations. In the United States, Raytheon is active in the microwave oven market (Raytheon invented the technology in the 1940's). Hoover (based in the US and part of a conglomerate, the Chicago Pacific Corporation since 1985) is a leading manufacturer of vacuum cleaners worldwide. The company is also active in white goods, not in the home market but in the United Kingdom and Australia. From its UK base, Hoover is now trying to

penetrate other European markets. The TI group, based in the UK, is active in a wide range of products including: steel tubes, automotive components, bicycles, specialized engineering and domestic appliances (the Creda brand). The domestic appliance business, accounting for some 25 % of total turnover, is only active in the home market. This business was acquired by GEC in mid 1987.5/

In Japan, there are two diversified companies which are not among the group of major electrical firms - Sharp and Sanyo. Their main line of business is consumer electronics (audio and video systems, calculators, etc), but they are also active in electronic communication, air conditioning and white goods.

Firms specializing in domestic appliances include a large number of companies, both large and small. Some are almost totally dedicated to white goods, while others are active in electrical products, such as vacuum cleaners, sewing machines, commercial appliances, air conditioning, small kitchen appliances, consumer electronics (often referred to as brown goods) and personal care products (e.g. electrical shavers). Some of these products have a common denominator in distribution and service. In the United States, there are only a few sucn firms left as the industry has consolidated. Except for range manufacturing (where many small actors are still in existence) only five firms are left (except for GE): Whirlpool (selling under the Whirlpool, Hobart, Kitchen Aid and West Bend brands and also a large part under private label), Maytag (selling under the Maytag, Jenn-Air, Hardwick, Admiral, Norge, Revco, Magic Chef and Gaffers & Settler brands), Roper and Design & Manufacturing (D&M) (both predominantly selling under private labels), and Litton (only active in microwave ovens). The Litton microwave oven company is separated from Litton Industries which is a large diversified electronics company.

In Table 6.2, the leading white goods manufacturers in Europe are shown.

Table 6.2: The 50 largest manufacturers of white goods (excluding ranges) in Western Europe. Production (thousands of units) in 1978, 1982 and 1985.

Company	1978	1982	1985
Philips (NL)	3,995	3,225	3,140
Zanussi (I)*/	3,385	2,815	2,924
Bosch-Siemens (D)	1,995	2,025	2,420
Thomson (F)	1,900	1,725	1,575
Electrolux (S)	1,410	1,365	1,416
AEG (D)	1,575	1,505	1,175
Candy (I)	1 025	940	915
General Electric Company (UK)	620	635	870
Liebherr (D)	350	570	750
Miele (D)	570	690	740
A. Merloni (I)	85	300	560
Merloni Ariston (I)	570	660	555
Indesit (I)	1,725	1,165	550
Ocean (I)	430	435	515
Hoover (UK)	600	465	450
Lec Refrigeraton (UK)	390	320	440
Thorn EMI (UK)**/	610	370	360
Philco (I)	305	325	290
Tube Investments (Creda) (UK)***/	350	200	280
Blomberg (D)	215	285	245
Vestfrost (DK)	95	130	245
Derby (DK)	20	150	218
Gram (DK)	210	210	205
Smeg (I)	120	115	185
Iberna (I)	160	320	180
Gooding-Servis (UK)	190	200	170
ASEA (Cylinda) (S)	90	110	150
Siltal (I)	135	135	123
Caravell (DK)	50	105	121
Norfrost (UK)		30	100
IAR (I)	45	45	80
Schuurink (NL)	120	100	70
Eudora (A)	55	60	67
Industria Termotecnica Campana (I)			60
DAI (I)			60
Austria Haustechnik (A)			60
UPO (SF)	35	45	45
Frigor (DK)	60	25	42
Riber (I)	55	90	40
MEA (I)	20	30	40
Cordes (D)	30	60	40
Osbypannan (S)	30	40	35
Helkama-Forste (SF)	15	25	35
Vitri Frigo (I)			25
Elcold (DK)	10	30	20

Table 6.2 (cont'd)

Company	1978	1982	1985
Mondial Frigor (I)			20
Burco Dean (UK)	150	60	20
Siron (I)	15	20	10
Hemmermann (I)			10
Buderus (D)			10

*/ Acquired by Electrolux in 1985.
**/ Acquired by Electrolux in 1987 (the white goods business only).
***/ Acquired by General Electric Company (GEC) in 1987 (the white goods business only).

Source: Internal material, Zanussi.

Most of these European firms are specialized within a few product lines, sold under one or two brands, and under private label. Electrolux is the company with the most brands (received through acquisitions). In 1987, Electrolux sold under the following names: Electrolux, Elektrohelios, Husqvarna, Elektra, Strömberg, Atlas, Voss, Zanker, Arthur Martin, Faure, Therma, Lincoln, Zanussi, Rex, Zoppas, Castor, Frigidaire, White-Westinghouse, Gibson, Kelvinator, Philco, Hupp, Franklin, Tappan, Anaheim, O'Keefe & Merrit, Bendix, Tricity and Moffat.

6.2 STRUCTURAL EVOLUTION IN THE EUROPEAN WHITE GOODS INDUSTRIES

Introduction

During the early 1900's, white goods industries emerged all around Europe. Entrepreneurs and innovative engineers started up manufacturing of ranges, washing machines and, later, refrigerators. Different designs and technical standards emerged in the various national markets. High transportation costs combined with high tariff barriers meant that manufacturers only supplied national or sometimes part of national markets from their plants. Competition was largely kept within national barriers until the 1960's, but in order to gain economies of scale firms began to widen their geographical

scope. Italian producers who had developed cheap standard products began in particular to conquer the European market. The low-priced products were often sold under private label. Later, the Italians also managed to build up an image of being the design leaders in Europe. However, several Italian manufacturers, like Zanussi and Indesit, got into financial trouble. As a result, the Italian industry has consolidated, and Zanussi was taken over by Electrolux. As a production platform, Italy still holds the number one position with 39 % of the total European production, after West Germany with 22 %, France 11 % and the UK 10 %.6/ Production has been rationalized, and total employment in the sector in Italy was cut in half from 70,000 to 35,000 between 1975-1985, while the production volume was maintained.7/

In the 1960's, markets began to open up (with the formation of EFTA and the EEC) and increasing export activity could be noticed. However, national structural characteristics, such as existing distribution networks, established brands, old customer ties, etc, in combination with high transportation costs, made export strategies less successful. Thus, entry barriers effectively kept out foreign intruders. Given the underlying scale advantages, some firms continued to strive for a larger market than their home market, in spite of the export problems. This led to a wave of foreign acquisitions. The national consolidation phase continued with a European consolidation phase beginning in the 1970's. However, today there still exist some 300-350 fringe manufacturers in Europe, behind the leading five (Electrolux-Zanussi (25 %), Philips (13 %), Bosch-Siemens Hausgeräte (BSHG) (12.5 %), AEG (8 %), and Thomson and Indesit (6 % each)) who control some 70 % of the European white goods market. (For sales figures see Appendix 3.) The concentration ratios vary somewhat between product lines. In 1985, the number of firms, each manufacturing equal to or more than 0.1 % of total production in Western Europe (which is close to the market figure as imports from other areas are small), amounted to: 30 firms in freezers, 28 in refrigerators, 26 in washers, 22 in dryers and 15 in dishwashers. The figure for the five product groups taken together was 47. Four-firm concentration ratios amounted to: refrigerators 53.6 %, freezers

39.5 %, washers 42.0 %, dryers 48.3 % and dishwashers 59.9 %. The number of European manufacturers of ranges probably exceeds 100. In Italy alone there were 30 firms with 0.1 % or more of Italian production in 1985.8/ The group of 300-350 "fringe manufacturers" consists of a wide variety of firms. A large number of these firms are typically family-owned businesses running one assembly plant. Furthermore, the output is sold in the national market, often under private label. In terms of product specialization, companies are divided into "wet product companies" (washing machines, dryers and dishwashers), "cold product companies" (refrigeration and freezing) and "hot product companies" (ranges and ovens). When these companies sell under their own brands, they often source part of their product line externally in order to be able to offer a full range of products. A few companies have focused on more exclusive products.

During the last decade, the industry has been characterized by an over-capacity in the range of 20-40 %, low growth and low or negative profit rates. AEG, Thomson and some Italian manufacturers have survived only after government intervention. Lately, the industry has witnessed increased competition from East European manufacturers. The East Europeans have attacked the low-price segments of refrigerators and free standing ranges. Except for the microwave-oven market (representing only 3 % of the total European white goods market in 1985), Japanese importers have not made any major inroads into any of the European markets. In 1986, Matsushita, Sharp and Toshiba announced plans to start production of microwave ovens in Europe. US firms are not active in Europe. However, Whirlpool is showing increasing interest in the European market. A joint venture with Philips is under way.9/

Product Markets

The European market, totalling almost 130 million households, is characterized by very low, or in some instances even negative, growth. The refrigerator, range and freezer markets are close to saturation. Even if individual national markets have been growing, the total European market has decreased since 1978. Only the market

segments for dishwashers (with only marginal growth) and microwave ovens have grown. In Table 6.3 penetration levels are shown for the various product groups.

Table 6.3: Penetration levels in selected European countries, 1981*/ and 1985, (% of households).

Country	Washing machines		Dish-washers		Refrige-rators		Freezers		Microwave ovens
	1981	1985	1981	1985	1981	1985	1981	1985	1985
D	90	95	25	33	95	98	52	61	4
F	81	84	19	28	96	97	30	39	2
B	80	83	16	19	93	95	45	51	2
NL	87	91	11	13	98	98	44	52	n.a.
I	88	95	16	18	89	95	28	35	n.a.
UK	80	87	3	8	94	98	31	43	15
S	65	72	21	25	94	98	66	76	n.a.

*/ 1978 figures for The Netherlands, Italy, and United Kingdom and 1979 figures for Sweden.

Source: 1981 figures - Zahlenspiegel der Deutschen Hausgeräte Industrie 1983, Zentralverband der Elektrotechnischen Industrie e.v., Franfurt (Main).
1985 figures - leading electrical appliance manufacturers in Europe, E.R.C. Statistics International Ltd.

Dishwashers

Penetration rates in Europe compared to the US have been significantly lower. In 1984, the penetration rate in Europe reached 15 % compared to 45 % in the United States. In 1975, the penetration rate in Europe was only 8 %. The market has levelled off, with sales reaching 1.89 million units in 1978 and 1.95 million units in 1986.10/ Between 1965 and 1970, the growth rate was as high as 25 %, while between 1970 and 1980 it slowed down to 8 %.

Most markets prefer free-standing dishwashers. However, in West Germany and Italy built-in models now account for around 60 %, in Austria over 70 %, and the Netherlands around 50 %.11/ In 1975, free-standing units accounted for 73 % of the total European demand, as compared to only 58 % in 1984.

West Germany is the largest market (30 %), followed by France (25 %), Italy (13 %), Scandinavia (10 %) and other countries (22 %). In terms of production location the picture is a different one, see Table 6.4.

Table 6.4: Main exporting countries of dishwashers, 1984 (thousands of units).

	Production	Exports	Export share of domestic production (%)
West Germany	1,040	500	48
Italy	450	255	57
Sweden	160	73	45

Source: Internal material, Electrolux.

Production of dishwashers is concentrated to a few countries. West Germany, Italy and Sweden are exporters, Spain is on a balance, while all the other countries are importers. Except for France, where imports amount to 50 %, these importing countries import almost 100 % of the dishwasher demand.

The concentration of production to a handful of countries is the result of a few companies' successful strategies, building up market presence throughout Europe. Leading manufacturers include: Electrolux-Zanussi, Philips-Bauknecht, BSHG, Miele, AEG, Candy and Indesit. Strong market positions are found in the home market and neighbouring countries without strong indigenous manufacturers. However, in a few cases markets with strong indigenous manufacturers have been penetrated. Notable examples are the Netherlands, France and the United Kingdom (see Table 6.5).

Philips have had a long-standing tradition of strong local market presence with a high degree of local manufacturing throughout Europe, not only in white goods, but through a wide range of products (e.g. light bulbs, consumer electronics, records and tapes). Relatively weak positions in the West German and Italian white goods markets have been strengthened through acquisitions. During the last few

years, BSHG has become the leading manufacturer of dishwashers, far ahead of the others (in 1985 Bosch-Siemens manufactured 500,000 units as compared to 290,000 units for Philips-Bauknecht, which is the number two competitor).12/ The company not only retails branded and unbranded dishwashers, but also sells manufacturing licenses to foreign manufacturers, for example to Hotpoint in the United Kingdom.13/

Table 6.5: Dishwashers: market shares (%) in selected European countries, 1983.

	NL	D	F	UK	S	I
Philips-Bauknecht	22	27	15	15	5	X
BSHG	10	18	12	8	5	7
Indesit		4		22		X
Electrolux-Zanussi	15		8	16	75	30
Candy				5		
Miele	25	17				
AEG*/	15	8			5	

X = Unknown market share above 5 %.
*/ AEG in Sweden is no longer a subsidiary of AEG. However, they sell appliances made by AEG in West Germany.

Source: "Leading Electrical Appliance Manufacturers in Europe", E.R.C. Statistics International Ltd, London, 1985.

To give the reader an idea of the various distribution patterns across Europe, important distribution channels of dishwashers in selected European countries are outlined in Table 6.6 below. Specialized trade accounts for about half the total European market, kitchen fitters for some 15 %, department stores 5-10 %, wholesalers 5-15 % and other types of retailers 10-25 %.

Table 6.6: Important distribution channels of dishwashers in selected European countries.

	Specialized trade	Wholesalers	Kitchen fitters	Department stores	Hardware stores	Discount houses	Supermarkets
West Germany	x	x	x				
France	x					x	x
Italy	x	x					
Austria	x	x	x				
Belgium	x	x	x				
UK	x		x	x			
Spain	x				x		
Holland	x	x	x				

Source: Internal material, Philips.

Washing machines

The European washing machine market is divided between top-loading washing machines and front-loading washing machines. Top-loading machines have accounted for 25-30 % of the total European market during the 1980's.14/ France and Finland are the two countries with the highest proportion of top-loading machines (80 % and 70 % respectively).

Two countries - Italy and Spain - are the main exporting countries. West Germany and France are on a balance, while the rest mainly import (see Table 6.7). Around 2 % of the European demand is imported from Eastern Europe (mainly Yugoslavia).

Table 6.7: Washing machines: demand, production and trade figures for selected European countries, 1984, (thousands of units).

	Demand	Production	Net export	Net import
Italy	1,320	3,330	2,010	
Spain	700	1 040	340	
West Germany	1,495	1,680	185	
France	1,420	1,240		180
UK	1 605	995		610

Source: Internal material, Electrolux.

In 1983, the total European market amounted to 8.35 million units, down 0.15 million units from 1978.15/ In 1983, the washing machine market accounted for 26 % of the total European white goods market. The penetration rate in Western Europe in 1980 was 74 %, compared to 79 % in the United States.16/

Leading competitors are shown in Table 6.8. No dominant firm existed before 1982. However, the mergers of Electrolux-Zanussi and Philips-Bauknecht have changed the situation.

Table 6.8: Washing machines: market shares (%) in Western Europe, 1977 and 1982.

	1982	1977
Zanussi	10	8
Philips	10	7
Thomson	8	7
Bosch-Siemens	6	5
AEG/Zanker*/	6	9
Indesit	4	8
Hotpoint	4	4
Hoover	4	6
Candy	4	4
Miele	4	4
Electrolux	3	4
Bauknecht**/	2	2
Others	35	32

*/ Zanker was later acquired by Zanussi, which in turn was acquired by Electrolux.
**/ Acquired by Philips.

Source: Internal material, Philips.

AEG, Indesit and Hoover were the main losers in the late 1970's and early 1980's. Philips and Electrolux have been the winners. These two companies have strong positions throughout Europe. BSHG is strong in the home market and in neighbouring Belgium and in the Netherlands, as is Miele and AEG. Thomson is only strong in its home market - France. (See Table 6.9.)

Table 6.9: Washing machines: market shares (%) in selected European countries, 1983/1984.

	B	F	D*/	NL	UK	S	I
Electrolux (incl. Zanussi, Zanker)		13	4	22	8	70	28
Philips (incl. Bauknecht, IGNIS)	23	20	7	17	6		3
Bosch-Siemens	4	4	25	8 4			4
Thomson		40					
Miele	14	2	16	13			
AEG	6	2	14	15			5
Hoover	4	2			20		
Hotpoint (GEC)					25		
Indesit				5	9		6
Candy				4			15
Servis					8		
Thorn					8		

*/ The German retail chain Quelle holds a 20 % share of the market (sourced under private label, mostly from Italy).

Source: "Leading Electrical Manufacturers in Europe", E.R.C. Statistics International Ltd, London, 1985; Baden Fuller, et al (1987).

Refrigerators and freezers

Market positions in refrigerators and freezers resemble the dish-washer and washing machine markets - with one big difference - the number of small manufacturers. Electrolux and Philips have strong positions throughout Europe (except for Electrolux in West Germany). Interestingly enough, Electrolux became as strong as Philips in the Netherlands (stronger in freezers) through the acquisition of Zanussi. In France, Electrolux acquired a well-established firm - Arthur Martin - in 1977. Arthur Martin is a leading brand beside Thomson (several brands) and Philips. West German manufacturers like AEG, BSHG, Miele and Blomberg have noteworthy positions in the freezer market. In the United Kingdom, two local companies, Thorn-EMI (acquired by Electrolux) and LEC are the two leading manufacturers.

Refrigerators reached a penetration rate of 96 % in 1980, while freezers have levelled off at a 30 % level.17/ Refrigerators accounted for 30 % of the total market for white goods in 1983. 9.6 million units were sold in 1978 as well as in 1983. Freezers accounted for 12 % of the total market. Sales reached 3.4 million units in 1983, down 0.4 million units from 1978.

Ranges and Microwave (MW) Ovens

Ranges accounted for 23 % of the total white goods market in 1983, with a total volume of 7.35 million units, down from 8.0 million units in 1978. Range manufacturing is the most fragmented part of the industry. Leading manufacturers include: Electrolux-Zanussi with some 17 % of the total European market, Philips-Bauknecht and BSHG with 8 % each, Thorn and TI-Creda with 6 % each, and Thomson, AEG and Ulgor with 3 % each. National markets are dominated by domestic firms. (See Table 6.10.)

Table 6.10: Electric ranges: leading manufacturers in selected European countries, 1983, (%).

	UK	F	D
Thorn-EMI*/	35		
TI-Creda**/	35		
Belling	20		
Thomson		X	
Electrolux		X	
Philips		X	X
Siemens			X
AEG			X
Kuppersbusch			X

X = Unknown market share above 5 %.

*/ Acquired by Electrolux in 1987.
**/ Acquired by GEC in 1987.

Source: "Leading Electrical Appliance Manufacturers in Europe", E.R.C. Statistics International Ltd, London, 1985.

The European microwave oven market experienced a slow take-off in the early 1980's - the penetration rate only reached 4 % in 1984, as compared to 42.5 % in the United States.18/ All the leading European manufacturers have entered the market. Japanese manufacturers entered the European market early, through exports. Philips, which pioneered the European market, decided to centralize its manufacturing to Sweden (the Norrköping plant is the largest manufacturing unit of MW ovens in Europe). Electrolux acquired a US manufacturer - Tappan (Tappan manufactured 536,000 units in 1983). Part of the US production is shipped to Europe and sold under various Electrolux-owned brands. The total European market amounted to over 3 million units in 1986, as compared to 200,000 units in 1978 (see Table 6.11). More than 50 % of the market in 1983 was supplied by Japanese firms. In Great Britain, which is the largest market in Europe, the Japanese penetration rate is over 70 %. Microwave ovens accounted for 3 % of the total white goods market in 1983.19/ Leading manufacturers are shown in Table 6.12.

Table 6.11: Microwave ovens: selected European markets and total European sales (thousands of units).

	1980	1982	1984	1986
Great Britain	110	480	1,200	1,635
Scandinavia	12	25	75	287
West Germany	65	80		560
France	17	40	122	301
Italy	2	8	15	54
Total Europe	230	667	1,653	3,056

Source: Internal material, Electrolux.

In the UK market, Creda (now acquired by GEC) has a joint venture with Hitachi. Furthermore, Zanussi established a joint venture with Litton - European Microwave Ltd. In 1985, Zanussi bought out Litton (however, with a continuing license from Litton). Thomson cooperates with Toshiba, and Bosch-Siemens with Matsushita. Several Japanese companies are about to start production in Europe (in the UK). Samsung from Korea has also established a plant in the UK. Several leading European brands source smaller microwave ovens from Korea.

Table 6.12: Microwave ovens: leading positions in selected European countries, 1984.

	UK	NL	F	D	S
Sharp	X				
Toshiba	X				
Thorn-EMI (Tricity)*/	X				
Panasonic	X				
Electrolux	X				X
Philips		X			X
Moulinex		X	X	X	
Thomson			X		
BSHG				X	
AEG				X	
Miele				X	

*/ Acquired by Electrolux in 1987.

Source: "Leading Electrical Appliance Manufacturers in Europe", E.R.C. Statistics International Ltd, London, 1985.

Europe in Transformation

The white goods industry was transformed during the 1970's and 1980's, with a handful of manufacturers building up international positions. However, only two companies - Electrolux and Philips - have managed to create a major presence throughout the European market. The decisive move in creating such a market position was taken by Electrolux through its acquisition of Zanussi. However, the acquisition of Zanussi was just one link in a chain of acquisitions, starting in Sweden back in the early 1960's.

Electrolux had started in 1910 as a manufacturer of vacuum cleaners. In the early 1960's, Electrolux' white goods business was still limited to refrigerators (based on the old absorption-type technology, acquired by Electrolux from the two Swedish inventors von Platen and Munther). However, in 1964, Electrohelios was acquired, and Electrolux now began to broaden its line of white goods, and increase volumes in order to make rationalizations possible. Electrohelios was a technical leader in compressor-type refrigerators (and also a manufacturer of freezers and ranges). In the late 1960's

and early 1970's, Electrolux was restructured (the white goods business had made losses in the mid 1960's). Assets, such as the 30 % holding in Electrolux Corporation in the United States, were sold off, and new companies acquired. Expansions were geared at vacuum cleaners (for both private and commercial purposes, and later also cleaning services) and white goods.

Acquisitions were not only made in Sweden, but also in neighbouring countries. With close transportation distances, manufacturing could be rationalized within the Nordic market, with each plant manufacturing one line of products. In the 1970's, the expansion turned to Europe (see further Table 6.13). In the late 1970's, Electrolux had acquired some 80 firms for a total of one billion SEK, and sold off for 800 million SEK during the same period.20/

Table 6.13: Acquisitions made by Electrolux in the white goods industry, 1964-1987.

Acquired company	Country	Year
Electrohelios	S	1964
Electra	N	1967
Scan-Atlas	DK	1967
Ankarsrums Bruk	S	1968
Oy Slev AB	SF	1969
Håkansons Industrier	S	1971
Kreft Sarl	LUX	1972
A/S Vestfrost	DK	1972
Wilhelm Loh	D	1973
Arthur Martin	F	1976
Neston Martin	B	1976
Menalux	CH	1976
Bono	CH	1976
Therma AG	CH	1977
Prometheus	CH	1977
Husqvarna	S	1978
Tappan	USA	1979
Zanussi*/	I	1985
Zanker	D	1985
White Consolidated	USA	1986
Thorn-EMI**/	UK	1987

*/ Acquired a 49 % share in 1984.
**/ Only the white goods business.

Source: Compiled by the author. Sources include: Forsgren (1981) and Andersson, et al (1982).

Electrolux' extensive international manufacturing operations are the result of acquisitions. These acquisitions have primarily been motivated by the need for local brands, designs and established distribution networks, rather than plant capacity. But given the added plant capacity, Electrolux has put in great efforts to rationalize production through plant specialization. For most products, only one plant is used as a source for all of Electrolux' European brands. Component production is also rationalized. In order to coordinate component production worldwide, a new group - Electrolux Component Group - has been formed in Italy, based on Zanussi's component operations.

In 1984, Zanussi operated 24 manufacturing subsidiaries (20 in Italy) and 13 sales subsidiaries in Europe and in the United States. The number of plants had increased from 33 in 1979 to 50 in 1983. In the same year, 29,000 people were employed (reduced to 22,000 in 1984 and an expected 14,000 in 1987),21/ and sales had reached USD 1,058 billion. However, in 1984, the company had run substantial losses for a few years (USD 176 million between 1978-1982), and the Zanussi family (with 90 % control of the company) decided to sell out to Electrolux (after a final fight between Electrolux and Thomson). The main losses derived from unrelated products, such as consumer electronics. In 1984, around 70 % of Zanussi's total revenues derived from the white goods sector.

Zanussi nad diversified into consumer electronics in the late 1970's through several acquisitions. In the Italian colour TV market, Zanussi had only managed to reach a 13 % share in 1982, far behind Thomson's 30 % share and Philips' 25 %. Zanussi was heavily dependent upon Thomson, sourcing 80 % of its need for picture tubes from its main rival. A state-run electronics holding company (REC) then tried to reorganize the domestic TV industry by merging the electronics operations of Zanussi and Indesit (another Italian manufacturer of both white goods and consumer electronics). However, the government efforts never succeeded. With the reorganization of Zanussi under the new owner, Electrolux, unrelated areas such as prefabricated housing, catering equipment and consumer electronics (Ducati) were divested.

At least two of Electrolux' attempted acquisitions have failed. In the 1970's, Electrolux tried to acquire the TI group in the United Kingdom and later, in the early 1980's, they tried to take over the white goods division from AEG.

Philips and Electrolux are the only two companies with extensive international manufacturing. A few other companies have established one or two foreign manufacturing operations. For example, Spain is used as a low-cost sourcing platform. The role of Spain as a sourcing platform is likely to increase with its new status as a member of the Common Market (which has led to a 12.5 % reduction in tariffs). Moulinex has a plant for microwave ovens, Hoover has one for dishwashers. Philips and Electrolux have acquired local companies (Electrolux obtained Ibelsa through the acquisition of Zanussi). (See Table 6.14.)

Table 6.14: Manufacturing subsidiaries in Europe, 1986.

	S	DK	UK	F	CH	D	A	I	ES
Electrolux		1,2	1,2,3	2,4,5	2,5	1,4		1,2,4,5	1,2,4,5
Philips	3			4		5		1,2,4	1
Merloni			4						
Candy		1,5							
Miele							4		
Moulinex									3
Hoover			X						5
LEC				1					

1 = Refrigeration appliances
2 = Ranges
3 = Microwave ovens
4 = Laundry appliances
5 = Dishwashers
X = Product range unknown

Source: Compiled by the author.

Philips established an extensive network of subsidiaries across Europe as early as the 1920's (many of these later turned into manufacturing subsidiaries). Philips and Co was already established in 1891, manufacturing electric lamps. In 1912, the company was reorganized under the name N.V. Philips' Gloeilampen Fabrieken. Foreign expansion began in the early 1900's. Prior to the end of the

First World War, products were sold through agents or directly to wholesalers, throughout Europe and in a few non-European countries. In the 1920's, agents were replaced by sales subsidiaries, in 24 countries, of which six were outside Europe (including Japan, India, Mexico and South Africa). During these years, Philips entered the field of radio broadcasting and radio receivers. In the 1930's, other products, such as X-ray equipment, recording equipment, telecommunication equipment, electric shavers, white goods and welding products, were added. The great depression of the 1930's led to severe import prohibitions in all major markets. In an attempt to protect its foreign market shares, Philips established local assembly facilities around the world. Of a total of 40,000 employees in 1929, 33 % were employed outside the Netherlands, while in 1976, 78 % of a total workforce of 391,500 employees were employed in foreign subsidiaries (some 70 % of the total labour force was employed in Western Europe). Foreign plants were devoted to the local market. However with the formation of the Common Market and increased competition, the role of the manufacturing subsidiaries changed dramatically. Plants were specialized to fit into international production networks within the Philips group. During the 1980's, Philips has consolidated its decentralized manufacturing network. In Europe alone, 35,000 workers were laid off between 1980 and 1982, and almost 20 plants were closed down. Major acquisitions in the late 1970's and early 1980's include: Magnavox (consumer electronics), Westinghouse Lamp Division, GTE-Sylvania and Philco (TV-sets) in the US, Grundig (25 %) in West Germany, and Marantz (50 %) and Matsushita Electronics (35 %) in Japan.

