Emerging Multinationals in Global Value Chains: Arçelik, Haier, and Mabe

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Abstract

On the basis of low labour costs and fast-growing domestic markets, in many global value chains (GVCs) manufacturing firms from developing and emerging countries have developed into competitive players as original equipment manufacturers (OEMs) selling their own products with a foreign firm's brand affixed. Some of them are also nurturing their own dynamic competencies, as either original design manufacturers (ODMs) or original brand manufacturers (OBMs), and try to deploy them on overseas markets through foreign direct investment. This paper documents the rise of three emerging multinationals from China, Mexico, and Turkey (Haier, Mabe and Arçelik, respectively) in the home appliances industry. Their corporate histories differ – in particular in terms of ownership, forms of insertion into GVCs, reliance on government support, and emphasis on innovation – and show the importance of accounting for both systematic heterogeneity observed in corporate competencies and the fine details of the mechanisms governing the dynamics of interactions among agents (firms, governments, institutions).

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1. Introduction

The vertical fragmentation of manufacturing production into discrete activities that can be performed in different locations by different firms is possibly the most distinctive feature of the contemporary global