The major domestic appliance division of Philips is a full-line manufacturer of white goods. Manufacturing and marketing activities include Western Europe, South America, The Middle East, Africa and Australia. Headquarters and main facilities are located in Comerio, Italy. A large factory in Classinetta, Italy, was run as a joint venture (Industrie Riunite Eurodomestici established in 1970) with Italian Ignis, until Philips acquired Ignis. Another joint venture

for the production of dishwashers was set up with Bauknecht in West Germany. Also in this case, Philips acquired its partner in 1982. Outside Europe, Philips manufactures white goods in Mexico, Argentina, Colombia, Indonesia and Australia. Cooperative ventures for the production of refrigerators were set up in Egypt and China in 1983. In 1982, domestic appliances accounted for 12 % of total sales of 86.4 billion SEK. It was the most profitable division.

A few companies - mainly based in Italy and West Germany - rely on exports for their international sales. The main ones include: BSHG (D), AEG (D), Miele (D), Indesit (I), Merloni (I) and Candy (I). The two German manufacturers predominantly sell under their own brands, while the Italians have a large proportion of private label sales.

The internationalization process of a few European firms, paralleled by a European concentration process, is driven by economies of scale in component manufacturing and assembly. However, impediments in the form of widely differing tastes, established brand names, national electrical standards, etc impede the potential of utilizing economies of scale in manufacturing. To overcome these barriers firms have, on the one hand, been highly responsive to local standards and tastes, but have on the other hand tried to rationalize the manufacturing process.

Through such product rationalization (towards a few specialized plants), manufacturers have developed strategies of intra-firm sourcing, across in-house brands throughout Europe. However, inter-firm sourcing, which is commonly practiced in the United States, is not common in Europe. One exception is Italy, where products are shipped between the many domestic manufacturers. An example is Candy's and Zerowatt's product exchange of dishwashers (from Candy to Zerowatt) and dryers (from Zerowatt to Candy). In 1985, Candy took a majority stake in Zerowatt, and thus the product exchange was internalized. Although unbranded products are not shipped between competitors in Europe, this is the case for components such as compressors.

Through these rationalization moves, the cost gap between the largest manufacturers and the "fringe" is increased. The large manufacturers gain even more by investing in the latest assembly technology (including new plant design, robots, etc), and by developing new products and components.

Many white goods manufacturers have faced serious financial problems during the 1980's. This is especially true for the many "fringe manufacturers" which often sell to the lower end of the market where competition is fierce, including imports from Eastern Europe. Even manufacturers with extensive international sales have faced severe problems. Indesit from Italy is such an example. The company manufactures a full range of products and has extensive in-house component manufacturing (also sold to external buyers). Some 70 % of total sales are exported. The two most important export markets are France and the United Kingdom. After financial difficulties in the 1970's, the company was rescued from bankruptcy by the Italian government in 1980. With continuing problems during the 1980's, the government has not been able to find a suitable commercial partner. In June 1985, Merloni, Candy and Philips Italiana issued a proposal to form an alliance with Indesit. Hoover has also shown an interest in acquiring Indesit.22/

6.3 STRUCTURAL EVOLUTION IN THE US WHITE GOODS INDUSTRY

Historical Background

Growth and prosperity were the main characteristics of the 1920's, and there seemed to be an unlimited potential for the infant white goods industry. Electric refrigerators constituted the fastest growing sector with 11,000 units sold in 1922. General Electric (GE) took the lead. General Motors (GM) entered the industry by acquiring the Guardian Frigerator Company (later Frigidaire) in 1919. With its mass production and mass marketing know-how GM pulled the company out of bankruptcy. In the mid 1920's, Frigidaire became a separate division, and began to expand its product line into room air conditioning units, electric ranges and other home appliances.23/

Dishwashers, still not a mass product, were introduced in new and increasingly innovative configurations during the 1920's. However, none of these seemed to catch on. Some companies were slightly premature in announcing "the era of automatic dishwashing is at hand". The laundry machine was much more popular in the 1920's, but still no standard format had been agreed upon, and the vast number of manufacturers continued to develop new washers throughout the decade. However, in 1922 Maytag came up with a fundamental change in design. The machine which had previously pulled the clothes through the water now forced the water through the clothes. In 1925, Upton Machine Co. (later Whirlpool) became the sole supplier of washers to Sears, Roebuck & Co. Dryers also emerged on the scene during this decade, although they were far from the appliance we know today. Most models consisted of a large cabinet filled with racks on which the clothes were hung.

Ranges continued to be improved. Prices were brought down and an increasing number of smaller units designed for apartments were introduced. The ad campaigns concentrated on the argument of "keeping the operating costs low". Hot Point became one of the leading range manufacturers.

The industry crept into the 1930's with uncertainty. The stockmarket had collapsed, and unemployment soared to record levels. Independent retailers did not dominate the industry as before, because of increased competition from catalog firms like Sears and Montgomery Ward, which began to capture a larger share of the market. Department stores also started to go successfully after more of the business. Increased competition led to price wars. Already, many of the retailers were beginning to look for unsaturated markets and replacement demand. One of the hardest hit segments of the economy during the Depression was the housing industry. Still, there were consumers who were interested in upgrading their standard of living. Instead of buying new homes, some people preferred to improve their existing ones, and this involved purchases of white goods.

Income levels peaked in 1940, and some of the money found its way into the appliance market. New sales records were reported. However, the outbreak of World War II resulted in government restraints. An excise tax was imposed to help conserve raw materials. Retailers were advised to put their emphasis on selling quality merchandise that would last. The tighter credit restrictions announced by the Federal Reserve Board also had a negative impact on sales. The Federal Reserve Board mandated a minimum down payment of 20 %, and a maximum of 18 months to pay for anything purchased on credit. Competition was stiff, with continuous price wars.

The 1950's brought a number of fundamental changes to the industry. New discounting channels were opened. These outlets operated out of old downtown warehouses, devoid of frills, and salesmen were virtually nonexistent. Costs were kept at the lowest possible levels. Furthermore, demand approached saturation, and replacement demand now outstripped first time purchases. The industry suffered from overcapacity problems, and a wave of mergers and acquisitions swept across the industry. The more offensive competitors employed brand proliferation to an increasing extent.

In the 1960's, demand increased as the purchasing power of households went up due to lower interest rates and increased wages. The housing boom of the early 1950's generated a large replacement market in the late 1960's. Sales of dryers tripled, and dishwashers quadrupled. Even refrigerators experienced a 50 % growth during the 1960's.

The major news in the 1960's was the introduction of the microwave oven. A number of manufacturers introduced models to the market that were greeted with interest and curiosity. By the end of the decade, sales began to pick up, and a new market was born. Self-cleaning and continuous cleaning ovens were introduced. At the same time dryers were launched which automatically shut off when the clothes had been dried to the proper degree. This development represented the first use of electronics in laundry appliances, and was led by Maytag, Whirlpool and General Electric. Compact laundry appliances began to gain in popularity towards the end of the decade.

At the beginning of the 1970's, the market was booming, surpassing records of earlier years. In 1970, over 28 million units were sold, with a retail value of some USD 6 billion. In 1973, sales reached 39 million units with a retail value of USD 8.6 billion. However, competition became more intense and cost control became more critical than ever. Old plants scattered around the country became inefficient, which necessitated rationalization and plant closings.

Energy efficiency became more and more important. In 1975, the government asked for cooperation from manufacturers to help reduce electricity consumption. A minimum of a 20 % improvement in energy efficiency would have to be made by 1980 compared to 1972 figures (in 1983, DOE dropped the mandatory energy standards for refrigerators, freezers, ranges, ovens and dryers). Several manufacturers had added more plastic to their products early in the seventies to reduce costs. A couple of years later, as oil supplies tightened, some companies found themselves faced with shortages. When the recession hit in late 1974, demand fell drastically. People deferred purchases of expensive consumer durables like white goods. The construction market fell through. In 1975, sales had dropped 30 % from 1973 levels. However, in 1977-1978 the market picked up again.

At the beginning of the 1980's, the US white goods industry was plagued with overcapacity problems. Workers were laid off. The Japanese threat also began to be more obvious. Some appliance manufacturers even proposed import restrictions, fearing that it would not take long before consumers would find full size appliances by companies like Panasonic, Sanyo (introduced a standard size refrigerator in 1983), Sharp and Toshiba.24/ The manufacturers feared a reappearance of the same pattern that had been experienced in the auto industry. Accordingly, the focal point of the Gas Appliance Manufacturers Associations's (GAMA) and the Association of Home Appliance Manufacturers' (AHAM) conferences in 1982 was the Japanese threat. It was pointed out that overseas suppliers had already established well-known names for quality products in a range of products, including white goods such as microwave ovens, compact laundry and refrigeration appliances. Production facilities had also been established in the United States during the 1970's.

In 1983, sales gains were reported from all over the country. An estimated 288 million appliances installed between 1962 and 1973 were now beginning to be replaced.25/ Demand was pushed up by the increase of sales of new homes and increasing personal income. Also, structural changes among consumers added to sales growth. These include: the baby boom of 1959-1963 which began to be reflected in sales figures, and an increase in the number of single person households, as well as single parent households. 1984 and 1985 also turned out to be good years. In 1985, industry shipments reached a record level of 41.8 million units.26/

Firm and Brand Characteristics

Throughout the history of the US white goods industry, competition has included a wide variety of firms, differing in width of product lines, degree of diversification, brand image, etc. In the early phase, prior to the Second World War, most appliance manufacturers manufactured a single product line. Seeger corporation and GE manufactured refrigerators, Hotpoint manufactured ranges, Maytag washers etc. Later on, the larger firms began to extend the number of lines through mergers, acquisitions and greenfield investments. However, in 1971 still more than half the number of appliance manufacturers could be classified as single-product producers. The full-line producers included: GE, Frigidaire (owned by GM), Westinghouse, Whirlpool, White Consolidated (WCI), Raytheon and Fedders.

Early on, new entrants diversified into the white goods industry. Automotive companies like GM (Frigidaire), Ford (Philco), AMC (Kelvinator), Studebaker (Franklin), Bendix and International Harvester were involved in white goods. As of today, all these companies have divested their appliance divisions, most of which have been acquired by WCI. Other diversifiers include electric/electronic firms like GE, RCA, Westinghouse, McGraw Edison, Emerson Electric, Litton, Raytheon, Borg Warner, United Technologies, Rockwell and Dart & Kraft.

Of some 300 manufacturers active in the late 1940's, less than 15 remain today. Newcomers include Raytheon, who diversified into the industry by acquiring Amana and Caloric in the mid 1960's. Raytheon applied their microwave technology, and in the early 1970's Amana/-Caloric had gained a significant share of the microwave oven market. Corning entered the market with its superior knowledge of glass, introducing the glass surface range. Litton, Sharp, Sanyo and Matsushita moved into the microwave oven market during the 1970's. Other foreign entrants include Indesit (laundry products) and Gold Star (refrigerators). In Table 6.15 we compare manufacturing companies in 1971 and 1984.

As we can see from the table, a few broad-line producers have become more dominant. Only a few narrow-line producers are still in existence. In the group of broad-line producers, all diversified firms have withdrawn except for GE. However, GE divested its small appliance division to Black & Decker in 1984. Today the very high-end segments are controlled by Maytag (laundry products), Raytheon-Amana (refrigerators), and Hobart-Kitchen Aid (dishwashers, acquired by Whirlpool in 1986), while the larger segments are controlled by GE, Whirlpool, WCI (acquired by Electrolux in 1986), and Magic Chef (acquired by Maytag in 1986). Waste King (Thermador), Roper, Design & Manufacturing (D&M), In-Sink-Erator and Litton have their strengths in single-product niches. This is also true for the foreign brands. The remaining manufacturers listed in the 1971 column have either been acquired, gone bankrupt or are in very weak positions with very small market shares today.

GE and Whirlpool both had appliance sales of over 2 billion USD in 1984, and are both cost leaders. Whirlpool has a unique 50-year relationship with Sears, which accounts for about 50 % of Whirlpools' sales. GE, on the other hand, has pursued a strategy of product differentiation with a strong brand image backed up by its own distribution and service network. During the 1970's, WCI climbed to the number three position through acquisitions of appliance divisions, including Ford's Philco division and GM's Frigidaire division. In 1984, WCI had sales of 1.5 billion USD.

Table 6.15: US competitors in the white goods industry. Product mix in 1971 and 1984.

	1971					1984							
	A	B	C	D	E	A	B	C	D	E	F	G	H
Fedders Corp. 1/	x		x	x	x								
General Electric (GE & Hotpoint)	x	x	x		x	x	x	x	x	x	x	x	x
General Motors (Frigidaire Div.) 2/	x	x	x	x	x								
Westinghouse 3/	x	x	x	x	x								
Whirlpool	x	x	x	x	x	x		x	x	x	x	x	x
White Consolidated, WCI 4/	x	x	x	x	x	x	x	x	x	x	x		
Raytheon 5/	x	x	x	x	x			x	x	x	x	x	
Admiral Corp. 6/			x	x									
Malleable Iron Range Co.	x		x	x									
Modern Maid, Inc. 7/	x		x										
Mullins Mfg.	x	x	x										
Norris Industries, Inc.	x		x										
Ford (Philco Div.) 8/			x	x	x								
Rangaire Co.	x		x	x								x	x
Tappan Co. 9/	x	x	x				x	x				x	x
Waste King Corp. 10/	x	x	x			x	x						x
King Refo Co.				x									
Maytag Co.	x	x			x	x	x	x		x		x	
Hobart Mfg. (Kitchen Aid) 11/	x		x			x	x						x
Republic Co.	x		x										
Athens Stove Works			x										
Autocrat Co.			x										
Boston Stove Co.			x										
Brown Stove Works, Inc.			x										
Columbus Stove Co.			x										
Cory Corp.			x										
Crown Stove Works			x										
Eagle Range Mfg.			x										
Gray & Dudley			x										
Hardwick Stove Co. 12/			x										
Hedges Mfg.			x										
Hill Shaw Co.			x										
Jenn-Air Corp. 13/			x										
Knox Stove Works			x										
Magic Chef 14/			x					x	x	x	x	x	x
Peerless Enamel Products			x										
Corning Co.			x										
Phillips & Buttorf Co.			x										
Prizer Painter Stove Works, Inc.			x										
Roper Co.			x					x					x
Sunral Stove Co. (Div. of Glenwood Range Co.)			x										
Wolf Range Co.			x										
Hager, Inc.				x									

(cont'd)

Table 6.15: (cont'd)

	1971					1984							
	A	B	C	D	E	A	B	C	D	E	F	G	H
Herrick Refrigerator Co. (Div. of Diebold, Inc.)				x									
Nor-Lake, Inc.				x									
Victory Metal Mfg. Co.				x									
Blackstone Corp.					x								
Centrex Corp.					x								
Ero Industries, Inc.					x								
Hoover					x								
Midwest & Manuf., Inc.	x					x							
Design & Manuf., Inc.	x					x							
Emerson Electric (In-Sink-Erator)							x						
Litton												x	

A = Dishwashers
B = Disposers
C = Ranges
D = Refrigerators
E = Home laundry machines
F = Freezers
G = Microwave ovens
H = Compactors

1/ Fedders-Norge was acquired by Magic Chef in the 1970's.
2/ GM - Frigidaire was acquired by WCI.
3/ Westinghouse was acquired by WCI in the 1970's.
4/ Included Gibson, Hupp, Franklin, and Kelvinator Divisions in 1971. Acquired by Electrolux in 1986.
5/ Included Amana, Caloric Divisions in 1971.
6/ Admiral was acquired by Magic Chef.
7/ Modern Maid was acquired by Raytheon.
8/ Philco was acquired by WCI.
9/ Tappan was acquired by Electrolux in 1979.
10/ Waste King was acquired by Thermador.
11/ Kitchen-Aid was acquired by Whirlpool in 1985.
12/ Hardwick was acquired by Maytag in 1981.
13/ Jenn-Air was acquired by Maytag.
14/ Magic Chef was acquired by Maytag in 1986.

Source: Note on the major home appliance industry in 1984, various articles.

Raytheon, Magic Chef and Maytag also grew through acquisitions during the 1970's. However, they are still less than half the size of WCI. Both Magic Chef, traditionally a strong range manufacturer, and Maytag, a strong manufacturer of laundry products, have moved towards full-line manufacturers. In 1986, Maytag acquired Magic Chef (for USD 736 million), only a few weeks after the Swedish company Electrolux announced that they would take over WCI (for USD 750 million). A year earlier, Whirlpool had acquired Kitchen-Aid (from Dart & Kraft for USD 150 million), a company with a premium position in the dishwasher market. Soon after the acquisition, Whirlpool signalled that they would broaden the Kitchen-Aid product line.27/ Competitors actively tried to prevent the acquisition, with WCI and Magic Chef filing anti-trust suits. However, the deal was cleared by the Federal Trade Commission. James M. Ringler, President of Tappan Co., said: "It's GM buying American Motors".28/ In 1984, Whirlpool was also negotiating with Litton Industries to acquire their microwave-cooking products division. However, the negotiations fell through, and instead the divisional management acquired the division.

The recent acquisitions have changed industry structure significantly. The USD 11 billion market is now dominated by four groups, with Raytheon as a distant number five, all of which are investing substantially in introducing new product ranges and automating their plants. The five groups in 1986 included:

	Brands
Whirlpool	Whirlpool
	Hobart
	Kitchen-Aid
	West Bend
GE	GE
	Hotpoint
WCI/Tappan*/	Frigidaire
	White-Westinghouse
	Gibson
	Kelvinator
	Philco
	Hupp
	Franklin
	Tappan
	Anaheim
	O'Keefe & Merrit

Maytag	Maytag
	Jenn-Air
	Hardwick
	Magic Chef
	Admiral
	Norge
	Revco
	Gaffers & Settler
Raytheon	Amana
	Caloric
	Speed Queen
	Modern Maid

*/ Owned by Electrolux

Corporate and appliance sales figures for the major competitors are shown in Appendix 3. For market share data, see Christensen, et al (1987:351 ff).

So far, we have considered competition between manufacturers. However, the picture is quite complex with a multitude of brands, where cross-shipments of products between in-house brands and between manufacturers are common. This makes it possible to broaden the product range without heavy investments. Retailers also design their own brands, where products are sourced under private label. Some retail brands have national coverage, while some are more local. Retail brands also differ in another respect, in that some are designed by the retailer (products are made to retailer specifications), while others are private brands that manufacturers develop as low-end product lines separate from their own brands. The latter ones are not available nationally, and are usually not heavily advertised. Even full-line producers like GE and Whirlpool source from smaller manufacturers. Sears with its own brand, Kenmore, buys most appliances from Whirlpool, D&M and Roper. WCI delivers private label products to a wide range of retailers. Table 6.16 shows the many different brands offered on the market in 1971.

Table 6.16: The private label market in 1971.

Manufacturer	Product	Retailer	Retail brand
Westinghouse	Washers, dryers	B.F. Goodrich	Goodrich
	Washers, dryers	Allied Stores	Ambassador
	Ranges, refrigerators freezers	Montgomery Ward	Signature
Kelvinator (WCI)	Washers, dryers	E.J. Korvette	Leonard-Korvain
Whirlpool	Refrigerators, freezers	Sears	Coldspot
	Washers, dryers	Sears	Kenmore
GE	Refrigerators, freezers, ranges, dishwashers, dryers	Penneys'	Penncrest
Fedders-Norge	Washers, dryers	Montgomery Ward	Signature
Magic Chef	Ranges	Gamble-Skogmo	Coranado
Roper	Ranges, dishwashers	Sears	Kenmore
Tappan	Ranges	Montgomery Ward	Signature
Franklin Div. (WCI)	Washers	Associated Merchandising Corp.	
	Refrigerators, freezers, washers, dishwashers	Gamble-Skogmo	Coranado
	Refrigerators, freezers	B.F. Goodrich	Whiteking
	Refrigerators, freezers	W.T. Grant	Bradford
	Refrigerators, freezers	Western Auto	Wizard

Source: Note on the major home appliance industry in 1972.

In Table 6.17 we can see how the private label market has expanded. New products like microwave ovens, disposers and compactors have been developed by only a handful of manufacturers supplying the retail sector with unbranded products. In 1983, J.C. Penneys discontinued its Penncrest line. To GE, who supplied the Penncrest line (with refrigerators and laundry products), the loss was only marginal. In 1983, Penneys accounted for less than 1 % of GE's refrigerator sales (2 % in 1980), and 5 % of laundry sales in 1982.29/

Table 6.17: The private label market in 1984.

Manufacturer	Product	Retailer
GE	Refrigerators, freezers	Firestone Tire & Rubber Co.
Whirlpool	Refrigerators, freezers	Sears
	Washers, dryers	Sears
	Compactors	Modern Maid
		Sears
WCI	Refrigerators	Sears
		Western Auto
		Gamble-Skogmo
		Marquette
	Laundry	Montgomery Ward
		Gamble-Skogmo
	Freezers	Montgomery Ward
		Gamble-Skogmo
		Marquette
		Broich
		Western Auto
Magic Chef	Refrigerators	Crosley Groups
	Freezers	Montgomery Ward
		Western Auto
	Ranges (Electric & Gas)	Crossley Group
		Gamble Skogmo
		Sears
		Montgomery Ward
	Microwave ovens	Crossley Group
		Gamble Skogmo
	Washers, dryers	Montgomery Ward
		Western Auto
D & M	Dishwashers	Sears
Maytag	Ranges, laundry	Montgomery Ward
Tappan	Disposers	Earl's Plumbing
	Ranges (Gas)	Montgomery Ward
Sanyo	Refrigerators, micro-wave ovens	Sears
Sharp	Microwave ovens	Montgomery Ward

Source: Note on the major home appliance industry in 1984, and WCI company material.

The Vertical Chain

A clear distinction exists between the retail market and the construction market. There are large differences in purchasing criteria and buyer-seller relationships.

The contract market accounted for around 25 % of all appliance sales during the 1970's. Some products, such as disposers, built-in ranges and undercounter dishwashers are mainly sold through construction firms (sometimes via local builder suppliers). When new homes are being sold, brand image is important to the perceived quality of the whole house. Thus, demand is geared towards well-known brands in the medium range. The builders usually source all appliances for a housing development from a single source.

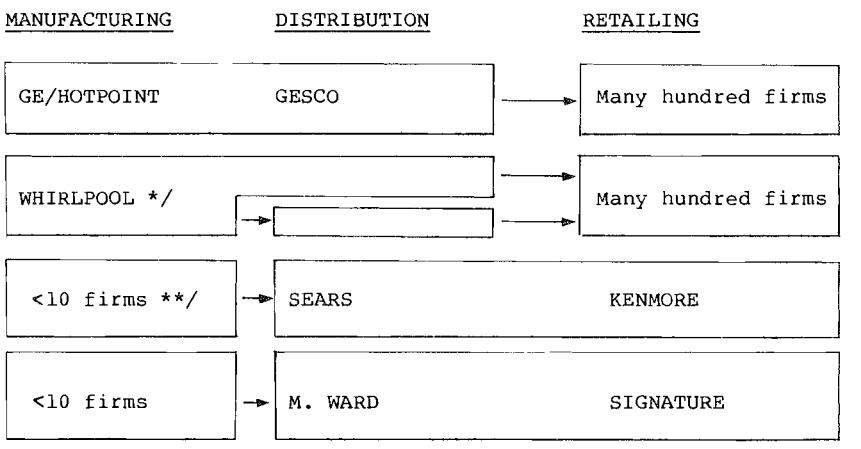
In the retail market, the structure changed significantly during the 1960's and 1970's. The small appliance retailers, carrying a limited number of brands, lost volume to large discount stores and chain stores (also called catalog stores). Sears, Penneys, Montgomery Ward and other national chain stores carrying national brands grew in importance. Also, regional chain stores specializing in appliances, such as Lechmere (Dayton Hudson) in Massachusetts and Polk Brothers in Illinois, gained a share of the market. Traditional department stores lost share, and many of them have gradually phased out their major home appliance departments. The small, independent dealers have managed to keep their share. Discount stores, such as K. Mart and Caldor's, have lost share in the standard size segment, while improving their sales of microwave ovens and compact appliances. In 1982, appliance stores accounted for 32.8 % of refrigerator and freezer sales, while catalog stores accounted for 28.6 %. Furthermore, contractors accounted for 12.3 %, department stores 8.0 %, discount stores 5.1 %, furniture stores 4.7 %, home improvement centers 2.2 %, kitchen remodelers 1.5 % and others 4.8 %.30/ For compact refrigerators and freezers, catalog stores and discount stores accounted for a larger share (33.7 and 18.1 % respectively). Appliance stores accounted for a smaller share (24.5 %) and contractors were not particularly active in compact appliances with only

0.6 % of sales. A major reason as to why catalog stores and discount stores have a larger share of compact appliances is that these stores are less dependent upon US manufacturers (the large catalog stores have their own brands and the discount stores look for low-priced products). For dishwashers, appliance stores, contractors and catalog stores dominated the market with 26.3, 28.2 and 24.0 % respectively (1982 figures). The laundry market (washers and dryers) was dominated by catalog stores 38.5 %, and appliance stores 34.0 %, with contractors at only 5.0 % (1982 figures).31/

For most manufacturers, the use of independent distributors is the most economically feasible way of reaching the market. Different logistical costs, such as warehousing and transportation, can thus be spread out over a broader range of products than just white goods. Only GE, and to some extent Whirlpool, own their own distribution networks. Services offered by distributors are under constant attack as both manufacturers and retailers have an incentive to keep distribution costs down. In some instances, large shipments are made by manufacturers straight to the dealer. The dealers, on the other hand, form buying groups (across distributors' territories) to gain bargaining power vis-a-vis distributors and manufacturers. Independent entrepreneurs also enter as sub-wholesalers from time to time, whenever imperfect information creates business opportunities.

If we take a closer look at the white goods' vertical chain, we can see how actors, predominantly in the manufacturing and the distribution/retail industries, interact on several levels. Most often, ownership is separated with manufacturers, distributors and retailers as independent entities. The main exceptions include GE's and Whirlpool's inhouse distributors, and the large national retail chain's own distribution operations (see Figure 6.2). This picture only tells a very limited story. Between the actors in the three stages, a complex network has evolved throughout the years.

In the appliance business, Sears have enjoyed a dominant position in retailing for many decades. Controlling some 25 % of the total white goods market (varies across products), Sears have exercised



*/ Whirlpool owns a distribution business accounting for some 50 % of non-Sears sales.
**/ Sears has a 41 % interest in Roper.

Figure 6.2: Vertical integration in the US white goods industry.

substantial bargaining power vis-à-vis their suppliers. During the 1940's and 1950's, Sears actively supported several single-line appliance manufacturers. By arranging for the merger between the Seeger Corporation and 1900 Corporation, forming Whirlpool, Sears made sure that there would be a large rival to the leading brands GE, Westinghouse and Frigidaire. With access to Sears' vast network of retailers, Whirlpool soon became one of the leading appliance manufacturers. Later Sears engaged in forming Roper and D&M. The leading dishwasher manufacturers in the 1950's, GE and Hobart, had been reluctant to supply the national retailers. Thus, there was an incentive for Sears to induce entry of a new dishwasher manufacturer, or to offer an expanded market to a smaller firm. In 1959, D&M was formed out of Avco's appliance division, which had been acquired by a former Philco employee. D&M began to supply Sears with dishwashers, and quickly grew into the leading dishwasher manufacturer. In 1964, D&M had an 18 % market share, which grew to 45 % in 1977. In 1983,

the market share was reduced to 37 %, a result of GE's come-back in the early 1980's. D&M also sells unbranded dishwashers to competing firms which source externally to be able to carry full-line brands. In 1984, Whirlpool sold close to half of its output of refrigerators through Sears (a share that has been slowly reduced over the last decade). The similar figure for WCI was 26 %. In 1983, Sanyo, Sears' major supplier of microwave ovens, began to supply refrigerators (accounted for 75 % of Sanyo's US sales in 1984).

For laundry products, Whirlpool sold over 70 % through Sears and is by far the dominant supplier. In 1984, WCI (White-Westinghouse) supplied 78,000 units to Sears as compared to Whirlpools's 3,125,000 units.32/ For electric ranges, WCI sold 32 %, and 52 % of its gas ranges (up from 39 % in 1980). Roper is the main supplier of gas ranges to Sears.

Also J.C. Penneys and Montgomery Ward (also called Wards) built up similar ties with manufacturers of private label goods. Penneys adopted a policy of head-on competition with Sears in the early 1960's. By 1970, Penneys had bypassed Wards and reached the number two position. Penneys had allied themselves with GE, which manufactured Penneys' Penncrest line. However, logistical chains were never integrated between the two firms, and Penneys had a cost disadvantage in terms of transportation and distribution costs vis-à-vis Sears. Also, Penneys failed in establishing a competitive advantage vis-à-vis other retailers (mainly specialized appliance stores who have gained considerable market shares). After many years of losses in the major appliance business, Penneys decided to exit in 1983. Wards have long established ties with Magic Chef (refrigerators, freezers and laundry) and WCI (dishwashers, freezers and laundry). In 1984, 28 % of Magic Chef's refrigerator output was sold through Wards (down from 47 % in 1980). Comparable figures for laundry products was 73 % in 1984, up from 68 % in 1980. WCI sold 38 % of its freezers, 19 % of its laundry products and 43 % of its dishwashers through Wards in 1984.33/ Ranges and microwave ovens are sourced from Sharp, Tappan and Raytheon. The major networks of vertical relationships are shown below in Figure 6.3.

WCI has consistently grown as a manufacturer of private label products and a supplier to a number of mass merchandisers. Some of these vertical ties came with acquisitions of manufacturers with already established ties, such as Westinghouse-Wards, and Kelvinator-Sears. The same was true for Magic Chef when it acquired Norge, a supplier to Wards. Most of these vertical ties have existed over long periods.

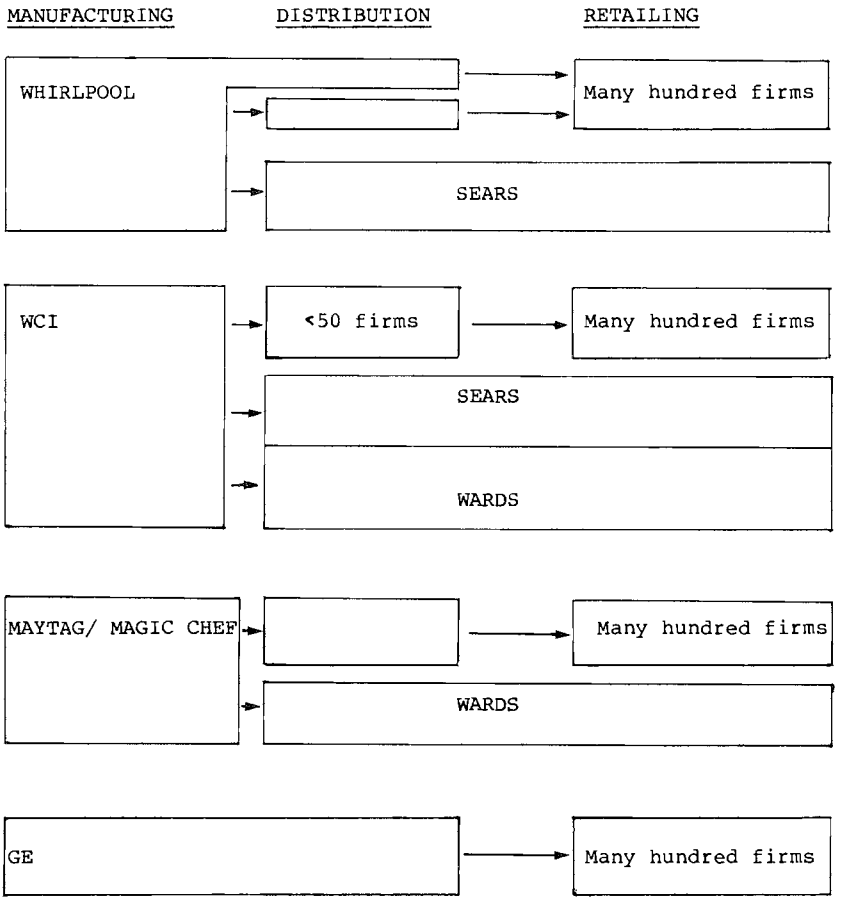


Figure 6.3: Vertical relationships in the US white goods industry.

Over the years, manufacturers have become more engaged in the retailing business by offering new services. In the early 1980's, Whirlpool introduced dealer support systems, including financial packages and computerized inventory systems. In 1983, GE followed suit, offering new dealer financing and consumer credits, through a joint venture between the Major Appliance Group and GE's own Credit Corporation.34/ In 1983 WCI also established a new consumer credit company.35/ Other ways of pushing your own brand include salesmen incentives (known as "spiffs" in the trade), where every product sold is rewarded in cash, or aggregated into gifts, trips, etc. These "spiffs" have become part of the industry tradition and are used as an alternative to advertising, especially when introducing new products. Historically, retailers carried a single brand and incentives were directed towards the retailer rather than the sales person. Today, most major appliances are sold in stores carrying several brands, and thus there is an incentive to influence the individual salesman to push your brand. As a general rule, "spiffs" are more used in lower end products. High-quality brands, such as Maytag and Kitchen Aid spend proportionally more on advertising than other competitors.36/

Concentration

The post-war period has been characterized by concentration, and today there only exist some 10 white goods manufacturers, as compared to some 230 firms active in 1945. In the mid 1950's, the industry experienced overcapacity problems, and the concentration pace increased. In some cases, firms went bankrupt and plants were closed. In other cases, weak firms were acquired by competing firms. In a few cases, firms active in other industries entered the white goods industry through acquisitions. The acquiring firms have most often continued to use the acquired brand names, since brand proliferation has been a key sucess factor in this industry.

In 1970, there were four leading firms or groups of brands - three manufacturers' brands and one retail brand. Except for the range market, market shares of these four groups were in the range of 60-70 % (around 40 % of the range market). The four groups included:

Sears (Coldspot, Kenmore), GE (GE, Hotpoint), Whirlpool and Frigidaire. During the 1970's WCI expanded rapidly through acquisitions, including Frigidaire. WCI continued to use the acquired brands, but also established itself as a manufacturer of private label products. WCI became a major second source to Sears during these years.

Between 1970 and 1984 the market shares of the leading brands did not change significantly. The most volatile market has been the microwave oven market, where old established brands and new ones have competed for positions. However, even if market shares per brand have been stable, firms have grown by acquiring new brands. The most active ones include: WCI, Magic Chef, Raytheon and Maytag. Thus, while the reduction in number of independent firms has been considerable, the number of brands was almost the same in 1986 as in 1970. A few new brands in the microwave oven market and the compact refrigerator/-freezer market have been added (see discussion below on entry). Due to fear of antitrust actions, the acquisition route has not been open to GE and Whirlpool. However, in 1985, Whirlpool acquired Kitchen Aid. This acquisition was made possible with a changing antitrust climate, in combination with increased competition, especially from WCI. In 1986, Electrolux acquired WCI, and Maytag acquired Magic Chef. The acquisition of WCI made it possible for Electrolux to become a major actor outside its home territory Europe. Also, Tappan's position as a leading range manufacturer was threatened due to increased efforts in this segment by leading competitors. GE, for example, which had not been active in this segment introduced a highly successful line of gas ranges in late 1985. Thus, the acquisition of WCI made it possible for Electrolux to protect Tappan's position (Tappan had been acquired by Electrolux in 1981). Maytag moved to a clear number four position through the acquisition of Magic Chef. Magic Chef's line of refrigerators, freezers and ranges nicely complemented Maytag's dishwashers and laundry products.

Lack of Industry Leader

Even if the white goods industry has gone through a major concentration process, no single firm has managed to reach a clear leading

position. In the various product markets, leadership is more pronounced. However, no single firm controls the whole white goods market, which is important to note, considering that brand proliferation, and to some extent also cost position (economies of scope in purchasing, manufacturing and marketing), is driven by the whole white goods market, rather than the individual product markets. During the last decades, GE and Whirlpool/Sears have been fighting for a dominant position, without success. During the 1970's, GE actually lost market shares, and a new actor, WCI grew into a number three position through acquisitions of ailing appliance divisions among diversified automotive and electrical firms. A good proxy for industry leadership is price leadership. New prices are often announced in connection with the November-December meetings with dealers, when also new product designs are also presented. If there were a price leader, this firm would set the new prices at these meetings, and the competitors would follow. This has not been the case. For example, when GE raised their prices in 1984, Whirlpool did not follow, and in 1985 GE did not follow Whirlpool's price increases.37/ In terms of product design and new product innovations, no single firm has dominated the industry. Some imitation is part of every competitor's R&D strategy.

Domestic Entrants

Only four firms have entered the industry since 1945. Raytheon and Dart & Kraft both diversified into the industry through acquisitions. The acquisitions were directed towards undercapitalized firms with high quality images. Raytheon, a leading electronics company, had developed the heart of the microwave oven, the magnetron, in the mid 1940's. The first microwave ovens were made for sale to restaurants and hotels. However, Raytheon did not emphasize this product, and the Raytheon brand was never established in the white goods market. Instead, licenses were sold to other white goods manufacturers, such as Tappan, Amana, Caloric and Speed Queen (the latter three were acquired by Raytheon in the mid 1960's). With its in-house microwave technology, Amana and Caloric established a leading position early in the product life cycle. Dart & Kraft is a large diversified manufacturer of food products, consumer durables, chemicals, plastics

(Tupperware brand), packaging (glass bottles etc) and batteries (Mallory-Duracell brand). The company has largely grown through acquisitions, beginning in the 1960's. In 1968, West Bend was acquired and later Hobart/Kitchen Aid. West Bend is a leading manufacturer of buffet appliances and non-electrical cookware. Hobart/Kitchen Aid are leading brands in dishwashers and compactors. In 1985, Dart & Kraft decided to exit and sold out Hobart/Kitchen Aid to Whirlpool.

The two other entries were Litton and D&M, both single-product entries. Litton entered the new microwave oven market in the 1970's. Without an established brand in the appliance market, they managed to reach the number one position in 1977 with a 25 % market share. However, Litton's initial foothold slowly eroded when some of the leading brands introduced microwave ovens, and foreign entrants moved into the market. In 1984, Litton's share was down to 10 %. D&M was established as a new firm by a former Philco employee who acquired the appliance division of AVCO in 1959.38/ D&M was not to be established as a brand in the market place. Instead, the company was guaranteed a huge private label market through Sears, who were looking for competition to GE and Hobart/Kitchen Aid, which at the time did not show any interest in selling under private label. D&M got a head start, and in 1964 they reached an 18 % share of total US production, which later rose to 45 % in 1977. In 1984, the share was down to 31 %. Today, D&M are selling unbranded dishwashers to Sears and 12 competing brands.

In summary, no entrant has established a new brand since the Second World War in already established market segments. Three types of domestic entries have occurred: first, entry through the acquisition of established brands by firms with no earlier experience in this industry; second, entry with the emergence of new product markets, such as disposers and microwave ovens; and third, entry as a private label manufacturer.

Foreign Entrants

Given the high barriers to entry in this industry (see discussion below on competitive advantage), few entries by foreign firms have occurred. The only major entries with foreign brands have occurred in compact appliances and microwave ovens. The compact appliance market has largely been neglected by US firms since this has been thought of as a very small market, not worth investments in new designs and manufacturing facilities. Instead, this market has been covered by imports from Italy (Zanussi and Indesit), Yugoslavia (Gorenje), Japan (Matsushita, Toshiba, Sharp and Sanyo) and South Korea (Gold Star and Samsung). Most of these products have been sold under private label arrangements, and thus increased imports have been a result of offshore sourcing policies by US manufacturers and retailers.

In 1984, Admiral (a division of Magic Chef) and Speed Queen (a division of Raytheon) retaliated, and moved into the compact market. Imports now constitute some 50 % of the market, and part of the other half of the market is covered by foreign-owned US plants. US firms such as Raytheon and Tappan pioneered the microwave oven market. However, before the market was ready to take off, a few Japanese and South Korean firms had entered the market. Matsushita (Panasonic and Quasar brands), Sharp and Sanyo had already established brand names in other consumer durables. Since demand for microwave ovens was not related to replacement of existing white goods or new housing demand, there was room for new brands. Litton could use its high-technology renomée, while the Japanese firms already had established high-quality brand images. Costs of brand proliferation that had already been sunk in consumer electronics such as hi-fi equipment, TV-sets, VCRs, etc significantly lowered the entry barriers for the foreign entrants when they expanded into white goods.

Foreign firms have penetrated the US white goods industry through imports, acquisition of established firms and through greenfield investments. Foreign firms which have entered through exports have chosen to enter with products which they already manufacture and sell in their home markets. Hence, adaption costs to US tastes have been

minimized. These products also comply with US technical standards and enjoy UL approval, with minor adjustments. Importers have not invested heavily in building a brand image in the US market, but have sold under private label arrangements to US manufacturers and retailers.

A second type of foreign entry has been through the acquisition of a US white goods manufacturer. So far, only two such acquisitions have occurred. In 1981, Swedish Electrolux acquired Tappan, including the Tappan, Anaheim and O'Keefe & Merrit brands. The fact that Tappan is foreign owned has been little recognized in the business press. In 1986, when Electrolux announced that they would acquire WCI, suddenly the Electrolux ownership became more visible.39/

A third type of foreign entry has been through greenfield investment. Three Japanese firms have made major investments, especially in the microwave oven market, and introduced their own brands. Following from this aggressive strategy they have established US plants and cut down on exports. In 1979, Sanyo and Matsushita started local production of microwave ovens, and in 1980 Sharp followed suit. In 1984, 60 % of the US microwave oven market was supplied by Japanese and Korean producers (imports and US produced).40/ In 1983, Sanyo began test-marketing a larger-sized refrigerator (15-17 cu.ft.) and thus they entered the largest market segment (the 14-19 cu.ft. range).

In summary, foreign firms do not export any significant amounts of major appliances to the US under their own brands, and the only foreign brands that have been established in the marketplace have been in connection with the creation of new markets, i.e. microwave ovens and other compact white goods (mainly refrigerators). Offshore sourcing by US firms has reinforced the trend for increased imports of these products. By entering the microwave oven market and the compact appliance market, the foreign entrants have avoided head-on competition with the US manufacturers.

Industry Exits

Both single-product firms and diversified firms have left the industry. In some cases production facilities, brand names, etc have survived under a new owner, and in other cases old plants have been closed and brand names have ceased to exist. Diversified firms have sold off both profitable and unprofitable white goods divisions. Large diversified firms which have left the white goods industry are listed in Table 6.18.

Table 6.18: Diversified firms which have left the white goods industry.

Company	Core industry	White goods brand	Acquired by
GM	Automotive	Frigidaire	WCI
Ford	-"-	Philco	WCI
AMC	-"-	Kelvinator	WCI
Studebaker	-"-	Franklin	WCI
Bendix	-"-	n.a.	n.a.
International Harvester	-"-	n.a.	n.a.
RCA	Electric/ Electronics	RCA	Whirlpool
Westinghouse	-"-	Westinghouse	WCI
McGraw Edison	-"-	Albion	n.a.
Emerson Electric */	-"-	n.a.	n.a.
Rockwell	-"-	Admiral	Magic Chef
United Technologies	-"-	n.a.	n.a.
Borg Warner	-"-	Fedders-Norge	Magic Chef
Litton	-"-	Litton	Management Buyout

*/ Have kept the In-Sink-Erator brand (manufacturing and marketing disposers).

Source: Note on the major home appliance industry in 1984, Note on the major home appliance industry in 1972. WCI Company material.

These diversified firms have run their white goods business units as separate entities (with their own brand name, manufacturing facilities, etc). Thus, the organization structure has facilitated easy exit. The main reasons for exit can be found in the maturity of the industry. Slow growth and low innovative activity have not

attracted high technology firms like Rockwell, United Technologies, etc to continue the business. GE also considered selling off the profitable major home appliance group in the late 1970's. However, in 1981 the company made a turn-around and began investing heavily after years of neglected investments. Among the automobile manufacturers, high wage levels may also have been a factor behind divestments.

In the retailing industry, Penneys decided to move out of white goods in 1983. The effect of this move was twofold. First, Sears and Wards eliminated a firm who had been quite aggressive for some time and could take over most of Penneys' buyers. Second, GE, the main supplier of private label appliances to Penneys, lost volume. With private label business being a low volume and low-margin market for GE, the effects of Penneys' exit have not been significant for competition overall.

Technological Evolution - Imitation vs. Innovation

Innovation activity has focused on three aspects: reduction in manufacturing costs through gradual improvements in both the products and the production process, new customer-oriented features and new products that have expanded the market. These innovations have not led to any significant first-mover advantages to the innovator, since imitation has been easy and quick. Quick imitation is possible since the prototype-to-production cycle is about one year.

Electronic components have made a major inroad during the 1980's. Main areas for application include: micro-processor control, energy saving devices and sensors. United Technologies's Hamilton division is a major supplier of these components. No single firm has gained any substantial competitive advantages by introducing electronic devices.

In cooking appliances, gas appliances have continually been substituted for by electrical appliances. The leading manufacturers of gas ranges: Magic Chef, Tappan, Raytheon, Roper and Maytag have lost volume in this substitution process, and have not managed to

raise their market shares in electrical appliances to compensate for this loss.

No single firm stands out as a leading innovator. Rather small innovative steps are taken and competitors monitor each other's product redesigns closely. In the overall market, both GE and Whirlpool are leading innovators.41/ Maytag and Speed Queen stand out in laundry products, Amana in refrigerators and Kitchen Aid in cooking appliances. New features have first been tested in the less price sensitive high end of the market and then gradually shifted over to the medium - and lower range products. Thus, the leading manufacturers, selling branded appliances, have been the main innovators and the manufacturers of unbranded products, in combination with retailers' brands, have been the main imitators.

Innovation activity is a continuous process where firms strive to build competitive advantages by reducing costs and/or differentiating the product. On the cost cutting side, the major innovations include: substitution of materials, reduced number of parts which affects assembly and maintenance costs, less weight which affects transport costs and new product designs better fitted to automated assembly and easy service. Between product lines, the sharing of components has affected input costs. On the differentiation side, new features are added every year to the products. Furthermore, new functions are added (such as the self-cleaning oven, or custom ice and water dispenser), and appliances are combined into new configurations (such as the double oven over/under configuration, refrigerator-freezer combinations, stackable laundry appliances, etc). Appliances are also becoming more energy efficient and more reliable, requiring less maintenance. Flexibility is increased with detachable front panels where consumers can easily change the colors of their appliances. Cosmetic differentiation has made it possible for the manufacturers to cut down on the number of models in production. A few new products have also been added. The waste compactor was introduced by Whirlpool in the 1960's, and the microwave oven by Tappan in 1955 (GE's hotpoint division followed within a year). However, the first microwave oven using standard household circuits was introduced by

Raytheon's Amana division in 1967.42/ Litton who has been a leading innovator in microwave ovens entered the market in 1970 (in 1984 Litton introduced the first subcompact microwave oven).43/ New features and concepts have also quickly been imitated in the microwave oven market.

Vertical Disintegration Backwards

Over time, components used in white goods have become commodities, and supplying industries have gone through concentration processes. GE, which is highly diversified, has continued the manufacturing of small motors, compressors, etc. A major investment in rotary compressors enabled GE to introduce a highly energy efficient refrigerator in January 1986.44/ In-house component businesses are run as separate business units, selling a large proportion of their production to external buyers. For example, close to half of all motors used by Whirlpool are sourced from GE today. Another large supplier of motors, thermostats, controls, etc is Emerson Electric, acting as a supplier to most white goods manufacturers. Most imported compressors come from Japan and Brazil. Whirlpool, for example, has its own compressor plants in Italy and Brazil. Except for GE, the degree of vertical integration backwards among the white goods manufacturers has been significantly reduced. For example, pressing of sheet metal has traditionally been done by the manufacturers themselves. However, more recently some firms have begun to buy from outside sources.45/

Inter-Firm and Intra-Firm Sourcing

A trend among white goods manufacturers is to phase out part of the production of white goods. This is a symptom of changing competitive advantage, moving forward in the vertical chain towards design, marketing, etc, related to brand proliferation. Furthermore, instead of growing through investments in manufacturing facilities for new products, external sources have been used. Products most commonly sourced externally are: dishwashers (D&M and GE are major sources), disposers (In-Sink Erator and Tappan are major sources) and microwave

ovens (Matsushita, Sharp, Sanyo and Samsung are major sources). Dishwashers became a target market for GE around 1980. With the help of Toyota, highly automated assembly lines were set up to produce the newly designed range of dishwashers. Also, new inventory and quality control systems were adopted. In the light of these huge investments, several competing firms began to phase out dishwasher production. Within the large firms, i.e. groups of brands, the practice of specialization between manufacturing units (belonging to separate brands) is well established. Thus, each brand within the firm can offer a full line of products, while manufacturing only one or two lines.

In Table 6.19 below we can see the major flows of inter-firm sourcing of unbranded products in 1985.

The Role of Sears in Shaping Industry Structure

Sears, the dominant retailer, has played a major role in shaping the US white goods industry. During the rapid expansion in the 1940's and 1950's, Sears actively sponsored the 1900 corporation (selling laundry machines under private label), and the Seeger corporation (selling refrigerators under private label), and even arranged for the merger that created a new company under the name of Whirlpool. RCA (mainly a manufacturer of consumer electronic products, such as TV-sets, also called brown goods) also hooked on to the merger (Whirlpool offered manufacturing of white goods, while RCA offered a distribution network based on its brown goods). Whirlpool now gained access to a covering distribution network (for private label and branded products) that enabled them to move into a leading position. In the 1950's, Whirlpool acquired RCA's range and air conditioning business. Later, in the 1970's, RCA decided to focus on brown goods and sold its equity in the RCA/Whirlpool constellation. However, Whirlpool and RCA continued to share many distributors until 1985 when RCA was acquired by GE, Whirlpool's main rival. Whirlpool and Sears have had strong management ties, with managers moving between the two companies. To some extent they also use the same designers.

Table 6.19: Cross-sales between major competitors (unbranded products) in 1985.

From	To	Product
Whirlpool	Litton	Microwave ovens
GE	Magic Chef/Gaffers	Microwave ovens Dishwashers Compactors
	Tappan/O'Keefe	Microwave ovens Dishwashers
WCI	GE	Freezers
	Whirlpool	Ranges (electric)
	Caloric	Refrigerators
Hardwick (Maytag)	Whirlpool	Gas ranges
	Magic Chef/Admiral	-"-
Tappan	GE	Disposers
	Magic Chef	-"-
	Raytheon	-"-, compactors
Magic Chef	Tappan/O'Keefe	Refrigerators Freezers
Admiral (Magic Chef)	Tappan	Refrigerators, freezers
	Roper	-"-
D&M	Roper	Dishwashers
	Raytheon/Caloric	-"-
	Tappan/O'Keefe	-"-
	Caloric/Modern Maid	-"-
	Admiral	-"-
	Magic Chef/Gaffers	-"-
Roper	Maytag/Jenn-Air	Gas ranges
Emerson Electric	WCI	Disposers
	Roper	-"-
Toshiba	WCI	Microwave ovens
Samsung	GE	Microwave ovens
Matsushita	GE	Microwave ovens
Gold Star	WCI	Microwave ovens
	Tappan	-"-

Source: Compiled by the author from Company Material.

In the late 1960's, around two thirds of Whirlpool's volume went to Sears. This figure has slowly been reduced to less than half the volume today. Sears also actively shaped the industry structure for dishwashers and ranges. The dishwasher manufacturer they supported, D&M, became the largest manufacturer of dishwashers during the 1960's and 1970's, and held that position until the early 1980's, when GE invested heavily in a new line of dishwashers.

The fact that Sears could induce mergers and new entry shows that the company has had a major influence on determining structural evolution in the US white goods industry. Furthermore, Sears also induced entry by a foreign firm, namely Sanyo. As early as in 1976, Sears had negotiated a deal where Sanyo was to acquire Warwick's main plant for TV-sets. Sears was not satisfied with Warwick's performance and looked abroad for someone who could compete with RCA and Zenith (the leading TV-set manufacturers) on costs. Warwick, manufacturing TV-sets and electronic organs, was jointly owned by Whirlpool (75 %) and Sears (25 %), and sold almost all of its output through Sears.46/ In 1977, the line of color TV-sets was discontinued, and the plant was sold off to Sanyo. Two years later, Sanyo began manufacturing microwave ovens in the same plant, and later also refrigerators. By arranging for Sanyo to take over Warwick's facilities, and also by importing microwave ovens under private label, Sears opened up a significant beach-head for a foreign entrant. In 1983, a survey showed that 30 % of the consumers owned a countertop microwave oven, of which one out of five owned a Sears/Kenmore,47/ i.e. a Sanyo product. Other large retailers formed similar private label agreements with other Japanese and Korean manufacturers.

Changing Competitive Advantages

The base for building competitive advantage has clearly changed over time. Scale economies in production at the plant level have favoured large manufacturers who have consolidated production into one or a few plants per product line. In their striving to lower their overall cost position, the manufacturers have not only rationalized production, but they have also phased out whole product lines, or have

grown through external sourcing of unbranded appliances. Thus, a specialization can be seen in manufacturing, parallel to a widening of product lines sold per brand. D&M has turned into a supplier of dishwashers, and Tappan of disposers. Microwave ovens are sourced from South Korea and Japan. Japanese firms have also built up local plants in the US from which they supply both white goods manufacturers and retailers. In 1984, GE decided to phase out production of microwave ovens in the United States, and began to source from Matsushita and Samsung. In 1985, Tappan also began to import Japanese ovens. As early as in 1977 the last magnetron tube (the major component in a microwave oven) was manufactured in the US (by Raytheon).48/

As the products have become more and more of a commodity, successful manufacturers have invested heavily in brand proliferation. This has been necessary in order to reduce the loss of bargaining power vis-à-vis retailers, and to avoid too much rivalry within the manufacturing industry. Without a strong brand image, the threat of integration backwards by retailers would have grown considerably as products matured.

All surviving firms have gained scale economies in manufacturing, on a product line basis. Also, economies of scope through coordination of purchases across product lines and in-house production of a few strategic components have added cost advantages to the broad line manufacturers. GE is reported to have made a 5 % saving in the cost of goods purchased by implementing such a coordination policy in 1983.49/ However, the main differences in competitive advantage can be found in product differentiation. Brand proliferation has developed into the corner-stone of competitive advantage, based on a combination of brand loyalty and a large installed base built up over the years.

Even if there has been a general trend towards changing competitive advantage in the white goods industry, not all firms that managed to survive and prosper have chosen the same strategic route. If we take a closer look at the industry in the 1960's, there were a great many

firms with different strategic configurations. The main discriminating dimensions included: width of product lines, quality brand image, number of product lines, degree of vertical integration, degree of diversification, geographical scope and distribution channels. Over the years a few strategic configurations have become dominant over others. (See Figure 6.4 below.)

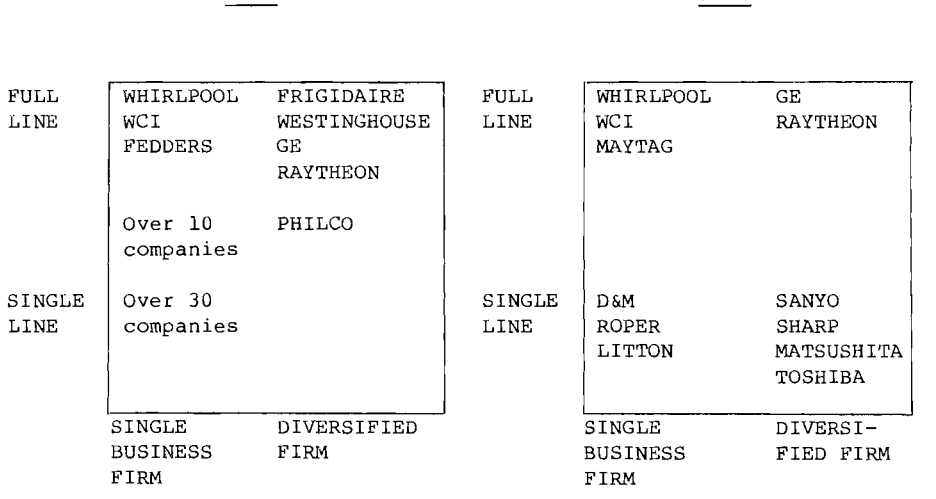


Figure 6.4: Strategic groups in 1970 and 1986.

Three of the four dominant manufacturers in 1986 are full-line undiversified firms. However, there are still a few firms left in the other three corners.

The lower left hand corner: D&M and Roper can be looked upon as subsuppliers to Sears (Roper is to 41 % owned by Sears). Litton microwave oven products was sold in 1985 to the divisional management, and is now an independent company.

The upper right hand corner: GE and Raytheon are the only full-line diversified firms left. As early as in the 1960's, GE directed its attention to other businesses, such as: computers, breeder reactors

and heavy jet aircraft engines. With neglected investments in the major home appliance group, GE slowly lost its leading position. To reduce costs, GE's and Hotpoint's production facilities were merged in 1965.50/ In 1970, the sales divisions of GE and Hotpoint were merged, while two new separate sales divisions were formed, divided between retail and builder sales. By adding private label sales (manufacturing the Penncrest line) through Penneys, larger scale economies were sought. In addition, more attention was given to the builder market, where both the GE and Hotpoint brands had favourable positions (with Sears being absent from this market). In 1976, consumer products contributed 22 % of GE's net income, while receiving only 12 % of the company's capital budget for new plant and equipment. In the late 1970's, GE had plans to withdraw from the major home appliance business, but decided to stay, and has since invested in new lines of dishwashers, ranges and refrigerators, manufactured in highly automated plants. Raytheon, which ranks fifth in the industry, has recently begun to integrate its three brands: Amana, Caloric and Speed Queen, under one executive.51/

The lower right hand corner: Here we find the Japanese new-comers focusing on microwave ovens and compact appliances.

In the other discriminating dimensions that were still prevalent in 1970, we can see a clear convergence over the years. The industry leaders today have:

- Broad coverage from low-end to high-end of the market through a number of brands.

- Full product line brands (with partial external sourcing, and cross-shipments between in-house brands).

- Manufacturing facilities mainly for assembly and less component production.

- In-house service organizations.

- Low degree of diversification (excluding GE).

- National scope.

- Minor international operations (mostly Canada and Brazil).

- Sales both through private label channels and brand channels.

- Sales both through retail and contract channels.

Two groups of non-survivors can be identified: diversified firms with full product lines, and single business firms with one or a few product lines. Magic Chef and Maytag have moved towards the upper left corner. The two firms that now have merged have different backgrounds. Maytag has enjoyed an outstanding reputation in laundry products for decades with margins twice the industry average.52/ The company moved into cooking products by acquiring Jenn-Air and Hardwick. Magic Chef, on the other hand, has a background in the lower-end range market. In the late 1970's, Magic Chef embarked on an acquisition route to broaden its manufacturing and marketing base into refrigerators and freezers (acquired Admiral in 1979 and Revco in 1981), and laundry equipment (acquired Norge in 1979).

Before Kitchen Aid was acquired by Whirlpool, the company had started to move in the direction of a full-line brand with slogans like "the Kitchen-Aid Kitchen" and "Komplete Appliances". The brand has a tradition in the high-end cooking appliance and dishwasher markets.

6.4 THE JAPANESE WHITE GOODS INDUSTRY

With a population of some 120 million people, Japan is second only to the United States in terms of size of the market for consumer products. Rapid economic growth has fostered a very large and diversified industry for electrical consumer products. As Table 6.20 illustrates, Matsushita is the largest supplier of electrical consumer products. It has a leading market share in nearly all product categories in major appliances and consumer electronics. Sony does

not manufacture major appliances but is number two to Matsushita in most areas of consumer electronics. Hitachi and Toshiba fight for the positions below Matsushita, Sony and Sanyo. Exports account for a disproportionate amount of consumer product sales for these companies. In 1982, Mitsubishi Electric's Consumer Products operation accounted for 24 % of revenues but 32 % of exports. Similarly, Hitachi's overall export ratio was 29 %, while Consumer Products was 46 %.

Table 6.20: Consumer product revenues in 1982*/ (million USD).

Company	Revenues
Matsushita	9,128
Sony	4,264
Sanyo	4,465
Hitachi	3,383
Toshiba	2,888
Sharp	1,550
Mitsubishi Electric	1,391

*/ Fiscal year ending March 1982, except Matsushita (November 1981) and Sony (October 1981).

Source: Overview of the Japanese Electrical Equipment Industry, First Boston Research Special Report, January 1983.

Refrigerators

The refrigerator market amounted to 3.71 million units in 1984 (4.2 million units in 1979). Some 1.29 million units were exported and only 10,000 units imported (mainly large refrigerators). In 1982, imports were 72,000 units but have decreased ever since. With the penetration process virtually complete, future growth will now depend on replacement demand, new household formations and developing export markets. Matsushita dominates all segments of the market. The concentration ratio for the six largest manufacturers was 92.1 % in 1984 (see Table 6.21).

Laundry Machines

Production of washing machines amounted to Yen 133 billion (USD 540 million) in 1981. The market faces a demand situation similar to refrigerators. Household penetration is over the 99 % mark and exports account for only 24 % of 1981 production (see Table 6.21 for market shares). In the future, competition may well shift toward technical innovation. Japanese manufacturers are seriously promoting alternative washing techniques. Japanese washing machines use a pulsating whirlpool method to wash clothes as opposed to American washing machines which use agitators. Hitachi has come up with a way to combine the two systems with the result, supposedly, of a quicker, less damaged wash. Hitachi has had some success exporting these to the Southeast Asian markets. Toshiba has developed a "shower rinse" system that has enabled it to increase market share despite lower sales.

Table 6.21: Market shares of leading Japanese manufacturers in 1984, (%).

Company	Refrigera-tors	Microwave ovens	Laundry machines	Electric ranges
Matsushita	27.0	28.5	25.1	27.6
Toshiba	18.1	10.9	15.7	18.1
Hitachi	14.7	13.2	17.5	15.3
Sharp	13.0	31.9	9.0	8.3
Mitsubishi Electric	10.0	4.4	9.6	14.8
Sanyo Electric	9.2	2.9	13.0	10.2
Others	7.9	8.2	10.0	5.7

Source: Yano Research Institute Ltd, 1985, "Market Share in Japan".

Microwave Ovens

The use of microwave ovens has not grown as quickly in Japan as in the United States. The Japanese market for microwave ovens reached 1.22 million units in 1984 (while exports reached 4.83 million units) up from 900,000 units in 1979. Range-oven combinations comprised 65 %

and single-purpose ovens 35 % of total domestic demand.53/ The market is quickly growing. Sharp and Matsushita dominate the market with approximately 30 % of the market each (see Table 6.21). In addition, these companies face stiff overseas competition from Raytheon's Amana division, General Electric, Tappan and others.

Major changes in market shares during the 1980's include Sharp's jump from a 25 % share of the microwave-oven market in 1981 to almost 32 % in 1984. Sharp pioneered the Japanese microwave-oven market.54/

Three companies, Matsushita, Sharp and Sanyo, have invested in manufacturing facilities in the United States. Foreign sales of microwave ovens have evolved as an extension of their consumer electronics businesses. Sanyo, for example, acquired a US TV plant from Warwick Electronics Inc in 1977. Sanyo, which was already a supplier to Sears (through imports) at the time, acquired the plant and has since increased the production of TV sets tenfold and has also begun the manufacturing of microwave ovens.55/ Matsushita and Sharp also extended their electronics businesses (TV, Hi-Fi) with local manufacturing of microwave ovens in the US in the late 1970's. Toshiba opened a plant in the early 1980's. Hitachi and Mitsubishi still rely on exports, mainly to the Far and Middle Eastern markets.

Matsushita invested in a compressor plant in Singapore in 1984 to supply manufacturers of refrigerators worldwide. A major part of these compressors is shipped to the US market. Today, Matsushita is a world leader in compressors.56/ The company is also a large supplier of electronic components to the US appliance industry.57/

Distribution in Japan is very fragmented, with a host of small and large actors, such as trading companies, sales companies, several layers of wholesalers and different types of retailers. For distribution of major appliances, only one layer of wholesalers carrying a single manufacturer's brand is used. The leading appliance manufacturers have tightly controlled distribution networks including: wholesalers, separate sales companies, which are tied into the

manufacturers through equity holdings, and in-house retailers. Structural change in distribution industries, where supermarkets, specialty stores and discount stores have been on the increase, has led to a major reconstruction of the sales company system. All appliance manufacturers have consolidated their sales companies into a few large ones (except for Matsushita, which still runs about 100 sales companies). (See Table 6.22.)

Table 6.22: Distribution networks among leading appliance manufacturers, 1984.

Companies	No. of sales companies after consolidation	Name of in-house retail stores	Number of units
Matsushita Electric	101	National shops	27,000
Toshiba	22	Toshiba stores	12,000
Mitsubishi Electric	14	Mitsubishi stores	5,500
Sayno Electric	11	Sanyo Bara chain	4,500
Sharp	1	Sharp Friend shops	3,800

Source: Yano Research Institute Ltd, 1985, "Market Share in Japan".

Since the mid 1970's, major department stores and supermarkets have been entering the field of specialty stores to increase their service to diversified customer needs. The major chains of specialty stores for home electrical appliances include: Best Denki (290 stores), Dai-Ichi Katei Denki (147 stores), Dai-Ichi Sangyo (123 stores), Joshin Denki (71 stores), and Laox (46 stores).58/

6.5 FROM NATIONAL TO INTERNATIONAL COMPETITION

In the preceding sections it was shown how national industries have become more concentrated over the last few decades. This concentration process has been especially pronounced in the United States, Japan and some smaller European countries. Except for underlying economic forces, the concentration process in the US has been driven by powerful retailers. Such a vertical power balance is not present in the individual European markets (where manufacturers often have

strong ties into retailing), and certainly not if Europe is looked upon as one market. There are no European-wide retailers or retail chains. With fragmentation both among suppliers and buyers, some 300-350 white goods manufacturers are still active in Europe.

In spite of large heterogeneity across European markets, a few companies - notably Philips and Electrolux - have built up extensive international activities across Europe. Through factory automation, component standardization (of strategically important components) and through reduction of the number of basic product designs (which are modified to local standards and tastes), these firms have built competitive advantages vis-à-vis firms only active in their home markets.

Philips, with its long-standing history in Europe, entered foreign markets while entry barriers were relatively low. Weak positions in West Germany and Italy, characterized by high entry barriers, were strengthened through joint ventures where the partners were acquired later. Electrolux, on the other hand, started to build up market positions across Europe much later. Acquisitions were used to overcome entry barriers.

International Trade Patterns

After World War II, demand for white goods grew quickly as the levels of consumer income grew throughout the industrialized world. In 1960, 98 % of the US households owned a refrigerator, while this figure was only 17 % in France, 14 % in Italy, and 5 % in Japan.59/ Major refrigerator producing countries are shown in Table 6.23. Japan, in particular, increased the production almost 20 times over the period 1955-1959. Italy increased the production more than five times.

In 1958, US production accounted for 37 % of the world's total production of refrigerators (8.6 million units), as compared to 90 % of all refrigerators made in 1939 (a total world output of 2 million units).60/ In 1983, the figure for North America was down to 16 % of the world output.61/

Table 6.23: Production of compressor and absorption-type refrigerators, selected countries, 1955 and 1959 (thousands of units).

	1955	1959
United States	4,200	3,750
West Germany	514	1,900
United Kingdom	325	994
France	250	720
Canada	248	256
Australia	247	231
Sweden*/	189	n.a.
Italy	140	750
Japan	30	549

*/ Including freezers.

Source: US Department of Commerce, 1960, "World Trade in Major Household Appliances: An Overall View".

Immediately after World War II, many countries imposed rigid import restrictions due to limited supply of foreign exchange and fear of an invasion of imports (especially from the US). During the 1950's, restrictions were relaxed but, not totally abolished. Demand heterogeneity in combination with trade barriers led US manufacturers to sell licenses to a wide range of manufacturers in Europe and Japan. Furthermore, components were sold both to European and Japanese firms, and licensed (licencees often purchased US made components, such as compressors). Fully built-up appliances were exported to Canada and third world countries (such as Costa Rica, Cuba, Mexico, and Venezuela). In 1955, Canada's share of total US exports accounted for 68 % of all ranges, 42 % of all semi- and fully automatic washing machines and 31 % of all refrigerators.62/

Within Europe, trade was kept at relatively low levels. Trade was often two-way between countries. Thus, Italian manufacturers managed to sell small quantities in the UK and West German markets, and West German and British manufacturers found pockets of demand in Italy (and similarly between West Germany and the UK). Italy had higher import duties on washing machines (and parts) than on refrigerators (27.9 % and 18.0 % respectively in 1959, plus a compensatory import

tax of 3 %.63/ Sweden, West Germany and The Netherlands had low import duties (12 % for refrigerators, and 6 % for washing machines in The Netherlands, 2 % for refrigerators and 7 % for washing machines in West Germany, and 10 % for both product lines in Sweden in the late 1950's). In Sweden, 33 % of all washing machines sold were imported (26 % of refrigerators, 15 % of freezers and 2 % of electric ranges, 1956 figures), and 40 % in the Netherlands.64/ Major exporters to these markets included: West Germany, United Kingdom, USA and Denmark.

If we take a historical look at Swedish exports, it is clear that the most important trading partners are not the closest ones (neither in physical distance nor in cultural distance). (See Table 6.24.)

Table 6.24: Swedish exports of selected white goods to major trading partners, 1957-1958, (thousands of USD).

1957 Rank	Country	Washing machines and dishwashers 1957	1958
1	United Kingdom	52,882	85,499
2	Italy	32,038	16,791
3	Norway	31,266	46,127
4	Venezuela	28,950	36,670
5	South Africa	21,616	14,475
6	New Zealand	11,773	13,124
7	Belgium-Luxembourg	5,790	13,510
8	The Netherlands	2,123	25,090

1957 Rank	Country	Household refrigerators, freezers and parts 1957	1958
1	South Africa	648,480	1,014,408
2	Venezuela	522,837	665,657
3	The Netherlands	516,661	444,865
4	Norway	495,045	572,631
5	Belgium-Luxembourg	466,674	511,064
6	Austria	391,018	314,590
7	Peru	387,544	435,601
8	Switzerland	270,200	250,128
9	Portugese East Africa	263,638	419,196

Source: US Department of Commerce, 1960, "World Trade in Major Household Appliances: An Overall View".

The UK market restricted imports of white goods severely until 1959. For example, before 1959 US exports to the UK were limited to 30 % of the annual prewar US exports (1936-38). A few US firms - notably General Electric (Hotpoint) and Hoover - established local manufacturing plants in the UK.

While intra-European trade has increased rapidly, trade between the three main regions - United States, Europe and Japan - has not. Large differences in tastes and technical standards, combined with substantial transportation costs, have kept trade at very low levels between the three regions. (Japan had severe import restrictions with 15-20 % import duties in the late 1950's, combined with restrictions on import licenses.) There have been small pockets of demand for large US appliances in Japan, for more compact European appliances in the US, and Japanese compact appliances in the US and Europe.

US exports have mainly been directed to Canada and developing countries (South America and the Middle East). Refrigerators are the main exports, followed by washing machines. During the early 1980's exports fell, due to a rapid increase in the US demand combined with an unfavourable exchange rate. Imports originate mainly from Canada, Brazil, Spain, Italy, South Korea and Japan. The single most important product line is microwave ovens, followed by compact refrigerators (see Table 6.25). Imports of microwave ovens showed an astonishing growth of 249 % between 1980 and 1983. This trend has been reinforced as the leading US firms have decided to phase out their own production and source from Japanese and Korean manufacturers. GE began sourcing microwave ovens from Japan (Matsushita) and South Korea (Samsung) in 1984, Tappan from Japan in 1985, and Amana from Far East sources in 1983. Imports of components mainly include magnetron tubes and compressors. The components are imported from the Far East and Brazil.

US manufacturers have had relatively low international sales compared to their domestic business. Canada is the major foreign market where GE (through Camco with 51 % ownership) has a 30 % market share, Whirlpool (through Ingus with 52 % ownership) a 24 % share, and WCI a

12 % share. Furthermore, GE and Whirlpool have manufacturing subsidiaries in Brazil, and WCI in Puerto Rico (both GE and WCI have had manufacturing operations in the United Kingdom which have been sold off). All the US majors have sold licences to local companies in the developing world.

Table 6.25: US Imports and Exports, 1980, 1983, (thousands of units and thousands of USD paid by importers excluding duty and manufacturers' export value plus freight and insurance).

Product line	Exports 1983*/	1980	Imports 1983*/	1980
Refrigerators	194	342		
	103,972	163,935		
Refrigerator/freezer comb.			11	2
13.5 cu.ft.			4,238	1,140
-"-			189	96
9.6-13.5 cu.ft.			22,962	11,796
-"-			81	102
6.5-9.5 cu.ft.			6,688	5,634
-"-			462	426
6.5 cu.ft.			30,716	24,780
Freezers	28	54	76	43
	13,130	21,621	15,317	6,652
Ranges, electric	53	109		
	15,839	29,182		
Microwave ovens	82	97	2,076	835
	19,765	27,046	317,140	160,091
Dishwashers	63	125		
	15,822	25,355		
Washing machines	151	191		
	43,684	48,684		
Dryers	50	49		
	12,346	10,920		

*/ Projection based on 10-months figures.

Source: Merchandising, March 1984, "62nd Annual Statistical and Marketing Report".

In the 1970's, export businesses were growing all around the world, including Japan. But in the early 1980's, several factors interacted and sales slowed down. The dollar went up, the Middle Eastern market boom was over, and Japanese and Korean producers moved into Asian markets with strong force. Furthermore, the US market picked up, reducing the interest for overseas business. In 1985 the international consumer products division of WCI had sales of 302 million USD, of which 10% was in sewing machines, 20% in commercial refrigeration, 42% in WCI-Canada (white goods), and 28% international sales companies. Thus, non-Canadian overseas business of white goods accounted for around 85 million USD out of almost 2 billion USD in total white goods sales.65/ WCI accounts for some 20-25% of total US exports of white goods.

Japanese manufacturers have offset weak domestic demand by strong overseas sales. Exports have been geared towards the Asian and the Middle Eastern markets, while penetration in Europe and the United States so far has been limited to compact appliances, most importantly, microwave ovens. Of the total appliance exports, microwave ovens accounted for 32.6 % in 1984. In the compact refrigerator segment, the combined market share of all Japanese firms in the US amounted to 40 % in 1982. For microwave ovens, the combined market share was 30 %.66/ With the economic recovery in the United States, exports of microwave ovens took off. In 1983, 2.7 million microwave ovens were exported, almost twice the 1982 level of 1.4 million units. In 1985, the figure had risen to 6.4 million units. Except for exports of microwave ovens to the US market, reaching 2.43 million units in 1984, exports have been directed towards Great Britain (1.05 million units), Australia (510,000 units), Canada (360,000 units) and West Germany (233,000 units).67/

Japanese exports of refrigerators and laundry machines have been of much smaller magnitude and mainly directed to Asian markets. In 1984, 261,000 refrigerators were exported to China, 199,000 to Saudi Arabia, 192,000 to United States, 181,000 to Hong Kong and 61,000 to Australia. Comparable figures for laundry machines were 357,000 to Saudi Arabia, 284,000 to China, 167,000 to Australia, and 112,000 to

Hong Kong.68/ Imports are virtually non-existent. In 1985, Japan imported 2,500 dishwashers, 4,000 laundry machines, 1,500 freezers (a very small market in Japan) and 10,000 refrigerators.69/ Sears entered the Japanese market during the 1970's through Seibu, which owns a large number of department stores and supermarkets. Seibu began to market Sears' refrigerators through department stores and mail order. However, a combination of tariffs and increased competition from domestic firms led to a cut down on imports, and Sears chose to source from a local manufacturer.

As can be seen from these statistics, microwave ovens are the only product of some size to be traded on world markets. With the growth of the microwave oven market in the United States and later throughout Europe, Japanese and Korean firms (partially controlled by Japanese firms) have managed to create a foothold on these markets. Products are both sold under private label (to US and European manufacturers as well as to retailers with their own brands) and with Japanese brand names (so far Korean manufacturers have low brand visibility).

Table 6.26: Japanese production, exports and imports, 1984, (thousands of units/billion Yen).

	Production		Export		Import	
	Units	Value	Units	Value	Units	Value
Microwave ovens	7,909(34.5)	278(17.5)	6,411	193	0	0
Washing machines	5,092 (1.7)	139 (1.0)	2,063	44	4	0.7
Refrigerators	5,354 (6.2)	435 (5.0)	1,919	77	10	0.4

Note: Figures within brackets denote the average annual increase in % for the period 1981-1985.

Source: Japan Electrical Manufacturers' Association (JEMA), March 1985, "World Household Electrical Appliance Market".

Major Entries Across Regions

As is described above, Japanese firms have built up a presence in the US market through exports of traditional compact appliances and

microwave ovens (predominantly under private label). To further strengthen their positions, three Japanese firms started local manufacturing - Matsushita and Sanyo in 1979 and Sharp in 1980. Sanyo acquired a local plant in a deal mastered by Sears. In 1985, Matsushita announced its intention to market a full line of major appliances in the US market on a full-line basis under the Panasonic brand. Panasonic sources ranges, refrigerators and freezers from WCI-Canada, and dishwashers from D&M. Toshiba and Hitachi are also now entering the US market. Hitachi compact laundry machines are sold under the Speed Queen brand - owned by Raytheon.70/

Only one European firm - Electrolux - has entered the US market with some force. In 1981, Electrolux acquired Tappan and thus established a position in the gas range and microwave oven markets. With almost no coordination between Electrolux' European operations and Tappan, this move can be looked upon as a portfolio investment in the short run. Thus, Electrolux did not acquire a local company, including brands and local distribution, to facilitate exports (which has been the case with acquisitions made in Europe). Instead, two other advantages accrue from the acquisition. First, it gave Electrolux a platform to get to know the US market and second, it gave the company an in-house source of microwave ovens (larger models) for the European market.

The need for improved quality and reduced costs has been the major message at industry conferences in the United States throughout the 1980's.71/ One company of the leading three, WCI, has been known as a laggard in this respect resulting in poor profitability figures over the long run.72/ Electrolux, with its outstanding reputation in cost rationalization, saw a chance to take over WCI (through a hostile bid). Except for the potential of turning WCI around and making it a profitable venture, there were two major reasons behind the acquisition. First, GE had made a turn-around in 1980, resulting in intense competition in the mid 1980's. Tappan - a small player in the market - was threatened, especially since GE entered with a line of gas ranges in 1985. GE, which had never been active in the gas range market, established a market position close to 20 % within a year.73/

Electrolux was faced with a situation where Tappan could be wiped out within a few years. The acquisition of WCI established Electrolux as a leading full-line manufacturer in the US market. For anti-trust reasons, GE or Whirlpool could not have acquired WCI to prevent Electrolux from doing so. Second, by acquiring WCI a new potential for increasing the production volume of components opened up. New components, such as energy-efficient rotary compressors are only produced by a handful of companies on a global scale. Companies like GE, Matsushita and Mitsubishi have recently made major investments in automated plants for these compressors.

Foreign operations of US companies have mainly been located in Canada, Brazil and Australia. The Canadian operations are market oriented, while plants in Brazil and Puerto Rico are used as low-cost sources. After World War II, US companies sold licenses to European and Japanese firms. A few manufacturing subsidiaries were set up in the United Kingdom. Today only two US brands have a position in Europe, and are furthermore limited to the UK market. The Hotpoint brand is now locally owned by GEC, and Hoover is not active in white goods in the US market any more. In 1986, Whirlpool acquired a majority interest in an Italian manufacturer of compressors - Aspera SpA - from Fiat.74/ Furthermore, Whirlpool is negotiating a joint-venture with Philips - a move truly matching the Electrolux-WCI deal.

Japanese manufacturers have entered Europe with almost total emphasis on microwave ovens. As the UK microwave oven market was the first to take off in Europe, Japanese manufacturers entered the UK market first. In the mid 1980's, several joint-ventures were formed between Japanese and European firms in the microwave oven area. Furthermore, several Japanese manufacturers began local production of microwave ovens in the UK (as a platform for Europe).

In 1987, the Japanese had come a long way in penetrating world markets for microwave ovens. Electrolux, WCI, Philips and Whirlpool were building positions across the Atlantic, while Japan was still untouched by both the Americans and Europeans.

NOTES TO CHAPTER 6

1/ Range is the term used in the United States. In this chapter, range will be used rather than stove or cooker.
2/ This study does not include commercial appliances, floor-care appliances, air conditioning equipment, kitchen cabinets, cooker-hoods or smaller kitchen appliances.
3/ Several references on household purchasing behavior are given in "Note on the Major Home Appliance Industry in 1984", p. 8, 9.
4/ Financial Times, Nov. 17, 1986.
5/ Baden Fuller, et al., 1987.
6/ Financial Times, Nov. 17, 1986.
7/ Ibid.
8/ Internal Material, Zanussi.
9/ Interview data. Also confirmed in Financial Times, May 22, 1987.
10/ Internal Material, Electrolux.
11/ Ibid.
12/ Internal Material, Zanussi.
13/ Financial Times, May 22, 1987.
14/ Excluding the so called twin-tops. Internal Material, Electrolux.
15/ Financial Times, Feb. 20, 1984.
16/ Internal Material, Philips.
17/ Ibid.
18/ Appliance, May 1986, "On the Range".
19/ Financial Times, Feb. 20, 1984.
20/ Andersson, et al., (1982:105).
21/ Fortune, Aug. 18, 1986, "Electrolux Wants a Clean Sweep".
22/ E.R.C. Statistics International Ltd., 1985.
23/ Penrose, 1963:121.
24/ Merchandising, May 1982, "Appliance Industry Prepares to Ward Off Japanese Threat".
25/ Merchandising, Dec. 1983, "Appliance Industry Reverses Itself in '83; Slump is Over".
26/ Business Week, Aug. 4, 1986, "Turning Up the Heat in the Kitchen".
27/ Business Week, Aug. 4, 1986.
28/ Fortune, July 1983.
29/ Internal Material, WCI.
30/ Merchandising, Nov. 1982, "Eight Annual Major Appliance Statistical and Marketing Reports".
31/ Ibid.
32/ Internal Material, WCI.
33/ Ibid.
34/ Fortune, July 1983.
35/ WCI Annual Report, 1984.
36/ Fortune, July 1983.
37/ Interview data, Stock Analyst.
38/ Harvard Business School Case: Competitive Positioning in the Dishwasher Industry (B) - Design & Manufacturing, 1984.
39/ As is discussed above, Electrolux cannot use its own brand in the US market as it was sold off in the 1960's.
40/ Business Week, August 26, 1985, "Fighting Back: It Can Work".

41/ In the 1960's, GE was clearly the major innovator. In a list of 19 innovations introduced between 1960-1970, GE/Hotpoint accounted for nine. No other firm accounted for more than one innovation. See note on the Major Home Appliance Industry in 1972, Exhibit 15.
42/ Business Week, August 26, 1985.
43/ Appliance Manufacturer, October 1984.
44/ Business Week, August 4, 1986.
45/ Appliance Manufacturer, July 1985.
46/ Business Week, July 14, 1986.
47/ Appliance Manufacturer, April 1983, "Whose Majors are Consumers Going to Buy?".
48/ Business Week, August 26, 1985.
49/ Fortune, July 1983.
50/ Harvard Business School Case, "Competitive Positioning in the Dishwasher Industry (D) - General Electric.
51/ Business Week, August 4, 1986.
52/ Interview data, Stock Analyst. Confirmed in various brokers' reports. See also Forbes, January 2, 1984.
53/ Yano Research Institute Ltd., 1985, "Market Share in Japan".
54/ First Boston Research, special report Jan. 1983, "Overview of the Japanese Electrical Equipment Industry".
55/ Business Week, Aug. 4, 1986, "At Sanyo's Arkansas Plant the Magic Isn't Working".
56/ Toyo Keizai Shindosha, Japan Company Handbook, 1st half 1986.
57/ Goldman Sachs' Investment Research, Dec. 18, 1985, "Matsushita Electric Industrial Co. Ltd.".
58/ Dodwell Marketing Consultants, Oct. 1985, "Retail Distribution in Japan".
59/ US Department of Commerce 1960, "World Trade in Major Household Appliances: An Overall View".
60/ Ibid.
61/ The Japan Electrical Manufacturers' Association, 1986, "Home Appliance Industry in the World".
62/ US Department of Commerce, 1960, "World Trade in Major Household Appliances: An Overall View".
63/ Ibid.
64/ Ibid.
65/ Internal Material, WCI. See also Table 6.26.
66/ Note on the Major Home Appliance Industry in 1984, Exhibit 2.
67/ Yano Research Institute Ltd., 1985, "Market Share in Japan".
68/ Ibid.
69/ The Japan Electrical Manufacturers' Association, March 1985, "World Household Electrical Appliances Market".
70/ Dean Witter Equity Research, Oct. 28, 1985, "Electrical Equipment Update".
71/ Merchandising, May 1982, "Appliance Industry Prepares to Ward Off Japanese Threat".
72/ Profitability records (Return on Total Capital, Five-Year Average, 1979-1983) varied from Maytag's 22.1 % to WCI's 8.5 % (with GE, 18.3 %, Whirlpool, 16.1 % and Magic Chef, 8.9 % in between). See Forbes, Jan. 2, 1984.
73/ Business Week, Aug. 4, 1986.
74/ Appliance Manufacturer, May 1986, "Whirlpool to Acquire Interest in Aspera".

7. Summary of Empirical Findings

7.1 INTRODUCTION

In the two preceding chapters we have seen how competition has become increasingly international during the post-war period. We find some general patterns in this process which will be summarized here.

With growing markets in the 1950's and 1960's, the leading firms in the industrialized countries had their hands full in their respective home markets. Thus, competition was largely kept within national borders. National structural evolution was characterized by concentration, involving national acquisitions and mergers. On the international scene, US firms built up positions in Europe, especially in the UK where plants were often located. However, the US firms did not direct a lot of attention to the European market, and positions slowly eroded as the European industry recovered. With differences in technical standards and tastes between United States and various European countries, local responsiveness would have been needed in order for the US firms to build up strong positions throughout Europe. This was apparently not in line with the strategies of the US MNEs, and thus entry into Europe was not followed by deepened penetration.

With the easing of trade barriers, creation of international capital markets, and demand saturation, firms began to expand abroad. As is further analyzed below, these expansion strategies took various forms and were induced both by firms in both home and host countries.

As a general trend, national industries without strong domestic competitors were targeted first. Later on, national industries with high entry barriers were entered and further penetrated. Such penetration took off in the 1970's within Europe and between the three major regions: the US, Europe and Japan. Japanese firms began to build up positions in the United States and throughout Europe (always starting in the UK). European firms started penetrating the US market, and US firms made a comeback in Europe. This process of entry and further penetration into oligopolistic national industries has now been going on for almost two decades. However, some national industries are still almost untouched by foreign firms. The most notable example is Japan. In both our empirical blocks, the Japanese market is still totally dominated by indigenous firms. No American or European firm has even tried to get a significant foothold on Japanese soil.

This whole process has been facilitated by exogenous changes, but was driven by a few change agents. These international change agents are not a homogenous group of actors, but we have found some strategic characteristics common to these firms. Most important, they have managed to build competitive advantages of a new magnitude, out-performing the national firms and traditional multinational firms (see further section 4 of this chapter).

7.2 INTERNATIONALIZATION PATTERNS - COUNTRY SEQUENCE

The first purpose of this thesis was to describe the sequence in which foreign national industries were penetrated, and give tentative explanations as to why certain countries were penetrated before others. From our empirical studies we can conclude that industry structure plays an important role in deciding such sequences. Thus, in both our blocks the major fortresses, i.e. the home industries of leading international firms, have not been seriously attacked until the 1970's, and some still remain untouched.

Competing in Third Markets

Instead of competing on each other's home markets, international competition has been removed to third markets, including markets in the Middle East, South Africa, South America, Southeast Asia, Australia and New Zealand (in Bloc A). In these markets we find all the major electrical firms from Europe, United States and Japan, as well as some second-tier firms which began to penetrate international markets in the 1970's.

During the last decade a few major moves have been made to penetrate leading industrialized countries. Siemens and Telemecanique acquired US firms, while Westinghouse and Square D acquired West German firms (see 5.8).

Market share data presented in sections 5.5 to 5.7 shows that home industries of leading international firms (France, West Germany, United States and Japan) have been avoided by foreign firms until recently. Data in Chapter 6 (see e.g. Table 6.9) show similar results. In Europe, fortresses like West Germany and Italy are now being opened up by foreign firms (most importantly through acquisitions made by Electrolux and Philips). The US white goods industry is also being penetrated by foreign firms, both Japanese and European (two of the three largest US competitors have recently been tied to European firms). The three leading US competitors have been active in international markets for over 50 years, with the focus on Canada, the Middle East, South America and Australia. Our conclusion that fortresses have been avoided over long periods is not based on detailed lists of sequence patterns of individual firms, but on market share data.

Even though proximity is an important factor in deciding country sequence (as we have seen in our industry studies), it has sometimes been overruled by host industry considerations. Otherwise the fortresses should have been penetrated before many of the third world countries, and industrialized countries without a strong indigenous industry. As an example, look at Table 6.24 showing early Swedish export patterns.

7.3 PENETRATION ROUTES INTO FOREIGN INDUSTRIES

Our second purpose deals with how foreign industries, surrounded by substantial entry barriers, have been penetrated. In our empirical work we have described how industrialized countries, with strong indigenous competitors, are now being penetrated by foreign firms. Such penetration has taken many routes, and in our model five important dimensions were outlined by which we can describe foreign entry and further penetration. This section is mainly based on our study of the U.S. white goods industry, which is the one national industry upon which we have focused our empirical work on regarding penetration behavior of foreign firms (purpose number two).

Foreign entry and further penetration is a multi-facetted phenomenon. It involves a process where both tangibles and intangibles cross borders. Our empirical studies tell us that in this process, actors both in the home and host countries are actively involved. This is complementary to the traditional view of how a company in a certain home country makes decisions regarding which foreign industries to enter and how to enter them. That such strategic decisions are actively influenced by actors in the host country is rarely considered.

Dematurity - Penetration tied to New Products

New technologies have played a significant role in foreign industry penetration, even in mature stages of the product cycle. Through new superior products, often in connection with superior manufacturing processes, foreign firms have managed to penetrate foreign oligopolistic industries. Entry through substitution puts established rules of competition in the host industry in a new light. Switching costs among buyers can constitute a major entry barrier, and thus such penetration tends to be slow. In Chapter 5 we reported on the slow substitution process from fuse technology to no-fuse technology (MCCBs). For example in Sweden, one of the last "fuse-markets", foreign firms had entered with MCCBs but not with any success. Only

when ASEA, the dominant actor, decided to bring in MCCBs (through a sourcing contract with a Japanese firm), a gate was opened (see discussion below) for a foreign firm to really penetrate the Swedish market. Thus, the speed of penetration of new technologies is much a question of when host country actors decide to push the new products.

Maybe more important than entry with substitute products has been the entry with improved products, such as the new generations of IEC contactors and ACBs. Only those manufacturers who have invested heavily in new product generations have managed to penetrate the fortresses (see discussion on global apparatus specialists in section 5.9). Thus, even in a mature product area like LV apparatus, technological leadership has been needed in order to penetrate foreign oligopolistic industries.

The only major new product introduced on the white goods market after World War II is the microwave oven. In the United States, demand took off during the 1970's. In 1982, it became the single largest selling appliance, and thus demand did not follow the general business cycle. Furthermore, demand has not been tied to well-established white goods brands. Instead, the microwave oven received more of a high-technology image, which consumers could more easily connect to brand images in the electronics field (see discussion below on product broadening). With the introduction of the microwave oven, the first new brands were established in the US market since World War II, including both domestic and foreign brands.

In spite of being a slow penetration route, new product technologies (ranging from improved products to substitute products) seemed to have been instrumental when fortresses have been penetrated. When the acquisition route has been used, penetration has not been tied to a superior product, however, here we believe manufacturing technology to have played an important role (compare the discussion on Electrolux in section 6.2).

To conclude, in our mature industries new product and process technologies have been a central feature in a process where fortresses have been penetrated by foreign firms.

Product Broadening

Fortress penetration (where acquisitions have not been used) has been characterized by product-broadening strategies where the entrants have pursued sequenced strategies beginning in limited niches. Penetration of the US white goods market by Japanese firms started in the compact segment. However, in the 1980's a few Japanese firms began to broaden their product lines into larger size appliances. The leading Japanese firm in the compact refrigerator market, Sanyo, began test-marketing larger refrigerators in 1983.

Another act of product broadening (widening the corporate scope) among the Japanese firms in both the United States and Europe, is the move from brown goods to white goods. With already well established brand names in the consumer electronics area, this image was moved over to the white goods sector at low costs. Thus, costs sunk by white goods manufacturers in building brand image did not constitute a barrier to entry vis-à-vis the Japanese firms established in the U.S. consumer electronics market. The transfer of a brand image to microwave ovens has been facilitated by the fact that microwave ovens are not considered a traditional appliance, but something of a high-tech, electronics-oriented product. Often microwave ovens are sold by retailers or departments in department stores carrying consumer electronic products.

Gate Openers

To penetrate a foreign industry via private label versus a foreign brand, the hurdles to be overcome clearly differ as locally established firms have established brand names. Normally the private label hurdle is much lower than the brand hurdle. Thus, entry barriers differ whether one talks about entry of a product, or entry

of a product marked with a foreign brand. As we shall see, private label entry has often been induced by established firms in the host country and thus the hurdle has been eliminated. Two different types of induced entry appear - induced entry by horizontally related firms, and induced entry by vertically related firms. Firms inducing entry we term gate openers. These gate openers source their products from foreign firms.

Horizontal Gate Openers - National and Multinational

What we have chosen to characterize as horizontal gate openers are those firms in the host industry deciding to: (a) phase out part of, or the whole product line and source those products from a foreign supplier, or (b) expand into new products to broaden their product mix through foreign sourcing.

These horizontal gate openers open up the market for foreign firms. However, most often the foreign entrant does not sell under its own brand but under private label arrangements. In our two empirical studies we have found several examples of horizontal gate openers.

Foreign entry in the LV apparatus industry has been induced by host country LV apparatus manufacturers. We have several instances where part of the production line has been phased out. Thus, GE, BBC, Siemens, Asea and others have opened up new national markets for a Japanese company (see Chapter 5, section 8). Firms have also expanded their production lines by sourcing from independent foreign firms. A case in point is Asea, sourcing MCCBs from Terasaki. With Asea being a multinational enterprise, not only the home market is opened up, but also a number of other markets where ASEA has a strong position. Thus, such horizontal gate openers act as multinational gate openers.

Entry into the US and European markets by Japanese firms has been facilitated by local firms. In Chapter 6 (section 3) we saw how US white goods manufacturers began to source microwave ovens from Korean and Japanese manufacturers under private label, and thus opened up

the US market for these firms. In Europe large quantities of unbranded appliances are hauled across borders. Especially the Italians export large quantities of unbranded goods to competing firms in other European markets.

Vertical Gate Openers

Vertical gate openers are firms in vertically related industries in a host country, which actively encourage entry of foreign firms. The incentive to induce entry is to gain bargaining power vis-à-vis a supplying (or buying) industry. New entry into a supplying industry means increased competition, implying weakened bargaining positions vis-à-vis the buying industry.

We can only expect to find vertical gate openers in markets with vertical structures where there exist at least two industries with strong independent actors. If the vertical chain is totally dominated by one industry - with industry members exercising control through vertical integration or tapered integration - there are no actors along the vertical strong enough to induce entry by foreign firms.

In Bloc B we found notable examples of vertical gate openers, whereas in Bloc A vertical structures have not permitted such actors. A clear sign of the difference between Bloc A and B is that in Bloc B strong retailers' brands exist, while such brands do not exist in Bloc A, where distribution is integrated, or is carried out by small firms with weak bargaining positions vis-à-vis manufacturers.

In at least two important cases in Bloc B, retailers have opened up their national markets for foreign firms. The important role played by Sears in shaping industry structure in the United States was reported in Chapter 6 (section 3). By sourcing microwave ovens from Sanyo, and arranging for Sanyo to take over a US plant, penetration was highly encouraged. Through Sears, Sanyo got access to the leading brand in United States, in the single largest product segment. In the

West German market a large retail chain - Quelle - has opened up the market for foreign firms, such as Zanussi. In many European markets, retailing is partially controlled by the manufacturers, and thus there is little room for vertical gate openers. Manufacturers of white goods have also acted as vertical gate openers to foreign component manufacturers (sometimes being vertically integrated firms, such as Zanussi selling compressors to assemblers around Europe).

Common for these gate openers is the use of private label arrangements. But even if the foreign entrant does not build up its own brand initially, he is gaining volume, and can slowly build up its brand alongside the private label market from an enhanced base.

Penetration as a Process of Increased Commitment

Significant footholds in foreign markets have necessitated local manufacturing - either through acquisitions, coalitions, or green-field establishments. Increasing commitment has also involved the move from private label sales to brand sales. The process of increased local committment has been slow (except in rare cases of major acquisitions).

Trade of LV switchgear has been and still is very limited, and in order to start penetrating foreign markets, local assembly is needed. Thus, internationalization in this industry means a somewhat larger commitment than in others, where firms initially export from their home base. However, local assembly can start as a relatively small operation. Trade of LV apparatus, on the other hand, is much more feasible. Given the large economies of scale, combined with low transportation costs, local manufacturing is still the exception for LV apparatus (except for some final assembly operations such as adding enclosures). With differences in technical standards and demand, only limited entry has followed from pure trading. Major positions have instead followed from acquisition, where US firms have acquired European firms and vice-versa. Also a few European mergers - such as ASEA-Strömberg have occurred. Japanese companies still rely on exports both to United States and Europe and they also have weak positions.

In the white goods industry penetration through pure trade into major industrialized markets has been of limited importance, if gate openers have not been present (such as in the case of Sanyo's entry into the US market). Due to transportation costs and demand differences between the United States, various European countries and Japan, only a few niche items are traded around the globe. Thus, US market segments for compact appliances and "European-style" appliances have been filled by Japanese and European-made products, delivered with only minor adjustments from home country plants. The market for compact refrigerators, freezers and, more lately, washers and dryers, has largely been neglected by the US firms, leaving the segment open for imports. The market for compact refrigerators was the first to take off, and some 40% of this market is accounted for by Japanese firms. Similarly, US companies have found small niches for the larger US-type appliances around the world.

Intra-European trade has increased significantly during the post-war period. Except for private label trade, branded products have also been shipped across Europe. Imports of branded products into home countries of leading appliance manufacturers have been kept at low levels. With Electrolux and Philips building up extensive production networks across Europe, intra-firm trade has increased significantly. This trend has been reinforced as MNEs begin to specialize their plants. In the extreme case only one plant covers the whole European market. Examples in Sweden are Philips' microwave oven plant in Norrköping and Electrolux' plant for larger refrigerators in Mariestad. However, due to large demand heterogeneity in the range market, even the integrated MNEs are forced to run several plants.

Several Successful Penetration Routes

As we expected, acquisitions play an important role when fortresses are penetrated by foreign firms. Electrolux has acquired local firms, getting access to local plant capacity, local brands, local distribution, etc, while Philips built up positions green-field (in a much earlier period) except in two major cases - West Germany and Italy -

two fortresses which Philips did not really begin to penetrate until the 1970's. However, not all entrants have used the acquisition route. The Japanese firms in particular have managed successfully to penetrate foreign industries without acquisitions. In Bloc B we saw how the United States and now Europe are penetrated through green-field investments (manufacturing of microwave ovens as a first step) in combination with various forms of cooperative arrangements. Such cooperation includes private label arrangements and furthermore the transfer of new technology (in the case of Europe) (see Chapter 6, section 2).

The proposed cooperation between Whirlpool amd Philips is of a new type. Suddenly two major actors, formerly competing in two different worlds - the U.S. and Europe, combine their operations in an alliance, which is short of merger but has the similar competitive implications.

7.4 ACTION-REACTION PATTERNS

It has been an almost impossible task to separate out which actions taken by incumbents in a host industry are direct responses to an attack by a foreign firm. Thus, our results are not very convincing. However, we will report on a few phenomena which were not brought up in Chapter 3. Before going into reaction patterns, we shall take a closer look at those firms taking initial (or early) actions. The proacting firms we term international change agents. In Bloc A, these international change agents were typically specialized firms (within the LV apparatus field), and thus did not belong to the group of major electrical firms which are highly diversified and vertically integrated. In Bloc B international change agents clearly differed. While Philips and some Japanese firms are highly diversified, Electrolux is more of a specialist. Vertical integration was also more pronounced among change agents in Bloc B. Common to all international change agents is the force by which they penetrate foreign industries. Such force is based on superior technology which in turn is a result of long-time investments made in new product designs and new manufacturing technology, based on large volume

production (especially in a few strategic components in Bloc B and a few lines of LV apparatus in Bloc A) resulting in superior cost positions. The international change agents are innovative firms putting emphasis on mature product areas.

International Change Agents

In the LV apparatus industry, a few firms have concentrated their efforts product-wise and diverted their efforts geographically at the same time. These firms have concentrated on a few transferable firm-specific advantages making it possible to overcome host industry entry barriers. Telemechanique started the process some 15-20 years ago, and a few firms have followed. The implications of this emerging group of global apparatus specialists are far-reaching. Major electrical firms with in-house suppliers find themselves competing with superior external suppliers. The make-buy decision is put in a new light. Vertical disintegration has followed, while the global apparatus specialists are negotiating contracts with all the major electrical firms. The fight for a leading global position among the specialists includes all major markets in Europe, North America and Japan. The process of vertical disintegration is speeded up, as the gap in competitiveness between in-house suppliers and the global specialists has rapidly increased.

Competitive pressures on the majors are also increased from national second-tier firms and panel-builders which are in a much more flexible sourcing position than the majors. As long as the fight for market share goes on, the nationals can shop around at good prices. This in turn will put them in a better competitive position in the switchgear market (apparatus being the most important cost element).

In the European white goods industry, Electrolux in particular has acted as an international change agent merging the various national industries. The Japanese companies are also early actors in that they penetrate both the US and European markets, however within limited niches. While many firms are falling behind, Whirlpool (a specialist)

and Philips are forming an alliance to match Electrolux acquisition of WCI - the third largest competitor in the US market. With these trans-Atlantic groups the nature of competition is changing in both Europe and the United States. With homogenizing component standards trans-Atlantic groups can enhance their cost positions. Furthermore, within Electrolux technological know-how, assembled products and design move both ways between their US and European operations (such as microwave ovens produced in the United States and shipped to Europe, and a new full line of white goods manufactured throughout Europe and shipped to the United States).

A Major Electrical Firm - Reactions to Increasing International Competition

As we discussed in Chapter 4, we have not been able to track down action and reaction patterns over time. Recorded strategic behavior is part of a long-run structural evolution, and might not be a direct response to entry by a foreign firm. And furthermore, foreign entry might be a response to strategic moves made in the host industry (a case in point is General Electric's turn-around which pushed the decision of Electrolux to move beyond the initial Tappan foothold; see page 199), thus being a reaction rather than initial action. Instead of summarizing strategic moves which fit into the framework of reaction patterns presented in Chapter 3, we will bring up a few points which we experienced in our study of ASEA (a company responding rather than driving structural change in the LV business).

Securing the Home Market

ASEA, which has not acted as an international change agent, has been forced to look after its home market. Historically, ASEA dominated the Swedish LV market, yielding profits on which internationalization could be built. When faced with increasing foreign competition in the home market, ASEA made a turn-around in two major respects: a co-operative venture was formed with a Japanese manufacturer, and acquisitions were made in both Finland (acquiring its toughest competitor

Strömberg) and Norway. By taking these measures, ASEA could pick up lost market shares in both the apparatus and the switchgear markets, as well as consolidate the industry throughout the Nordic countries. The company even redefined its home market as being the Nordic market.

Lagged Response

When reacting to increasing international competition, such reactions were not implemented until the business unit was financially hurt. Both apparatus and switchgear were basically sold in-house, and thus the business unit had little contact with the end-user market. Signals of changes in competition had to move through several layers within the company until reaching this up-stream business unit (moving through subsidiaries and parent company divisions).

8. Conclusions

8.1 INTRODUCTION

In this concluding chapter we will present our main conclusions. As was pointed out in Chapter 1, section 6, the purpose of this study was not to fully explain a process of increased international competition, but to describe and give tentative explanations regarding country sequence, how fortresses are penetrated, who the early actors are, and reactions following from foreign penetration. In doing so, we have limited our empirical work to two mature industries in the electrical engineering area. Our results regarding the first two purposes we believe to have some validity in other mature engineering industries where internationalization efforts are made in a world of well-established industry and vertical structures in the industrialized nations. Conclusions regarding purpose number three are weak, and we therefore defer any attempts to generalize our tentative indications as to which firms become early actors (breaking up patterns of competition on a nation-to-nation basis). We believe that with our methodology of creating rich industry studies, a deep understanding of structural change is reached, permitting us to develop some tentative explanations as to why the process of increased international competition takes the form it does. Such tentative explanations should have some validity in other mature industries than those studied here.

The Hymer-Kindleberger tradition brought in the notion of imperfect industries into the analysis of MNEs. In their view MNEs built up

competitive advantages, i.e. monopoly power, in their home industries, later to be exploited in foreign markets. In this work we have taken a complementary view, analyzing MNE behavior from a host industry perspective. In our empirical studies we noticed how host country industry barriers (and in later stages of internationalization also international industry barriers) shape strategic behavior of MNEs. We have considered two types of strategic behaviour: country sequence, and entry and further penetration into oligopolistic host industries. Our findings are summarized below (not in order of importance).

(1) MNEs have avoided national industries characterized by high barriers to entry over extended periods, while other more distant national industries have been penetrated. Such behavior can either be a result of collusion, or an act of mutual accomodation made by firms independently. It is reasonable to believe that such an understanding was reached without tacit collusion. Reasoning of the following type would have been sufficient - "If we avoid national industries with strong indigenous firms (home industries of potential competitors), we will not be threatened at home by foreign entrants". Literature in this field has emphasized proximity (see Chapter 3). In our two empirical studies, proximity factors have been overruled by host industry considerations.

(2) Barriers to entry cannot be understood as a simple absolute phenomenon. They vary depending upon behavior by both incumbents and potential entrants. Barriers vis-à-vis domestic entrants have given very limited protection against foreign entrants. Thus, contrary to traditional theory, which assumes that entry into significant oligopolistic industries is a rare phenomenon (Scherer, 1980:248), we have seen many cases of entry by foreign firms (but not by domestic firms). Similarly, foreign entry has been a common phenomenon in our mature industries, which is not in line with models of industry evolution. Our results are in line with those works considering the

resource heterogenity among potential entrants, and the multitude of possible penetration routes (compare the works of Yip, presented in Chapter 2).

(3) We have seen many cases of entry into foreign oligopolistic industries. However, few firms have really penetrated these industries, and become leading actors in host industries (reaching the core in Yip's terminology). The theoretical implication is that barriers to entry are something different to barriers to penetration. Instead of thinking of barriers to entry as something transitional, implying that once the firm has "jumped over the fence" it is an incumbent among others, one could visualize penetration barriers as continuous in time. Once the firm has entered there is a continuing stream of barriers which bar further penetration. Our observations thus fit into the concept of intra-industry groupings, where mobility barriers vary in height between strategic groups. When fortresses are penetrated by foreign firms (and not just entered) competition is truly becoming international. Entry footholds are not enough to integrate national industries.

(4) The entry and further penetration process has been characterized by precaution, due to resource constraints and a wish to minimize retaliation. Penetration of fortresses, which only began some 10 to 20 years ago, is still taking place, and some countries are still untouched (notably Japan). Hence, the evolution towards truly international competition is a process over several decades.

(5) Host industry structure does not dictate a single superior penetration strategy. Instead, various routes have been used with similar success. Fortresses have been penetrated not only through acquisitions, but also through green-field investments and various forms of coalitions. Despite tight oligopolistic structures, there seems to be room for various strategic paths or logics among foreign entrants.

(6) Penetration by foreign firms has sometimes been facilitated by host country actors. Such gate openers can either be horizontal or vertical on a national level or multinational. Gate openers speed up the penetration process of foreign firms, and thus the internationalization of competition is speeded up.

(7) A few dominant firms have shaped industry outcomes, not only on the national level but also on the international level. We term these firms "international change agents". Thus, within a certain product area (disregarding geographical borders) structural change from a national towards an international state of competition is to some extent given endogenously.

8.2 THE PROXIMITY HYPOTHESIS REVISITED

Results from our empirical studies are not fully in line with the proximity hypothesis (see discussion in Chapter 3, section 2), and the question is why national industries with high entry barriers have been avoided over long periods. Furthermore, we must ask ourselves if these results can be generalized to other industries. Regarding the first question we propose that mutual accomodation was reached before the major national industries were penetrated by foreign firms. An international "equilibrium" built on mutual accomodation need not be negotiated. However, both our empirical blocs are within the broad frame of electrical industries which have a history of international cartels, and this could limit our possibilities of making generalizations. (For a discussion of FDI behavior in cartelized industries, see Wilkins 1977 and Buckley & Casson, 1985:Ch 4).

With the electrification of the United States and Europe, markets were locked into cartels early on. Around the turn of the century, the world market was dominated by four industrial groups, tied together two by two: General Electric (GE) and AEG on the one side, and Westinghouse and Siemens on the other (Broder, 1986:184). In 1913, the world market for heavy electrical equipment was divided by these four groups, which also actively cooperated in various research

programs and joint ventures, and certain patents were exchanged. Even though France and Great Britain (including the colonies) were not formally included in these cartels, British and French firms were tightly controlled through license agreements from the dominant four. The Swiss Brown Boveri Group (BBC), which managed to build niche positions in, for example high power turbines, resisted attempts by AEG to incorporate the company into their sphere.

One could of course argue that MNEs within our industries (especially within Bloc A) have made country choices under the influence of cartels or of some remnants of cartelization. However, both our empirical blocs have, on an international scale, been fragmented enough to prevent international cartel negotiations. But some of the larger diversified players which were engaged in cartels in the early 1900's may still have a corporate perspective, which could affect business unit level sequence strategies.

Whether or not MNE behavior in our industries has been affected by remnants of historical cartels, micro-economics tells us that in oligopolistic situations, both incumbents and potential entrants consider counter-moves when making a move, and thus we can understand how mutual accomodation can be reached. Hence, MNEs bring into their decision of entering a foreign industry or not, the risk of disturbing the international "equilibrium". Such a reasoning is not limited to our studies, but is applicable to other product areas where segmented national oligopolistic industries exist (which is typical for mature industries.

Even if proximity sometimes is overruled by competitive considerations, it is still an important factor explaining sequence patterns. For example, similarities in demand can help to explain why Japanese companies have entered the United States before Europe, as US technical standards were adopted by Japanese firms in a number of industries after World War II (through licenses). Furthermore, similarities in culture can reduce transaction costs, home country plants can better be utilized if products can be shipped to close-by markets,

etc. However, we believe proximity to play a diminishing role as the MNEs become increasingly experienced in international markets (compare Vernon, 1979; Davidson, 1980b), and as national differences in, for example, technical standards diminish.

Works on sequence patterns have assumed that the decision is solely made by the entrant. In our studies we have shown that sometimes host country firms play an active role in such decision-making. Thus, behavior among gate openers also has an impact on the decision whether to enter a foreign industry or not.

To sum up, foreign entry and further penetration decisions (and thus country sequence) are based on proximity factors as well as competitive factors. With a fear of disturbing a state of mutual accomodation, countries with strong indigenous firms (implying high industry barriers) are avoided over long periods, while other more distant countries are penetrated. Furthermore, penetration can actively be induced by gate openers which will affect the entry sequence.

8.3 BARRIERS TO ENTRY AND FOREIGN ENTRANTS

Contrary to what theory predicts, we have seen plenty of new entrants into mature oligopolistic industries. These entrants are foreign firms (as expected, domestic entry turns out to be a rare exception). Thus, we can conclude that barriers to entry, keeping out domestic firms, do not stop entry by foreign firms. Hence, foreign firms are in a front queue position, and thus the most likely entrants (compare discussion in Chapter 2). To explain this phenomenon we must look at possible gains of entry for a domestic and a foreign entrant. If a foreign entrant has more to gain, he will be less discouraged to enter, given a certain structure within the industry and given entry-deterring behavior among incumbents. For example, if the foreign entrant can gain scale advantages (which the domestic entrant is less likely to reach) by rationalizing production on an international scale, he might be less deterred by, for example, retaliatory price cuttings by incumbents after entry. Thus, pre-emption through excess

plant capacity is less likely to deter potential foreign entrants. Actually, the foreign entrant might already have excess capacity (plants in the home country or in any third country), which can be used at marginal costs to enter with low prices (sometimes regarded as dumping).

Every potential synergy that the foreign entrant can gain, but not the domestic entrant, means that the former faces lower barriers to entry than the latter. Thus, it can be perfectly rational for a foreign entrant to pay a higher price for a local company than domestic firms are prepared to pay. If the stock market values an acquisition candidate based on its worth to potential domestic buyers, the foreign firm can find the stock price attractive. In mature industries, a local brand and a distribution network are often higher valued by foreign entrants than host country firms (incumbents as well as domestic firms in other industries).

Our results are in line with those considering resource heterogeneity among potential entrants (Encaoua et al., 1986). It is not only important to point out that foreign firms (active in the same product area) enjoy a front queue position, but that expansion into foreign industries will enhance the competitive advantage of the MNE (through various scale economies, learning, etc), which in turn will put the MNE in an even better entry position in the next entry game, and the next.... Thus, entry positions vary among MNEs, given their earlier experience of foreign industry penetration (reflecting resource heterogeneity). Following from this discussion, we can conclude that entry barriers (structural and behavioral) have not been able to bar foreign firms from entering in mature stages. This fact has often been overlooked as industrial economists have emphasized the threat of domestic potential entrants. In such a world, entry has been regarded a less of a threat in mature stages (Encaoua et al., 1986:60), which turns out to be the opposite case when international competition is considered.

When analyzing entry, it is thus important to recognize that: (a) potential entrants differ in their queue position, and (b) that entrants gain competitive advantages unequally by entering, and thus incentives to enter vary. In these respects, foreign entrants seem to have a front line position and strong incentives to enter, in order to build competitive advantages in mature industries. Low entry barriers in combination with strong incentives drive competition to become increasingly international.

Minimizing Retaliation

We have analyzed how foreign entry and further penetration is affected by host industry entry barriers. A common theme is precaution. Entrants have slowly built up host industry positions. Such behavior seems rational both from a perspective of limited financial resources, limited international experience, and expectations of retaliation.

Entry and further penetration can be looked upon as a learning process for both incumbents and entrants. In early periods incumbents have a national horizon as competition is limited to the nation. As foreign firms enter and expand, the threat will become more and more visible to incumbents. Depending upon the real threat of entry, i.e. how much of the market is lost to foreign firms, and how incumbents perceive the threat, retaliatory actions will be implemented. The perceptions will change over time as incumbents learn more and more about the foreign entrants. Furthermore, as incumbents in the host industry begin to compete in foreign markets, they will enhance their knowledge of foreign firms. To avoid retaliation, foreign firms try to minimize disturbances in a state of mutual accomodation. This can only be accomplished if head-on competition is avoided (cf. Yip, 1982). Thus, entrants have followed a strategy of building up a local presence cautiously. The real and perceived threat among incumbents have been minimized in several ways:

Initial entry	Further penetration
Niche items, unattractive segments	Product broadening: new product segments and new product areas
Private label	Branded goods
Imports	Local production
Acquisition of a small firm	Major acquisition

When gate openers have been present, the move from initial entry to further penetration has been shortened, since retaliation has been less of a threat.

One might hypothesize that, ceteris paribus, the inexperienced MNE will be more cautious in entering a foreign industry than the highly experienced MNE. However, as we have already discussed, the penetration process is not only shaped by the experience of the MNE, but also by competitive considerations. Even the more experienced MNEs have to consider the threat of retaliation (in the home, host or any third national market). If mutual accomodation is the prevailing pattern (which can be reached both with and without hostage positions in each others' home markets), precaution is expected if the experienced MNE is anxious not to disturb established "peace" patterns. However, if the experienced MNE on the other hand is willing to upset established patterns of competition, or if such patterns are vaguely enforced, one might hypothesize that the more experienced MNEs are in a position to penetrate a foreign industry forcefully. Forceful penetration in turn will enhance disturbances, pushing threatened firms to react and initiate countermeasures to restore mutual accomodation.

Regarding the various routes open to a foreign entrant, different entrants have clearly chosen different routes. Some firms have chosen to enter with unbranded goods, yet others have acquired local brands. Following from this, the former import their products into the host market, while the latter gain access to local production through the acquisition. Yet, other entrants choose to put up green-field plants,

some using local manufacturing technology, while others bring in new manufacturing technologies. Some entrants offer products comparable to what is already offered locally, while others bring in new product technologies into the host market. Furthermore, timing decisions vary between entrants, depending upon their role of change agents versus laggards, actions taken by gate openers, exchange rates and stock market valuation (in case of entry through acquisition). As a common theme, substantial penetration has only been reached with some form of local manufacturing. Local plants are set up, green-field, acquired, or through various forms of coalitions. Thus, we can conclude that even if foreign industry penetration is associated with precaution, several routes are open to the entrant. Japanese firms seem to have been less inclined to use the acquisition route compared to US and European firms (compare discussion in Chapter 3).

Entry Facilitated by Gate Openers

Ever since Bain's works on entry barriers, theory has focused on various competitive weapons used to deter entry, such as precommitments (building up credibility of retaliation) and retaliation in case of entry. This study gives several examples of such entry deterrence (commitments made between manufacturers and distributors, the build up of national technical standards, retaliation through price wars, etc). However, we have also come across several cases of the opposite behavior - namely entry inducement.

Our empirical studies show that even if structural entry barriers can be of considerable height, various firms, both in the targeted industry and other vertically related industries (and possibly other related industries), have incentives and the power to induce entry. Such power is largely determined by intra-industry structure and structure along the vertical chain.

In the case of vertical gate openers, one can easily understand the motives for encouraging entry. By opening the gates to foreign suppliers, the vertical gate opener can enhance its buying power.

Horizontal gate openers on the other hand should rarely have incentives to increase competition in their home industry. However, one might speculate that horizontal gate openers have not intended to induce entry which would eventually become real threats to their home market position, but have opened up a gate with the intention of sourcing cheap products. Whatever the original intentions were, foreign firms have entered - passed the "private label hurdle", and then after some time slowly begun to climb over the "brand hurdle".

Foreign sourcing, or off-shore sourcing, is in fact an act of foreign entry, seen from the supplier's horizon. Foreign entry of this type is in line with mature product stages according to the product cycle model. However, in our studies we have found such an entry in newly developed products, and as a matter of fact, new products seem to play a more important part in foreign sourcing than old ones.

Another feature of foreign sourcing is the involvement of several national industries in private label arrangements. Thus, when an MNE decides to source externally, not only the home country is involved but also other national markets where the MNE has its operations, the implication being that in a world of multinationals, the gate opener can open up several markets in parallel. Thus, the internationalization process on the supplier's part, can be substantially faster when several markets are opened up with only one "key" - the multinational gate opener.

In summary, penetration is a much more complex phenomenon than initial entry, involving various penetration routes and reaction patterns as incumbents realize the threat and implement retaliatory actions (cf. Biggadike, 1979; Yip, 1982). Penetration by foreign firms is induced (gate openers) by some actors and yet curtailed by others.

8.4 INTERNATIONAL CHANGE AGENTS

In this section we will focus on those MNEs which take initial or early actions of penetrating foreign industries characterized by high entry barriers, i.e. the fortresses. Furthermore, given such penetration we will briefly elaborate on our conclusions regarding reaction patterns.

The horizontal MNE is sometimes characterized as an institution which internalizes intermediate product market across national boundaries. Our understanding is a more elaborate one. Within a certain product area, a number of MNEs can compete internationally over long periods, yet they differ in fundamental respects. The one discriminating dimension we have studied regards the role of MNEs as drivers of structural change towards international competition. While some MNEs take the role of international change agents, others respond to structural changes determined by the change agents. A parallel can be made to industries characterized by a dominant firm. Below we will look into the issues of competitive advantages associated with international change agents and common demoninators of these firms. As has been pointed out by several authors (Hood & Young, 1979:50; Flowers, 1976), models of international oligopolistic rivalry have not considered initial action - why it is taken and by whom.

International Change Agents and Competitive Advantage

In order for an MNE to establish itself as an international change agent, competitive advantage of a new magnitude is needed. Such competitive advantages are built on international experience, by which we include a higher utilization of scale economies, optimization of already established subsidiaries (e.g. manufacturing plants), and cross-fertilization (in R&D, marketing intelligence, etc) across national boundaries. One advantage which has been stressed in association with MNEs with a "global horizon" is the existence of a scanning network (Vernon & Wells, 1986). Such scanning networks can constitute a competitive advantage if less experienced firms are

unaware of what information is globally available (implying asymmetrical information), or if the experienced firm can collect and interpret environmental data at a lower cost (implying economies of scale).

We have no evidence of advantages based on cross-fertilization (which are rather intangible), although it is reasonable to believe that such a potential exists (as various cultures, environments, technical and marketing expertise are combined). However, our empirical studies indicate that the change agents exhibit considerable cost advantages, due to larger scale, and larger investments inplant automation and rationalization between manufacturing units. So far, economies of scale have been most pronounced in component manufacturing (compare Porter, 1986:Ch 1). In assembly operations factories are automated (and specialized) to such an extent that change agents are in a position to increase differentiation beyond competitors, and keeping a low cost position at the same time. On this point we have no strong empirical evidence (based on comparative cost and differentiation data), but rough estimates indicate such large differences in competitive advantage.

International Change Agents - Common Denominators

It seems as if the international change agents are a rather heterogenous group in terms of their background. They come from various countries, exhibiting different home industry structures (although always oligopolistic). However, we have found similarities in their strategic configuration, and most important in their overall continuous investments in research, and process and product development. Instead of following standard normative literature regarding "dogs" and "cash cows", the international change agents have invested heavily in mature businesses. In combination with increased volumes, old concepts of manufacturing and product design have been significantly altered, and hence competitive advantages of a new magnitude have been created. Following from such behavior, technological change has been a main feature of our mature industries, implying that the

standard concept of maturity is indeed a mature concept. A persistent striving to develop rather than milk a business unites international change agents.

If we take a closer look at the strategic configuration of these change agents, they exhibit a few similarities. In our first empirical study, a number of apparatus specialists acted as international change agents. These firms were characterized by:

- Low degree of vertical integration.
- Low degree of diversification.
- A covering product program within the market in which they specialize.
- Started their internationalization process relatively late.

In our second empirical study, change agents seemed to be a much more heterogenous set of actors. On the national level, the US white goods industry evolved along the line of specialists becoming the dominant force - with one major exception, General Electric. On the international level the dominant actors from Europe and Japan exhibit large differences, with both highly diversified firms and specialists, and vertically integrated and unintegrated firms, and newcomers and latecomers.

But why do these change agents establish positions throughout the world? Somehow these organizations must "understand" how competitive advantage can be enhanced through technical leadership combined with international leadership. Such an understanding can depend upon the skills and perceptions of the management. In a comparative study of the Italian and the UK white goods industries (with the Italians being export-oriented and the British domestic-oriented), Stopford & Baden Fuller found that: "Managers take different positions on the question of whether or not the industry has indeed become truly international" (Stopford & Baden Fuller, 1986:2). While the UK managers did not think of export as being profitable, the Italians did. Thus, one might hypothesize that management perceptions play an

important role in deciding which firms become change agents while others become laggards. With our methodology, we have not collected empirical data of this sort, and therefore our reasoning is highly hypothetical. However, we have not come across any highly decisive environmental forces (related to the home industry or home country), and it is thus natural to turn to factors which are internal to the firm.

Reaction Patterns

Once the change agents enter foreign oligopolistic industries, we expect incumbents to retaliate. As we discussed in Chapter 4, it has not been possible to sort out the causality between various strategic action taken by entrants and incumbents after entry has occurred. We have seen traces of both type 1 (domestic response patterns in a host industry), type 2 (international response patterns among incumbents in a host industry), and type 3 (follow-the-leader in a home industry) behavior (see Chapter 3), while we have not been able to detect multi-product area responses given our industry focus. We do not have the empirical insight to make any firm hypotheses regarding action-reaction patterns. One might argue that type 2 and 3 behavior reported in a few statistical studies have overstated the prompt reactions, especially the exchange-of-threat model. In our industries, early positions of US firms in Europe were not matched (although recent entry by European firms into the United States seems to have provoked such reactions). Similarly, within Europe some firms have penetrated foreign industries without type 2 responses. More lately, the Japanese penetration of Europe and the United States has not either provoked US and European firms to establish exchange-of-threat positions in Japan. We expected to find prompt reactions, but our studies picture a world full of inertia (Graham, 1978, used 2-digit industries, which are very broad for a test of competitive interaction). This is in line with the works of Biggadike (1979) and Yip (1982).

Some general patterns emerge in parallel to increasing international competition. We do not want to classify them as reaction patterns, as they may actually have had a triggering effect on foreign entry. One trend concerns specialization, with vertical disintegration backwards (especially standard components), and increased sourcing from competing firms. Such actions can have been motivated by increasing international competition, putting pressure on cost efficiency, but on the other hand, the act of sourcing from foreign firms will in itself propel international competition (as they act as gate openers). Another trend is to protect your home industry (involving consolidation through acquisitions). Again, such behavior can be a response to foreign entry, or a realization that competition is becoming increasingly international. A final trend is to be more open towards inter-firm cooperation on for example R&D, in order to catch up with the international change agents. Another type of cooperation is the alliances between leading competitors within Europe and between Europe and the United States, creating trans-Atlantic groups.

The lack of empirical data on reaction patterns is clearly a methodological issue, but it can also be partly explained by the absence of direct responses. Such absence could in turn be explained by response lags due to a lack of understanding among incumbents of the real threat of foreign entrants, and the cautious penetration strategies exhibited by foreign entrants. We have no firm evidence regarding the first point - lagged responses. However, we have seen a few laggards, and we believe organizational rigidities to have played an important role. Several of the large diversified and vertically integrated electrical firms in our empirical studies have been rather slow in reacting to threats by foreign entrants. Why this is so is probably explained by long channels of communication, unintended cross-subsidizations between divisions and the like. Rigidities based on historical profit records, and historically given routines (Nelson & Winter, 1982:16) probably also play a role in slowing down responses.

Structural change is an ongoing process where actions threatening established structures provoke reactions, which in turn will force

initial actors to respond (reaction patterns as presented in Chapter 3 are thus somewhat narrowly conceived). Penetration of fortresses is clearly such an act where retaliation is expected. We have identified early actors which to a higher or lesser extent voluntarily break established patterns of competition. However, such actions are to some extent also driven by structural change within national industries. There are home industry factors pushing some firms into international markets, and small entry footholds in foreign industries might be threatened (due to host industry structural changes), which will act as a driving force towards further penetration, and thus foreign penetration is a reaction to host industry actions.

To sum up, our results are in some cases complementary or even somewhat contradictory to established theory. Such results are in turn a result of the perspective we applied in this thesis, combining theories of the MNE (focusing on firm behavior) with theories of Industrial Organization. Recent theoretical developments, combining industry aspects (the deterministic forces) with strategic behavior among individual firms (the voluntaristic forces), are therefore more in line with our results. Regarding our first purpose of penetration sequences, our results tell us that such patterns have not been fully understood when only factors of proximity were considered. Results related to our second purpose, dealing with entry barriers and the penetration process of foreign firms, are in line with more recent works on intra-industry heterogeneity (entry versus further penetration), resource heterogeneity among potential entrants (the queue positions of foreign firms versus domestic firms, and the varying queue positions among the group of MNEs), and various penetration strategies used by entrants (green-field, coalitions, and acquisitions, avoiding direct confrontation versus head-on competition, etc). When identifying and characterizing early invaders of fortresses, and describing the reaction patterns (our third purpose), results are highly tentative. Here we believe new concepts have to be developed along the lines of research on dominant firms (where the international change agents act as dominant firms within a growing international industry), and research on competitive advantage among

the more experienced MNEs (as opposed to multinational laggards and home market oriented firms).

8.5 FROM NATIONAL TO INTERNATIONAL COMPETITION

In this thesis we have shown how the nature of competition has been changing towards becoming more international. In such a process, national industries within a certain product area go through a transformation, whereby they slowly merge into a larger whole - the international industry. We have looked at the early part of such a process of increased international competition, i.e. the move from a state of national competition into a state of international competition (but not as far as into a global state of competition). In the very first stages when competition was nationally segmented, firms were busy developing their respective home markets. When the internationalization process started, the sequence in which foreign countries were entered was dependent upon factors of proximity; but it was also a question of how much resources could be diverted to international operations. With resource scarcity competitive considerations were taken into account. Foreign industries surrounded by high entry barriers were avoided over long periods because of the expensive entry ticket, involving the threat of retaliation (in home, host or any third country). Thus, even in the early phases of industry internationalization, strategic behavior of MNEs was influenced by international competitive considerations, covering regions in which they were not active (an act of mutual accomodation). Host industries surrounded by significant entry barriers were avoided over long time periods, even though they exhibited cultural and economic similarities with the home country of the MNE. In this case we can talk about mutual accomodation without hostage positions. We believe such accomodation can be reached by a mutual understanding, which is not negotiated.

In later periods, when competition clearly became international, mutual accomodation could have prevailed if hostage positions were balanced (an incentive stressed by the exchange-of-threat model). However, in both our empirical studies the positions of Japanese

firms in the United States and Europe have not been countered by US and European firms positioning themselves in Japan (see Ohmae, 1985: Kverneland, 1987).

The process towards international competition has clearly been facilitated by exogenous changes such as demand (and technical) homogenization, trade liberalization, and improved transportation technology. However, the international change agents have played a crucial role. Through their entry and further penetration into foreign oligopolistic industries, national industry barriers have partly eroded. In the short run, the concentration ratio in the host industry is reduced, but on the other hand, the evolving international industry might turn out to be highly oligopolistic. The literature has concentrated on host industry effects (emphasizing the competitive spur), rather than looking at the evolving international industry. To us, it seems as if the national concentration process enlarges into an international concentration process. The international change agents have enhanced their competitive advantage by establishing themselves as a major force across a large number of national industries, including some fortresses. The competitive advantage exhibited by these experienced MNEs creates barriers to entry around the emerging international industry. The competitive game is fought on two levels - the national game and the international game. Some players are only active in the national game (home market-oriented firms and uncoordinated MNEs), while others are active in both. We think that the period of international competition between the two pure cases - national competition and global competition - is long-lasting, and thus it is important to develop the notion of parallel structures - national and international. If, and only if, the international change agents really succeed in their striving to build up superior competitive positions vis-à-vis national firms and multinational laggards, a structural change will follow as competing firms are forced to adopt similar strategies (or retract to local niche positions). With a large number of firms increasing their international efforts, the international structural level is more pronounced, while the notion of home and host industries becomes less valid. Parallel to the concept of core and

fringe firms in a national industry, the international industry will house core firms (which have penetrated a number of fortresses) and fringe firms active in certain niches (product-wise or geographically)

The process towards international competition has its discontinuances (following from less cautious moves). Such moves have for example involved acquisitions and coalitions made across the Atlantic in a period when competition has been clearly segmented between Europe and the United States. In our empirical studies we saw the formation of "bilateral groups", whereas "trilateral groups" (including Japan) are yet to be formed. We have seen two types of actors which have created such discontinuances - the international change agents and the gate openers. The international change agents break up established patterns of competition (breaking the patterns of mutual accomodation), while gate openers pull penetration by foreign suppliers (sometimes opening up a major part of the market over night).

Recently, the area of international business has been flooded by articles and books on the theme of global competition and global industries (Porter, 1986; Hood & Vahlne, 1987). Even though no exact definitions are offered, the main theme is growing interdependencies between nationally segmented industries, which fit our concept of how to describe international competition. Thus, global competition could be considered an extreme case of international competition. Clearly, our studied industries have not reached such a stage, although forces driving internationalization suggest that this is only a matter of time. However, one can speculate that the era of global competition has been announced somewhat prematurely (cf. Sölvell, 1987). And if such a stage is ever reached, the question is whether all firms have to adopt global strategies, or if there is still room for strategic decision-making regarding the international spread of the firm. Can national strategies be as successful or even more successful than global strategies? And what comes after global competition? Are structural change reversible so that deglobality will follow? The questions raised by the evolving phenomenon of global competition are manifold, and since we have not worked in such an empirical setting,

we can only speculate in these matters and develop some guidelines for future research. (See discussion in section 7 of this chapter.)

So far, European and US firms have not established exchange-of-threat positions in Japan. If global hostage positions are ever be created, no segmented national industries will exist, and thus local competition can no longer be stirred up by "foreing entrants". However, not even the global oligopolist can earn supra-normal profits peacefully, as the world is characterized by one major destabilizing force - technological change. As we have seen in this thesis, technology has played an important role in breaking down old structures - through the famous process of creative destruction - even in mature product areas.

8.6 MANAGERIAL IMPLICATIONS

Probably the most important managerial implication of this work regards firms active in mature businesses, which must decide the role they are going to play in the game of increasing international competition. If such a choice is not made (which is a choice in itself), it is unlikely that the firm will be successful. The single-business firm will face a risk of going out of business (and possibly be acquired by a successful firm, domestic or foreign), while the diversified firm will harvest its mature business units unintentionally.

The firm should either decide to act as a change agent internationally, or decide to become a follower, quickly imitating successful moves. The point is that such a choice should be intentional. If competition becomes increasingly international, i.e. industry structure is in important respects altered, avoiding such a strategic decision is highly unwise. It is not business as usual, and measures must be taken promptly if the firm is not to fall behind.

The international change agents invest heavily in mature businesses (both in product development and process development), and they

actively drive technological change. Thus, a company deciding to stay and make a profit in a mature business must understand the importance of technology and technological development in the later stages of the product life cycle. The changing nature of competition can be thought of as a race, both in terms of production volumes on an international scale, and in terms of investing in technological improvements in manufacturing technology, and new generations of components and products. If a firm is falling behind in this race, strategic flexibility is reduced. At some point, when too far behind, there is only one opportunity left - exit. To phase out part of the production (such as components or part of the assembled product line) can have major implications for competitive advantage, if new technological breakthroughs are made in those areas where the firm left off. Especially diversified firms can be tempted to undercut investments in mature businesses, milking cash from such business units. Such strategies will eventually lead to harvest - whether intentional or unintentional - and are not consistent with a change agent's strategy.

It might be argued that it is easier for undiversified latecomers to adopt a change agent strategy, as these firms have a fresh start. The well-established diversified MNEs on the other hand must rationalize their networks of subsidiaries, they must reorient managers and organizational structures etc (compare Porter, 1986:36). One way to imitate the specialists is to incorporate divisions within the parent company, which can later establish their own subsidiaries and overseas distributors (rather than sharing subsidiaries with other product divisions).

Since international change agents are often newcomers in international markets, it is important that old well-established MNEs do not underestimate these firms. To consider such specialists as some form of "B-team" is to make sure that the firm will fall behind in the competitive race. And once the company is too far behind, reductions will be necessary. The most scale sensitive components and products must then be sourced externally from competing firms. Such sourcing, which might look favourable in the short run, can undermine positions

in the long run. As the firm begins to source externally, it will open a gate to its market, even if the firm adds its own brand name. The added volume to a competitor creates a low cost base from which he can slowly build brand recognition. This has been a strategy pursued by many Japanese firms.

The international change agent must be prepared to invest in R&D and plant automation to become the technological leader. Furthermore, it must invest in building positions throughout the fortresses. As competition is driven towards a global state, strong positions are thus established throughout Europe, the United States, Japan and possibly some other markets. Such a position is probably (but not necessarily) reached through a few major acquisitions or coalitions. Even if differences in technical standards and tastes prevail between the three regions (Europe, United States and Japan), there are several reasons to establish cross-positions. First, by covering all the leading world standards the change agent minimizes the risk of not belonging to the global standard which might possibly evolve. Second, the change agents can preempt the possibilities of acquisitions or coalitions, if potential candidates are few (which is likely when mature industries become global). Third, it is likely that the change agent can realize first-mover advantages in scale and learning, especially in component manufacturing. These and possibly other factors create a base on which competitive advantage is built.

8.7 SUGGESTIONS FOR FUTURE RESEARCH

To give the reader some final thoughts, we want to outline a few avenues where we think further research is desirable. In this thesis we have pointed out some directions for conceptual development, as well as outlined tentative explanations to causal relations involved in a process of increased international competition. In order to make furtner progress it is necessary to increase our understanding of strategic behavior and its consequences for structural change.

International Change Agents

First, we think international change agents should be put in focus. These are the firms changing the parameters of competition (i.e. "the rules of the game") in the "static" environment of mature industries. Especially among policy-makers, an enhanced knowledge of these firms is needed in order to secure that they do not become endangered species. Research questions involve:

- Describe organizational structures and processes of these firms.

- Describe the role of individual entrepreneurs in these firms (with a technical and/or global mind).

- Search for factors common to international change agents.

Furthermore, it is important to get a detailed understanding of competitive advantages of international change agents (which become highly experienced MNEs) as compared to lagging MNEs and purely national firms. Areas to look at include:

- Realized gains from world-wide optimization.

- Realized gains from world-wide cross-tertilization.

- Competitive advantages based on cost efficiency versus product differentiation.

Laggards

Regarding the well-established MNEs which turn out to be laggards, it would be valuable to study the reorientation of these diversified and vertically integrated MNEs. In an organization context one could study:

- Organizational inertia in reformulating strategies and in implementation

- New organizational developments to cope with the reorientation (incorporation of divisions, global product companies within the corporate frame).

- Changing roles of subsidiaries (independence versus interdependence) and the new internal power positions between subsidiaries and between the parent company and subsidiaries.

Reaction Patterns

Our results on reaction patterns were not convincing. However, if slow responses, and possibly varying response lags among incumbents is a fact, than it would be worth pursuing research on why we have this inertia. Research could include:

- Study reaction patterns as a function of formal (and possibly informal) organization (structures and processes). Which firms are the quickest reactors?

- Study perceptions among incumbents right after a forceful move by a foreign entrant (e.g. major acquisition or coalition). Is the threat of a foreign entrant less identifiable or visible than the threat of a domestic entrant?

- Study the handling of multiproduct area responses (involving several business units).

Increasing International Competition

There is still a lot to be done on a conceptual level in understanding the structural change from a segmented nation-to-nation type of competition to a more interdependent world.

The emerging international industry possibly includes a more heterogenous set of competitors. Firms are flavoured by home country cultural and socio-economic conditions. They exhibit large differences in management, organizational design, etc and they differ in international experience (where companies based in small industrialized countries often have extensive experience of international business). How do such a heterogenous set of firms interpret market signals, and how do they perceive each other as competitors?

These suggestions for future research are somewhat biased towards the individual firm and its internal functioning. Such a bias in turn is a result of our overall understanding of how much room there is for entrepreneurial activity among MNEs. Thus, we conclude with the following quote from Casson:

> "It is commonplace that, where entrepreneurship is concerned, there is a gap in conventional economic theory. Theories of the MNE are no exception."
> (Casson, 1986:53)

Appendices

APPENDIX 1:1

Bloc A - A Chronology

1983	September	Initial contact with ASEA.
	November	ASEA agrees to cooperate. The ASEA Distribution Division is chosen for my study (the division was formed January 1, 1984. The LV apparatus division was formerly named ASEA Control.)
1984	January - April	Interviews within parent company. General Manager - ASEA Distribution. General Managers - subdivisions within ASEA Distribution General Managers - subdivisions within ASEA Transmis- sion, ASEA Industry and Electronics, and ASEA Swedish Sales Company. Former General Manager of LV switchgear and apparatus business (1960-1982). Total number of interviews = 17.
	May	Interviews in the United States, Japan, Singapore and Malaysia (the introductory letter is shown in Appendix 4.2). Participation in ASEA Distribution world-wide conference No 9. Total number of interviews=11.
	September-December	Continuous contacts with the General Manager of the LV switchgear subdivision. Writing a first draft.
1985	March	Participation in ASEA Distribution world-wide conference No 10. Follow-up meeting within Asea Distribution.
	May	Participation in Sales Manager conference - LV apparatus subdivision.
	June	Follow-up meeting within ASEA Distribution. Presentation of preliminary report to top management within ASEA.
	September	Collecting published material in the United States. Inquiry sent to 20 ASEA subsidiaries.
	December	Follow-up meeting within ASEA Distribution.

1986	February-March	Collecting published material in the United States. Participation in ASEA Distribution world-wide conference No 11.
	September-December	Follow-up meeting within ASEA Distribution. Writing the final report.
1987	April	Final version accepted.

Bloc B - A Chronology

1985	Spring	Began collecting magazine articles - Europe.
	September	Data collection in the United States. Interviews with stock brokers and the leading retailer, Sears. Total number of interviews = 5.
	Fall	Writing a report on the US white goods industry.
1986	January	Electrolux agrees to cooperate.
	February-March	Data collection in the United States. Interviews with GE cancelled.
	March, May and June	Interviews and follow-up discussions at Electrolux headquarters. Total number of meetings = 4.
	August	Participated in a two-day internal conference with participants from headquarters, Zanussi, WCI and subsidiaries in South America and Asia.
	September-October	Interviews with product specialists at headquarters. Total number of interviews = 4.
	November	Interviews with various staff people in Electrolux West German subsidiary. Total number of interviews = 6.
1987	April	Final version accepted.

APPENDIX 1:2

Bloc A - Published Sources

Dean Witter, 1986, Westinghouse Electric, Equity Research, January.

Dean Witter, 1985, Electrical Equipment Update, Equity Research, October.

Goldman Sachs, 1985, International Electrical Equipment Industry, Investment Research, August.

Goldman Sachs, 1985, Quarterly Electrical Equipment Notes, Investment Research, December.

First Boston Research, 1985, Electrical Products Group Spring Conference, Special Report, June.

First Boston Research, 1984, Electrical Products Group of New York 1984 Spring Conference - Informal Notes, Special Report, July.

First Boston Research, 1983, Overview of the Japanese Electrical Equipment Industry, Special Report, January.

Dean Witter, 1984, Electrical Products Conference, Research Note, June.

O.A. Goulden & Partners, 1982, The World Manufacturers of Motor Control and Distribution Components and Panels. Hampshire, England.

Bloc B - Published Sources

Merril Lynch, 1982, Appliance/Video Industry: Shipments and Price Trends, Quarterly Review, July.

Merril Lynch, 1985, Quarterly Review, May.

Merril Lynch, 1980, Institutional Report, Appliance Industry Review, April.

Merril Lynch, 1980, Appliance/TV, Appliance Industry Review, August.

Kidder, Peabody & Co., 1982, Industry Follow-up, Appliance Industry Review, January.

A.G. Becker, Paribas Inc., 1984, Industry Comments, Appliances, June and February.

Smith Barney Research, 1984, Consumer Electrical Products, Appliance Manufacturing Industry, June.

Donaldson, Lufkin & Jenrette Securities Corp., 1981, Industry Viewpoint, Major Appliance Industry, November.

-"- , 1983, February.

-"- , 1985, April.

-"- , 1985, August.

Salomon Brothers, 1985, "Major Appliances", May.

Japan Electrical Manufacturers' Association (JEMA), 1985, "World Household Electrical Appliance Market", March.

Dodwell Marketing Consultants, 1985, "Retail Distribution in Japan", October.

Yano Research Institute Ltd., 1985, "Market Share in Japan".

First Boston Research, 1983, Overview of the Japanese Electrical Equipment Industry, Special Report, January.

U.S. Department of Commerce, 1960, "World Trade in Major Household Appliances: An Overall View".

Dean Witter Equity Research, 1985, "Electrical Equipment Update", October 28.

First Boston Research, 1983, "Hitachi, Limited", March 14.

Japan Electronics Almanac, 1985.

Japan Company Handbook, 1st half 1986, Tokyo Keizai Shindosha.

Japan Company Handbook, 2nd half 1985, Tokyo Keizai Shindosha/Oriental Economics.

Morgan Stanley, International Investment Research, 1985, "Hitachi", June.

Goldman Sachs Investment Research, 1985, "Matsushita Electric Industrial Co. Ltd.", December 18.

E.R.C. Statistics International Ltd, 1985, "Leading Electrical Appliance Manufacturers in Europe", London.

Harvard Business School Cases:

Note on the Major Home Appliance Industry in 1972.

Note on the Major Home Appliance Industry in 1984 (published in condensed form in Christensen, et al., 1987).

Competitive Positioning in the Dishwasher Industry (B) - Design & Manufacturing (published in Christensen, et al., 1987).

Competitive Positioning in the Dishwasher Industry (D) - General Electric (published in Christensen, et al., 1987).

APPENDIX 1:3

INTERNAL INQUIRY - ASEA

In September 1985, the General Manager of ASEA Distribution sent out an inquiry to 20 subsidiaries. The inquiry was put together by me, however part A3 was added by the Divisional Manager for internal purposes. Part A includes a general overview of the local market, while part B, which was sent out in five copies to each subsidiary, include a profile of each of the five main competitors in the LV apparatus field (as is discussed in Chapter 5, leading LV switchgear competitors are local firms, and thus part B focused on LV apparatus where we have international firms being leading competitors across a number of countries). A reminding letter was sent out in December. In March 1986, we had 16 respondents (out of 20) including: Denmark, Finland, Belgium, West Germany, France, Italy, Greece, USA, Saudi Arabia, South Africa, India, Thailand, Malaysia, Philippines, Indonesia and Australia.

Part A GENERAL OVERVIEW

Name of subsidiary: _____

Name of respondent(s): _____

_____

A 1. Name of your main competitors:

	LV Apparatus		LV Systems		MV Systems	
	1975	1985	1975	1985	1975	1985
1.						
2.						
3.						
4.						
5.						

A 2. What is the total market size (local currency):

	1985	1975
LV Apparatus		
LV Switchgear		
MV Switchgear		

A 3. Strengths and weaknesses.
Please rank the following factors with High (3), Medium (2) and Low (1) for ASEA and its five main competitors.

LV APPARATUS

		ASEA	Competitor 1	2	3	4	5
A.	Brand image						
B.	Price level						
C.	Product quality						
D.	Service degree (spare parts)						
E.	Product range						
F.	Delivery service degree						
G.	Sales promotion activity						
H.	Active relationships with: Customers						
	Consultants						
	Contractors						
I.	Customer segment strengths: Panel builders						
	OEM						
	Distributors						

Please indicate if any major changes have occurred during the last 3-5 years in any of the above mentioned factors (A-I)

_____

_____

_____

LV SYSTEM

		ASEA	Competitor 1	2	3	4	5
A.	Brand image						
B.	Price level						
C.	Product quality						
D.	Service degree (spare parts)						
E.	Product range						
F.	Delivery service degree						
G.	Sales promotion activity						
H.	Active relationships with: Customers						
	Consultants						
	Contractors						
I.	Customer segment strengths Heavy industry						
	Light industry						
	Utilities						
	Commercial and public buildings						

Please indicate if any major changes have occurred during the last 3-5 years in any of the above mentioned factors (A-I)

_____

_____

_____

MV SYSTEMS

		ASEA	Competitor 1	2	3	4	5
A.	Brand image						
B.	Price level						
C.	Product quality						
D.	Service degree (spare parts)						
E.	Product range						
F.	Delivery service degree						
G.	Sales promotion activity						
H.	Active relationships with: Customers						
	Consultants						
	Contractors						
I.	Customer segment strengths: Industry						
	Utilities						
	Panel builders						
	Distributors						

Please indicate if any major changes have occurred during the last 3-5 years in any of the above mentioned factors (A-I)

_____

_____

_____

Part B COMPETITOR PROFILES - LEADING LOW VOLTAGE APPARATUS MANUFACTURERS

Competitor No. 1

Name of company: _____

B 1. Product range:
Please indicate market share if it is known, otherwise (mark with X)

LV Apparatus					
ACB	MCCB	Contactors and Starters	Load Switches	MCB	PLC

LV Systems		MV Systems	
Pure Distribution	Motor Control Centers	Switchgear	Ring main unit

B 2. Manufacturing:
What products are locally produced/assembled

LV Apparatus _____

LV Systems _____

MV Systems _____

B 3. IF LV Systems are assembled in your contry, what brands (their own or externally sourced) do they put in their switchgear:

ACB _____

MCCB _____

Load Switches _____

Contactors _____

MCB _____

PLC _____

B 4. Do they sell loose apparatus to other panel builders and/or distributors

Yes ☐ No ☐

If yes, what brands do they sell:

	Own brand	Externally sourced
ACB		
MCCB		
Load Switches		
Contactors and Starters		
PLC		
MCB		

B 5. Time-series data (local currency, if older figures are not known, please indicate proportions to 1985 figures):

	1970	1975	1980	1985
Total turnover				
Exchange rate to SEK				
Turn-over in: LV Apparatus				
LV Switchgear				
MV Switchgear				
Total number of employees				
Number of employees in low and medium voltage production and sales				
Sales force active in LV Apparatus				

B 6. Recent competitive moves (last 2-3 years):
What major strategic moves have been taken in terms of

Pricing strategy: _____

_____

_____

Expansions or cut-downs in production capacity: _____

_____

_____

Cooperative ventures with other competitors or main suppliers/ customers:

Focusing on any particular segments of the market (or the reverse - broadening of product range/customer targets):

Entry by new firms; or exits:

Acquisitions:

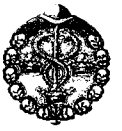
Launching of new products:

LV Apparatus

LV Switchgear

MV Switchgear

APPENDIX 1:4



STOCKHOLM SCHOOL OF ECONOMICS
Institute of International Business

PROJECT ON GLOBAL COORDINATED STRATEGIES
==========

The Institute of International Business (IIB) at the Stockholm School of Economics is presently engaged in a large research project on global competition and global coordinated strategies. One empirical study concerns the industries surrounding the area of electricity distribution (low and medium voltage components and assemblies). Here we collaborate with the Asea Group.

The main purpose of the study is to show how local competitive forces coincide with global competitive forces, driving the dynamics of the apparatus, switch and control gear industries. Industry structure, which sets the rules of competition, is seen as a result of both basic demand and supply conditions and the competitive behaviour of competing firms in the studied industries, coupled with governmental actions.

As part of the empirical studies, Mr. Sölvell will undertake an extensive trip during the first three weeks of May 1984 to investigate the local conditions in the North American region, Japan and South East Asia.

Some topics to be covered are: the local competitive situation (global vs local competitors, different competitive strategies), local market characteristics (market size, purchasing criteria among buyers, local standards, market segments), supplier patterns (local vs imports), entry into and exit out of the industry.

Örjan Sölvell
Project responsible
Senior Research Associate

84-04-05

APPENDIX 2

The figure below shows the main products involved in power distribution, the main low voltage apparatus, and how they connect to each other.

(1) Medium-voltage switchgear. The breaker can be based on three breaking medium technologies: air, gas (SF6) or vacuum. In 90 % of the cases, the MV switchgear is hooked on to a LV network (after transformation). The MV switchgear therefore acts as a protecting unit for the LV switchgear and personnel.

(2) This low-voltage switchgear is the incoming unit. It includes an air circuit breaker (ACB) that protects the rest of the low-voltage system and personnel in case of a short circuit.

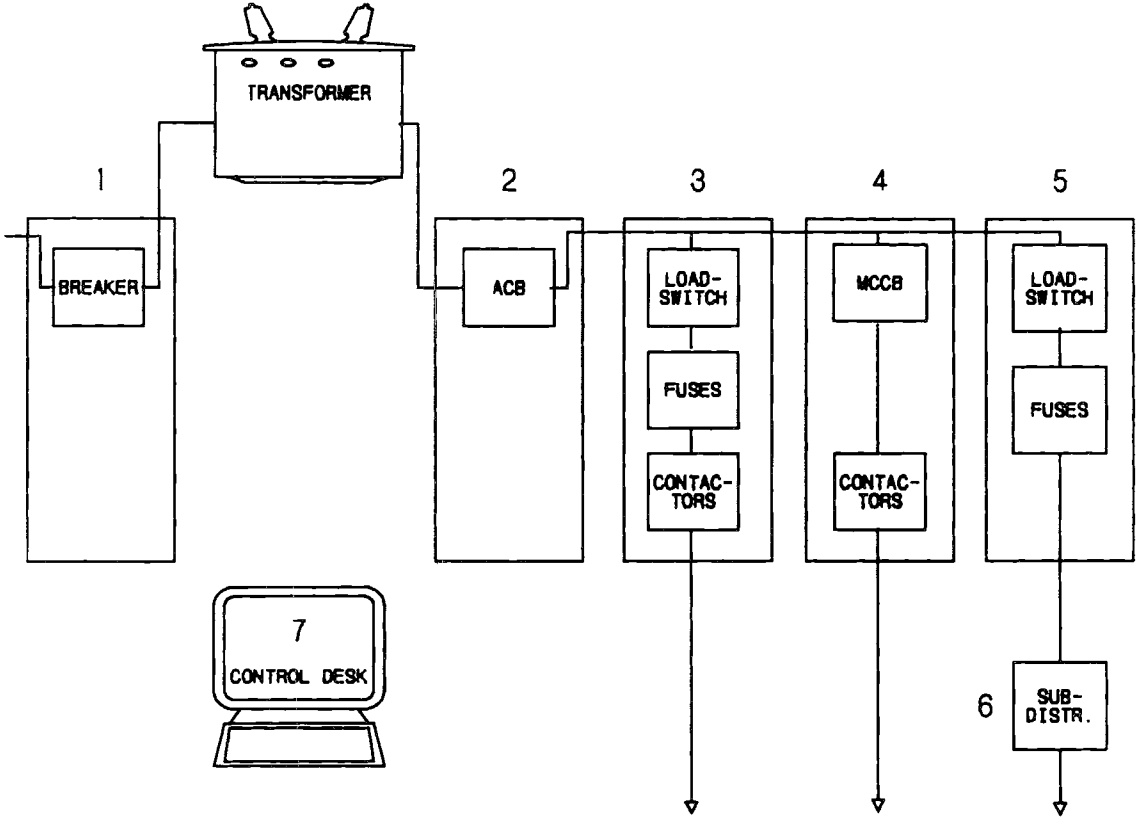
(3) This low-voltage switchgear is called a motor control center (MCC). It includes a load-switch (for service and reparation), fuses and a contactor. A thermal relay might also be added to protect from overload. In heavy-duty use these magnetic trip mechanisms are substituted for solid state relays. Solid state trips are also introduced in other over-current devices such as in MCCBs. Contactors can be controlled from a central control desk or from local on/off switches.

(4) This is an alternative type of a motor control center including a different apparatus technology. Here, the switch and fuse have been substituted for by a no-fuse mechanism, the so-called Modular Case Circuit Breaker (MCCB).

(5) This very simple version of switchgear is a so-called distribution center, distribution panel, switchboard or panel board. It distributes electricity to less demanding functions, such as lighting, air conditioning, etc, often via a subunit (see 6).

(6) Between the switchgear and the electricity consuming units there are several kinds of subunits (subdistribution). Both fuse and no-fuse standards exist. The no-fuse apparatus is called Miniature Circuit Breakers (MCB). Often so-called Earth Leakage Circuit Breakers (ELCB) are hooked on to the MCB.

(7) Control desks and control panels are used to supervise the LV system. More and more solid state technology is introduced for control systems, so-called Programmable Control (PLC).


TRANSFORMER
1
2
3
4
5
BREAKER
ACB
LOAD-
SWITCH
FUSES
CONTAC-
TORS
MCCB
CONTAC-
TORS
LOAD-
SWITCH
FUSES
7
CONTROL DESK
6
SUB-
DISTR.

APPENDIX 3

APPENDIX 3:1 Sales Among Leading US Manufacturers, 1970-1984

APPENDIX 3:2 Leading European Manufacturers, Turnover and Employment in 1985

APPENDIX 3:3 Company Characteristics - Leading Japanese Manufacturers

APPENDIX 3:1 SALES AMONG LEADING US MANUFACTURERS, 1970-1984 (million USD)

Appliance manufacturers		1984	1981	1978	1975	1970
GE	C	27,947	27,089	19,654		8,727
	A		2,850 a/			
Whirlpool	C	3,138	2,437	2,083	1,387	1,033
	A	2,878		1,844	1,266	
WCI	C	2,127	2,173	1,656	1,230	694 b/
	A	1,637	1,472	1,053		
Magic Chef	C	1,054	674	332	178	141
	A	863	535	218	119	
Maytag	C	690	409	300 c/		174
	A	690	409	300 c/		174
Raytheon	C	5,995 e/	5,002			
	A	565 e/		390 f/	241	

C = Corporate sales
A = Major home appliance sales (including room air conditioners)

a/ 1982 figure
b/ 1971 figure
c/ estimated figure
d/ 1980 figure
e/ 1983 figure
f/ 1977 figure

Source: Annual reports.

APPENDIX 3:2 LEADING EUROPEAN WHITE GOODS MANUFACTURERS, TURNOVER AND EMPLOYMENT IN 1985 (corporate figures)

Company	Turnover 1985 (million USD)	Number of employees
Philips (NL)	19,160	352,000
GEC (UK)	8,537	165,543
Thorn-EMI (UK)	4,578	90,327
Electrolux (S)*/	4,366	89,541
AEG (D)*/	3,951	73,190
Thomson Grand Public (F)**/	2,200	34,200
TI Group (UK)	1,424	n.a.
Bosch-Siemens Hausgeräte (D)*/	1,150	14,000
Hoover (UK)*/	750	14,000
Miele (D)	646	11,271
Candy (I)	275	2,700
Indesit (I)*/	166	1,500

*/ 1984 figures.
**/ Thomson grand public is the consumer products division of Thomson S.A., 1983 figures.

Note: USD exchange rate - mid point 1985.

Source: E.R.C. Statistics International Ltd, 1985, "Leading Electrical Appliance Manufacturers in Europe".

APPENDIX 3:3 COMPANY CHARACTERISTICS - LEADING JAPANESE MANUFACTURERS

Matsushita Electric Industrial Co. (est. 1918)	1984 sales breakdown:	
	Video equipment	37%
	Audio equipment	10%
	Home appliances	14%
	Communication and industrial equipment	17%
	Energy and kitchen-related products	4%
	Electronic components	11%
	Others 7%	
	1984 export ratio (up from 33% in 1982)	37%
	1983 sales: 3,988,519 mil yen	
	Matsushita has joint ventures with Philips (batteries), Thorn EMI and AEG Telefunken (VCR), and Bosch (VCR).	
	Brands: National, Panasonic, Technics Quasar and JVC.	
	Matsushita consists of 15 consolidated companies, including Matsushita Refrigeration Company (50.5 % ownership).	
Matsushita Refrigeration (est. 1939)	1984 sales breakdown:	
	Refrigerators	55%
	Freezers	15%
	Air conditioning	9%
	Parts 20%	
	Others 1%	
	Export ratio (up from 13% in 1983)	19%
	1985 sales	79,772 mil yen
	Foreign manufacturing white goods and parts: USA, 1979 (microwave ovens); Singapore, 1984 (compressors); and Thailand, 1979 (refrigerators).	

Sources: Japan Electronics Almanac, 1985; Japan Company Handbook, 1st half 1986, Tokyo Keizai Shinposha/Oriental Economist; Japan Company Handbook, 2nd half 1985; Matsushita Annual Reports; Goldman Sachs Investment Research, December 18, 1985, "Matsushita Electric Industrial Co. Ltd".

Hitachi (est. 1910)

Consists of a highly diversified group of some 500 unconsolidated affiliates. Some majority-owned companies are listed on the Tokyo Stock Exchange (Hitachi Wire and Cable, Hitachi Chemicals, Hitachi Credit Corporation, Hitachi Maxell, Hitachi Metals, Hitachi Sales, Hitachi Plant Engineering & Construction). Unconsolidated group companies include: Nippon Columbia (records & instruments), Moriba (sensors), Kokusai Electric (semi-conductors, semi-conductor manufacturing equipment), Shin Meiwa (special purpose trucks, robots, aircraft), Nakayo Telecommunications, Hitachi Koki (tools), Tokico (brakes, shock absorbers, robots).

Hitachi is divided into five sectors: power systems, consumer products, electronics and communications, industrial machinery and others (wire & cable, metals, chemicals), each accounting for roughly one-fifth of consolidated revenues.

1982 sales: 3,698,730 mil yen

1983 sales breakdown, appliances (billion yen):

Air conditioners and refrigerators	131
Laundry machines	34
Ovens and electric lighting	54
Other	63
Total appliances	282

White goods can be estimated to 3% of total consolidated revenues.

Foreign revenues (32.6% of total revenues in 1984, up from 24.1% in 1980) derive from: North America, 43%; Europe, 20%; Asia, 23%; Middle East, 6%; and other markets, 8%.

Sources: First Boston Research, March 14, 1983, "Hitachi Limited"; Japan Company Handbook, 2nd half 1985; Morgan Stanley International Investment Research, June 14, 1985, "Hitachi".

Toshiba Corp. (est. 1875)

The company is divided into five business sectors; industrial electronic components, consumer products, heavy electrical apparatus, and machinery and other products. Consumer products include: TVs, VCRs, Hi-Fi, air conditioning, white goods, heaters, vacuum cleaners, small home applicances, lamps and batteries.

1984 sales: 2,025,731 mil yen.

1985 sales breakdown:

Heavy electric machinery	35%
Home electric appliances	29%
Information-communication systems, electronic equipment	36%

1985 export ratio: 29%
(up from 24% in 1983)

General Electric owns a 3.6% share of the company.

Toshiba has joint ventures with: Westinghouse (color display tubes), United Technologies (fuel cell power plants) and Siemens (semiconductors). It also acquired 20% of Olivetti Corp. of Japan in 1984.

Sources: Japan Electronics Almanac, 1985; Japan Company Handbook, 2nd half 1985; International Management, September 1985, "Shoichi Saba: Can His Alliances Transform Toshiba?".

Mitsubishi Electric (est. 1921)

The company, which is part of the Mitsubishi group, is active in four main areas: electronic products and systems (ICs, computer systems, space telecommunications), heavy machinery (electric and nuclear power plant equipment, transportation systems and machinery for iron and steel mills), industrial products (motors, control equipment, circuit breakers), and consumer products (VCRs, TVs, Hi-Fi, heater, air conditioning, white goods).

1983 sales: 1,740,759 mil yen.

1985 sales breakdown:

Industrial machinery, auto equipment	17%
Heavy electric machinery	27%
Home electric appliances	26%
Information-communication systems, electronic equipment	30%

1985 export ratio: 29%
(up from 23% in 1983)

In 1986 Electrolux acquired know-how from Mitsubishi regarding rotary compressors.

Sanyo Electric Co. Ltd. (est. 1950)

The company is divided into five groups: TV, audio and video equipment, office automation, home automation, energy (solar energy devices, batteries), and components and materials.

Manufacturing of laundry machines began in the mid 1950's.

1984 sales: 1,420,695 mil yen.

Foreign manufacturing: USA (microwave ovens, refrigerators).

Sharp Corp. (est. 1912)

The company is mainly active in consumer electronics, such as VCR, TV, Hi-Fi, calculators, household appliances and office equipment, such as small portable computers and copiers. Also electronic components (LSI, VLSI) were added during the 1970's.

The appliance systems group in Osaka opened up a new laundry plant in 1983.

1984 sales: 756,559 mil yen.

(Sharp cont'd) Foreign manufacturing: USA (microwave ovens).

1985 sales breakdown:	
Industrial equipment	34%
Electronic equipment	35%
Home electric appliances	20%
Audio equipment	11%
Export ratio: (up from 55% 1983)	62%

Sources: Japan Electronics Almanac, 1985; Japan Company Handbook, 1st half 1986.

References

ABELL, D.F., 1980, Defining the Business: The Starting Point of Strategic Planning". Prentice-Hall.

ADELMAN, M.A., 1959, A & P: A Study in Price-Cost Behaviour and Public Policy. Cambridge, MA: Harvard University Press.

AHARONI, Y., 1966, The Foreign Investment Decision Process. Boston, MA: Division of Research, Graduate School of Business Administration, Harvard University.

ALIBER, R.A., 1970, "A Theory of Direct Foreign Investment", in C. Kindleberger (ed.), The International Corporation. Cambridge, MA: The MIT Press.

ALLEN, B.T., 1971, "Vertical Integration and Market Foreclosure: The Case of Cement and Concrete", Journal of Law and Economics, 14 (April), pp. 251-274.

ANDERSSON, R., et al., 1982, Krävande företagsledning. Liber.

ARNDT, J., 1985, "The Anthropology of Interorganizational Networks in Marketing", Scandinavian Journal of Management Studies, Vol. 1, No. 3 (February), pp. 163-180.

BADEN FULLER, C., NICHOLAIDES, P. & STOPFORD, J., 1987, National or Global? The Study of Company Strategies and the European Market for Major Domestic Appliances", Working Paper Series No. 28, Centre for Business Strategy, London Business School.

BAIN, J.S., 1956, Barriers to Competition. Cambridge, MA: Harvard University Press.

BAIN, J.S., 1966, International Differences in Industrial Structure - Eight Nations in the 1960's. Yale University Press.

BAIN, J.S., 1968, Industrial Organization. New York: John Wiley & Sons, Inc.

BAUMOL, W.J. & WILLIG, R.D., 1981, "Fixed Costs, Sunk Costs, Entry Barriers and Sustainability of Monopoly", Quarterly Journal of Economics, pp. 405-433.

BAUMOL, W.J., PANZAR, J.C. & WILLIG, R.D., 1982, Contestable Markets and the Theory of Industry Structure. Harcourt Brace Jovanovich Inc.

BECKERMAN, W. 1956, "Distance and the Pattern of Intra-European Trade", Review of Economics and Statistics, Vol. XXXVIII, No. 1, pp. 31-38.

BERRY, C.H., 1974, "Corporate Diversification and Market Structure", The Bell Journal of Economics and Management Science, Spring, pp. 196-204.

BERRY, C.H., 1975, Corporate Growth and Diversification. Princeton University Press.

BIGGADIKE, E.R., 1979, Corporate Diversification: Entry, Strategy and Performance. Boston: Division of Research, Harvard Business School.

BLAKE, H.M., 1973, "Conglomerate Mergers and the Antitrust Laws", Columbia Law Review, 73 (March), pp. 555-592.

BORK, R.H., 1969, "Vertical Integration and Competitive Processes", in J.F. Weston & S. Pelzman (eds.), Public Policy Towards Mergers, pp. 139-149. California: Goodyear Publishing Co.

BOWMAN, W.S., 1973, Patents and Anti-Trust Law: A Legal and Economic Appraisal. Chicago: University of Chicago Press.

BRODER, A., 1986, "The Multinationalisation of the French Electrical Industry 1880-1914: Dependence and Its Causes", in P. Hertner & G. Jones (eds.), Multinationals: Theory and History. Gower.

BRODIN, B., 1976, Produktutvecklingsprocesser - en studie ur marknadsföringssynvinkel av produktutveckling i svenska företag. Stockholm: EFI.

BROOKE, M.Z. & REMMERS, H.L., 1970, The Strategy of Multinational Enterprise: Organization and Finance. New York: American Elsevier.

BUCKLEY, P.J., 1983, "New Theories of International Business: Some Unresolved Issues", in M. Casson (ed.), The Growth of International Business. London: George Allen & Unwin.

BUCKLEY, P.J., 1985, "A Critical View of Theories of the Multinational Enterprise", in P.J. Buckley. & M. Casson (eds.), The Economic Theory of the Multinational Enterprise. MacMillan.

BUCKLEY, P.J. & CASSON, M., 1976, The Future of the Multinational Enterprise. MacMillan.

BUCKLEY, P.J. & DUNNING, J.H., 1976, "The Industrial Structure of U.S. Direct Investment in the U.K., Journal of International Business Studies, Fall/Winter, pp. 5-13.

BURENSTAM LINDER, S., 1961, An Essay on Trade and Transformation. Uppsala: Almqvist & Wicksell.

BUZZEL; R.D., GALE, B.T. & SULTAN, R.G.M., 1975, "Market Share - A Key to Profitability", Harvard Business Review, January-February, pp. 97-107.

CARLSSON, B., et al., 1979, Teknik och Industristruktur - 70-talets ekonomiska kris i historisk belysning. Stockholm: IUI, IVA.

CASSON, M., 1986, "General Theories of the Multinational Enterprise: Their Relevance to Business History", in P. Hertner & G. Jones, Multinationals: Theory and History. Gower.

CAVES, R.E., 1976, "The Determinants of Market Structure: Design for Research", in A.P. Jacquemin & H.W. De Jong (eds.), Markets, Corporate Behaviour and the State, Nijenrode Studies in Economics, Vol. 1.

CAVES, R.E., 1971, "International Corporations: The International Economics of Foreign Investment", Economica, 38, No. 149, February, pp. 12-17.

CAVES, R.E., 1974, "Industrial Organization", in J.H. Dunning (ed.), Economic Analysis and the Multinational Enterprise. London: George Allen & Unwin.

CAVES, R.E., KHALIZADEH-SHIRAZI, J. & PORTER, M.E., 1975, "Scale Economies in Statistical Analyses of Market Power", Review of Economics and Statistics, May.

CAVES, R.E. & UEKUSA, M., 1976, Industrial Organization in Japan. Washington, DC: The Brookings Institution.

CAVES, R.E. & PORTER, M.E., 1977, "From Entry Barriers to Mobility Barriers: Conjectural Decisions and Contrived Deterrence to New Competition", Quarterly Journal of Economics, XCI, May, pp. 241-261.

CAVES, R.E., 1980, "Industrial Organization, Corporate Strategy and Structure", Journal of Economic Literature, Vol. XVIII, March, pp. 64-92.

CAVES, R.E., 1982, Multinational Enterprise and Economic Analysis. Cambridge, MA: Cambridge Surveys of Economic Literature, Cambridge University Press.

CAVES, R.E. & WILLIAMSON, P.J., 1985, "What is Product Differentiation, Really?" The Journal of Industrial Economics, No. 2, Dec., pp. 113-132.

CHRISTENSEN, C.R., ANDREWS, K.R., BOWER, J.L., HAMERMESH, R.G & PORTER, M.E., 1987, (6th ed.), Business Policy - Text and Cases. Irwin.

COMANOR, W.S., 1967, "Vertical Mergers, Market Power and the Anti-Trust Laws", American Economic Review, 57, May, pp. 259-262.

COMANOR; W.S. & WILSON, T.A., 1967, "Advertising, Market Structure and Performance", Review of Economics and Statistics, 49, November, pp. 423-440.

CONNOR, J.M., 1977, The Market Power of Multinationals - A Quantitative Analyses of U.S. Corporations in Brazil and Mexico. New York: Praeger Publishers.

COOK, P.C., 1958, Effects of Mergers. London: George Allen & Unwin.

COWLING, K. (ed.), 1972, Market Structure and Corporate Behaviour. London: Gray-Mills.

COWLING, K., 1984, The Internationalization of Production and De-industrialisation. Unpublished Working Paper, University of Warwick.

CURHAN, J.P., DAVIDSON, W.H. & RAJAN, S., 1977, Tracing the Multinationals. Cambridge: Ballinger.

DASGUPTA, P., 1986, "The Theory of Technological Competition", in J.E. Stiglitz & Mathewson (eds.), New Developments in the Analysis of Market Structure. MacMillan Press.

DAVIDSON, W.H., 1980a, Experience Effects in International Investment and Technology Transfer. UMI Research Press.

DAVIDSON, W.H., 1980b, "The Location of foreign Direct Investment Activity: Country Characteristics and Experience Effects", Journal of International Business Studies, Fall, pp. 9-22.

DE LA TORRE, et al., 1978, Corporate Responses to Import Competition in the U.S. Apparel Industry. Research Monograph No. 74, Georgia State University.

DEMSETZ, H., 1973, "Industry Structure, Market Rivalry, and Public Policy", Journal of Law and Economics, 16, April, pp. 1-10.

DORFMAN, R. & STEINER, P.O., 1954, "Optimal Advertising and Optimal Quality", American Economic Review, December, pp. 826-836.

DOZ, Y., 1986, Strategic Management in Multinational Companies. Pergamon Press.

DUBIN, M., 1976, "Foreign Acquisitions and the Growth of the Multinational Firm". Doctoral dissertation. Graduate School of Business Administration, Harvard University.

DUNNING, J.H., 1958, American Investment in British Manufacturing Industry. Allen & Unwin.

DUNNING, J.H., 1970, Studies in International Investment. London: George Allen & Unwin.

DUNNING, J.H., 1971, The Multinational Enterprise. London: George Allen & Unwin.

DUNNING, J.H. (ed.), 1972, International Investment. Penguin Books.

DUNNING, J.H., 1973, "The Determinants of International Production", Oxford Economic Papers.

DUNNING, J.H., 1979, "Explaining Changing Patterns of International Production: in Defense of the Eclectic Theory", Oxford Bulletin of Economics and Statistics, 41, November, pp. 269-295.

DUNNING, J.H., 1981, International Production and the Multinational Enterprise. London: George Allen & Unwin.

DUNNING, J.H., et al., 1986, "The Theory of International Production: Some Historical Intecedents", in P. Hertner & G. Jones (eds.), Multinationals: Theory and History. Gower.

DUNNING, J.H. & CANTWELL, J.A., 1982, Inward Direct Investment from the U.S. and Europe's Technological Competitiveness. Paper presented at the European International Business Association.

ENCAOUA, D., GEROSKI, P. & JACQUEMIN, A., 1986, "Strategic Competition and the Persistence of Dominant Firms: A Survey, in J.E. Stiglitz & Mathewson, (eds.), New Developments in the Analysis of Market Structure. Proceedings from the International Economic Association. MacMillan Press.

ESPOSITO, L. & ESPOSITO, F.F., 1971, "Foreign Competition and Domestic Industry Profitability", Review of Economics and Statistics, 53, November, pp. 343-353.

ESPOSITO, L. & ESPOSITO, F.F., 1974, "Market Structure and Excess Capacity", Review of Economics and Statistics, 56, May, pp. 188-194.

FAYERWEATHER, J., 1969, International Business Management: A Conceptual Framework. New York: McGraw-Hill Book Co., Inc.

FELLNER, W., 1949, Competition Among the Few: Oligopoly and Similar Market Structures. New York: Knopf.

FLOWERS, E.B., 1976, "Oligopolistic Reactions in European and Canadian Direct Investment in the United States", Journal of International Business Studies, Fall/Winter.

FORSGREN, M., 1981, "De internationella investeringarnas effekter - några fallstudier", SOU 1981:43. Stockholm: Liber.

FORSGREN, M., 1985, Internationalisering i svenska storföretag. Unpublished working paper. Centre for International Business Studies, Uppsala Universitet.

FRANKO, L.G., 1976, The European Multinationals: A Renewed Challenge to American and British Big Business. Stamford, Conn.: Greylock Publishers.

FRANKO, L.G., 1983, "The Threat of Japanese Multinationals - How the West can respond", Wiley/IRM Series on Multinationals. John Wiley & Sons.

GALBRAITH, J.K., 1952, American Capitalism: The Concept of Countervailing Power. Boston: Houghton-Mifflin.

GORT, M., 1962, Diversification and Integration in American Industry. Princeton University Press.

GORT, M., 1963, "Analysis of Stability and Change in Market Shares", Journal of Political Economy, 71, February, pp. 51-63.

GRAHAM, E.M., 1974, Oligopolistic Imitation and European Direct Investment in the United States. Unpublished doctoral dissertation. Boston, MA: Graduate School of Business Administration, Harvard University.

GRAHAM, E.M., 1978, "Transatlantic Investment by Multinational Firms: A Rivalistic Phenomenon?", Journal of Post Keynesian Economics, Fall, pp. 82-99.

HALL, G. & HOWELL, S., 1985, "The Experience Curve From the Economist's Perspective", Strategic Management Journal, Vol. 6, pp. 197-212.

HAMEL, G. & PRAHALAD, C.K., 1984, Creating Global Strategic Capability. Paper presented at the Prince Bertil Symposium, Stockholm School of Economics.

HAMEL, G. & PRAHALAD, C.K., 1985, "Do you really have a global strategy?", Harvard Business Review, July-August.

HATTEN, K.J., 1974, Strategic Models in the Brewing Industry. Unpublished doctoral dissertation. Purdue University.

HATTEN, K.J. & SCHENDEL, D.E., 1977, "Heterogeneity Within an Industry", Journal of Industrial Economics, Vol. 26, pp. 97-113.

HEDLUND, G. & KVERNELAND, Å., 1984, Investing in Japan - The Experience of Swedish Firms. Stockholm: IIB, Stockholm School of Economics, Minab/Gotab.

HEDLUND, G., 1986, "The Hypermodern MNC - A Heterarchy?", Human Resource Management, Vol. 25, pp. 9-35.

HEFLEBOWER, R.B., 1957, "Barriers to New Competition - A Review Article", American Economic Review, June, pp. 363-371.

HEFLEBOWER, R.B. & STOCKING, G.W. (eds.), 1958, Readings in Industrial Organization and Public Policy. Homewood, Illinois: Richard D. Irwin Inc.

HELPMAN, E. & KRUGMAN, P.R., 1985, Market Structure and Foreign Trade, Increasing Returns, Imperfect Competition, and the International Economy. The MIT Press.

HERTNER, P. & JONES, G. (eds.), 1986, Multinationals: Theory and History. Gower.

HINES, H.H., 1957, "Effectiveness of Entry by Already Established Firms", Quarterly Journal of Economics, LXXI, February, pp. 132-150.

HOOD, N. & YOUNG, S., 1979, The Economics of Multinational Enterprise. Longman.

HOOD, N., 1983, Multinational Investment Strategies in the British Isles. London: HMSO.

HOOD, N. & VAHLNE, J-E. (eds.), 1987, Strategies in Global Competition. London: Croom Helm.

HOROWITZ, I., 1970, "Employment Concentration in the Common Market: An Entropy Approach", Journal of the Royal Society Series A, 133, pp. 463-479.

HOROWITZ, I., 1984, "On the Use and Nonuse of Entry Deterrents", Journal of Economics and Business, Vol. 36, pp. 371-389.

HORST, T., 1971, "The Theory of the Multinational Firm: Optimal Behavior under Different Tariff and Tax Rates", Journal of Political Economy, September.

HORST, T., 1972, "Firm and Industry Determinants of the Decision to Invest Abroad: An Empirical Study", The Review of Economics and Statistics, No. 3.

HORST, T., 1974, At Home Abroad - A Study of the Domestic and Foreign Operations of the American Food-Processing Industry. Cambridge: Ballinger Publishing Company.

HOTELLING, H., 1929, "Stability in Competition", Economic Journal, 39, March, pp. 41-57.

HUNT, M.S., 1972, Competition in the Major Home Appliance Industry, 1960-1970. Unpublished doctoral dissertation. Boston, MA: Harvard University.

HYMER, S., 1960, The International Operations of National Firms: A Study of Direct Foreign Investment. Ph.D. dissertation, MIT (published by MIT Press, 1976).

HYMER, S., 1970, "The Efficiency (Contradictions) of Multinational Corporations", American Economic Review, May.

HYMER, S. & ROWTHORN, R., 1970, "Multinational Corporations and International Oligopoly: The Non-American Challenge", in C. Kindleberger (ed.), The International Corporation. The MIT Press.

HYMER, S., 1979, The Multinational Corporation - A Radical Approach. Cambridge, MA: Cambridge University Press.

HÄGG, I. & JOHANSON, J., 1982, Företag i nätverk - ny syn på konkurrenskraft. Stockholm: Studieförbundet Näringsliv och Samhälle.

HÖRNELL. E., VAHLNE, J-E. & WIEDERSHEIM-PAUL, F., 1973, Export och utlandsetableringar. Uppsala.

HÖRNELL, E., & VAHLNE, J-E., 1986, Multinationals: The Swedish Case. Croom Helm.

JACOBY, N.H., 1964, "The Relative Stability of Market Shares: A Theory and Evidence from Several Industries, Journal of Industrial Economics, 12, March, pp. 83-107.

JOHANSON, J. & MATTSSON, L-G., 1985, "Multinationella företag och internationella investeringar - kommentarer ur ett nätverksperspektiv", in L. Engwall & J-E. Vahlne (eds.), Multinationella företag - en utmaning för ekonomisk forskning. Doxa Ekonomi.

JOHANSON, J. & WIEDERSHEIM-PAUL, F., 1974, "Internationaliseringsprocessen i några svenska företag", in J-E. Vahlne (ed.), Företagsekonomisk forskning kring internationellt företagande. Norstedts.

KALDOR, N., 1934, "The Equilibrium of the Firm", Economic Journal, March.

KARSTEN, C.F., 1965, "Should Europe Restrict U.S. Investments?", Harvard Business Review, Vol. 43, No. 5, September-October, pp. 53-61.

KINDLEBERGER, C.P., 1969, American Business Abroad: Six lectures on Direct Investment. Yale University Press.

KINDLEBERGER, C.P. (ed.), 1970, The International Corporation. The MIT Press.

KINDLEBERGER, C.P., 1973, International Economics, (5th ed.). Homewood, Ill.: Richard D. Irwin Inc.

KINDLEBERGER, C.P., 1976, "Market Structure and Market Power Consequences of Foreign Direct Investment by Multinational Corporations", Occasional Paper, No. 8. Centre for Multinational Studies.

KNICKERBOCKER, F.T., 1973, Oligopolistic Reaction and Multinational Enterprise. Boston MA: Harvard University Graduate School of Business Administration.

KOGUT, B., 1983, "Foreign Direct Investment as a Sequential Process", in C.P. Kindleberger & D.B. Audretsch (eds.), The Multinational Corporation in the 1980's. The MIT Press.

KOGUT, B., 1985, "Designing Global Strategies: Comparative and Competitive Value-Added Chains", Sloan Management Review, Vol. 26, Summer, No. 4, pp. 15-28.

KRUGMAN, P.R., 1983, "The 'New Theories' of International Trade and the Multinational Enterprise", in C.P. Kindleberger & D.B. Audretsch (eds.), The Multinational Corporation in the 1980's. The MIT Press.

KVERNELAND, Å., 1987, "Japan's Industry Structure - Barriers to Global Competition", in N. Hood & J-E. Vahlne (eds.), Strategies in Global Competition. London: Croom Helm.

LAMB, R.B. (ed.), 1984, Competitive Strategic Management. Englewood Cliffs, NJ: Prentice-Hall.

LAMFALUSSY, A., 1961, Investment and Growth in Mature Economies. Oxford, England: Basil Blackwell & Mott, Ltd.

LANZILLOTTI, R.F., 1954, "Multiple Products and Oligopoly Strategy: A Development of Chamberlin's Theory of Products", Quarterly Journal of Economics, LXVIII, August, p. 467.

LEIBENSTEIN, H., 1976, Beyond Economic Man - A New Foundation for Micro-economics. Cambridge, MA: Harvard University Press.

LEVITT, T., 1983, The Marketing Imagination. New York: The Free Press.

LINDGREN, H., 1979, Corporate Growth. The Swedish Match Industry in Its Global Setting. Liber.

MACNAMEE, S.J., 1983, "Capital Accumulation and the Du Pont Company: A Historical Analysis", Organization Studies, 4, No. 3, pp. 201-218.

MARCUS, M., 1969, "Profitability and Size of Firm", Review of Economics and Statistics, 51, February, pp. 104-107.

MARKHAM, J.W., 1965, "Market Structure, Business Conduct, and Innovation", American Economic Review, May, pp. 323-332.

MARKHAM; J.W. & PAPANEK, C.F. (eds.), 1970, Industrial Organization and Economic Development. Boston: Houghton Mifflin Company.

MASON, E.S., 1939, "Price and Production Policies of Large-Scale Enterprises", American Economic Review, Vol. 29, March, pp. 61-74.

MASON, E.S., 1959, The Corporation in Modern Society. Cambridge, MA: University Press.

MATTSSON, L-G., 1963, Bagerierna inför 60-talets strukturproblem. Stockholm: GUI.

McGEE, J. & THOMAS, H., 1984, "Making Sense of Complex Industries". Unpublished working paper presented at the Prince Bertil Symposium at the Stockholm School of Economics.

MINTZBERG, H., 1978, "Patterns in Strategy Formation", Management Science, pp. 934-948.

MINTZBERG, H., 1984, "Researching the Formation of Strategies: The History of Canadian Lady, 1939-1976", in R.B. Lamb (ed.), Competitive Strategic Management.

MINTZBERG, H. & WATERS, J.A., 1983, Of Strategies, Deliberate and Emergent. Unpublished Working Paper.

MUELLER, D.C. & TILTON, J.E., 1970, "R&D Costs as a Barrier to Entry", Canadian Journal of Economics, 2, No. 4, November, pp. 570-579.

MUELLER, D.C., 1977, "The Persistence of Profits Above the Norm", Economica, 44 (176), November, pp. 369-380.
NARVER, J.C., 1967, Conglomerate Mergers and Market Competition. Berkeley and Los Angeles: University of California Press.
NEWFARMER, R.S., 1980, "Transnational Conglomerates and the Economics of Dependent Development", Contemporary Studies in Economic and Financial Analysis, Vol. 23. JAI Press.
NEWMAN, H.H., 1973, Strategic Groups and the Structure-Performance Relationship: A Study with Respect to the Chemical Process Industries. Unpublished doctoral dissertation. Boston MA: Harvard University.
NIEHANS, J., 1977, "Benefits of Multinational Firms for a Small Parent Economy: The Case of Switzerland", in T. Agmon & C.P. Kindleberger (eds.), Multinationals from Small Countries. The MIT Press.
NORMANN, R., 1976, På spaning efter en metodolgi. Stockholm: SIAR. (Unpublished document.)
ODAGARI, H. & YAMAWAKI, H., 1983, "The Persistence of Profits in Japan", Conference Proceedings, Earie, August 23-25, Bergen.
OHLIN, B., 1933, "Interregional and International Trade, Harvard Economic Studies, Vol. XXXIX, Harvard University Press.
OHMAE, K., 1985, Triad Power: The Coming Shape of Global Competition. The Free Press.
OSBORN, R.C., 1970, "Concentration and the Profitability of Small Manufacturing Corporations", Quarterly Review of Economics and Business, 56, Summer, pp. 15-26.
OTTERBECK, L., 1974, "Internationell företagslokalisering och multinationella företag", in J-E. Vahlne (ed.), Internationellt företagande. Norstedts.
PEARLE, M., 1976, Entry Conditions, Decisions, and Behaviour in Selected Consumer Goods Businesses. Doctoral dissertation, 76-24, 744, Xerox U Microfilms. Harvard Business School.
PENROSE, E.T., 1963, The Theory of the Growth of the Firm. Oxford. Basil Blackwell.
PERLMUTTER, H.V., 1969, "The Tortuous Evolutions of the Multinational Corporation", Columbia Journal of World Business, January-February, pp. 9-18.
PORTER, M.E., 1976, Interbrand Choice, Strategy, and Bilateral Market Power. Cambridge, MA: Harvard University Press.
PORTER, M.E., 1979, "The Structure Within Industries and Company Performance", Review of Economics and Statistics, May, pp. 214-227.
PORTER, M.E., 1980, Competitive Strategy. New York: The Free Press.
PORTER, M.E., 1981, "The Contributions of Industrial Organization to Strategic Management", Academy of Management Review, Vol. 6, No. 4, pp. 609-620.
PORTER, M.E., 1984, "Strategic Interactions: Some Lessons from Industry Histories from Theory and Antitrust Policy", in R.B. Lamb (ed.), Competitive Strategic Management. Englewood Cliffs, NJ: Prentice-Hall.
PORTER, M.E., 1985, Competitive Advantage: Creating and Sustaining Superior Performance. New York: The Free Press.
PORTER, M.E. (ed.), 1986, Competition in Global Industries. Cambridge, MA: Harvard University Press.
PORTER, M.E. & FULLER, M.B., 1986, "Coalitions and Global Strategy", in M.E. Porter (ed.), Competition in Global Industries. Harvard Business School Press.

PORTER, M.E. & CAVES, R.E., 1980, "Market Structure, Oligopoly and the Stability of Market Shares", Journal of Industrial Economics, June, pp. 289-313.

PRAHALAD, C.K., 1975, The Strategic Process in a Multinational Corporation. Unpublished DBA thesis. Boston MA: Harvard University.

ROBINSON, E.A.G., 1934, "The Problem of Management and the Size of the Firm", Economic Journal, June.

ROLANDER, D., 1983, Horizontal Cooperative Ventures in the World Car Industry - Driving Forces and Effects. Stockholm: IIB, Stockholm School of Economics.

ROSEN, S., 1974, "Hedonic Prices and Implicit Markets: Product Differentiation in Pure Competition", Journal of Political Economy, 82 January-February, pp. 34-55.

RUGMAN, A.M., 1979, International Diversification and the Multinational Enterprise. Lexington Books.

RUGMAN, A.M. (ed.), 1982, New Theories of the Multinational Enterprise. Croom Helm.

RUMELT, R.P., 1972, Strategy, Structure, and Economic Performance. Unpublished doctoral dissertation. Harvard Graduate School of Business Administration.

SANDEN, P. & VAHLNE, J-E., 1976, Impact of Multinationality on Performance. Unpublished Working Paper. Centre for International Business Studies, University of Uppsala.

SCHERER, F.M., 1984, On the Current State of Knowledge in Industrial Economics. Discussion paper (Issn. no. 0722-6748), Wissenschaftszentrum, Berlin.

SCHUMPETER, J., 1942, Capitalism, Socialism and Democracy.

SHEPHERD, W.G., 1972, "The Elements of Market Structure", Review of Economics and Statistics, 51, February, pp. 104-107.

SICHEL, W., 1967, Industrial Organization and Public Policy, (selected readings). Boston, MA: Houghton Mifflin Company.

SPENCE, A.M., 1977, "Entry, Capacity, Investment and Oligopolistic Pricing", Bell Journal of Economics, Vol. 8, pp. 534-544.

SPENCE, A.M., 1984, "Competition, Entry and Antitrust Policy", in R.B. Lamb (ed.), Competitive Strategic Management. Englewood Cliffs, NJ: Prentice-Hall.

STIGLER, G.J., 1950, "Monopoly and Oligopoly by Merger", American Economic Review, 40, May, pp. 23-34.

STIGLER, G.J., 1968, The Organization of Industry.

STOPFORD, J.M. & WELLS, L.T., 1972, Managing the Multinational Enterprise. Basic Books.

STOPFORD, J.M. & BADEN FULLER, C., 1986, Regional-level Competition in a Mature Industry. Unpublished working paper. London Business School.

STOBAUGH, R., 1968, The Product Cycle, U.S. Exports, and International Investment. DBA dissertation. Boston MA: Harvard University, Graduate School of Business Administration.

SWEDENBORG, B., 1979, The Multinational Operations of Swedish Firms: An Analysis of Determinants and Effects. Stockholm: Industrial Institute for Economic and Social Research.

SWEDENBORG, B., 1982, "Svensk industri i utlandet", SOU 1982:27. Stockholm: Liber.

SÖLVELL, Ö., 1984, "Towards a Definition of Global Competition". Unpublished paper presented at the Prince Bertil Symposium, Stockholm School of Economics.

SÖLVELL, Ö., 1987, "Is the Global Automobile Industry Really Global?", in N. Hood & J-E. Vahlne (eds.), Strategies in Global Competition. London: Croom Helm.

TEECE, D.J., 1982, Some Efficiency Properties of the Modern Corporation. Unpublished Working Paper. Berkely, University of California.

THORELLI, H.B., 1986, "Networks: Between Markets and Hierarchies", Strategic Management Journal, Vol. 7, pp. 37-51.

TSURUMI, Y., 1972, "R&D Factors and Exports of Manufactured Goods of Japan", in Wells, L.T. Jr. (ed.), The Product Life Cycle and International Trade. Boston, MA: Harvard University.

TSURUMI, Y., 1976, The Japanese are Coming: A Multinational Spread of Japanese Firms. Ballinger.

VAHLNE, J-E. (ed.), 1974, Företagsekonomisk forskning kring internationellt företagande. Norstedt.

VAHLNE, J-E. & SÖLVELL, Ö., 1981, "Effekter av investeringar utomlands - en studie av sex industrier", SOU 1981:33. Stockholm: Liber.

VERNON, R., 1966, "International Investment and International Trade in the Product Cycle", Quarterly Journal of Economics, May, pp. 190-207.

VERNON, R. (ed.), 1974, Big Business and the State: Changin Patterns in Western Europe. Cambridge, MA: Harvard University Press.

VERNON, R., 1979, "The Product-Cycle Hypothesis in a New International Environment", Oxford Bulletin of Economics and Statistics, Vol. 41, November, pp. 255-267.

VERNON; R. & WELLS, L.T. Jr., 1986, The Economic Environment of International Business, (4th ed.). Englewood Cliffs, NJ: Prentice-Hall.

WATERSON, M., 1984, Economic Theory of the Industry. Cambridge University Press.

WEBBINK; D.W., 1977, "The Semiconductor Industry", Federal Trade Commission Staff Report, January. Washington, DC: Government Printing Office.

WEISS, L.W., 1972, "Quantitative Studies of Industrial Organization", in M. Intriligator (ed.), Frontiers of Quantitative Economics. Amsterdam: North Holland.

WELLS, L.T.Jr., 1972, (ed.), The Product Life Cycle and International Trade. Cambridge, MA: Harvard University Press.

WILKINS, M., 1970, The Emergence of Multinational Enterprise. Cambridge, MA: Harvard University Press.

WILKINS, M., 1974, The Maturing of Multinational Enterprise. Cambridge, MA: Harvard University Press.

WILKINS, M., 1977, "Modern European Economic History and the Multinationals", Journal of European Economic History, Vol. 6, pp. 575-595.

WILLIAMSON, O.E., 1975, Markets and Hierarchies: Analysis and Antitrust Implications. New York: The Free Press.

WILLIAMSON, O.E., 1981, "The Modern Corporation: Origins, Evolution, Attributes", Journal of Economic Literature, 19, December, pp. 1537-1568.

WILSON, B.D., 1980, "The Propensity of Multinational Companies to Expand Through Acquisitions", Journal of International Business Studies, 11, Spring/Summer, pp. 59-65.

WORCESTER; D.A., 1957, "Why Dominant Firms Decline", Journal of Political Economy, 65, pp. 338-347.

YIP, G.S., 1982, Barriers to Entry. Lexington Books.

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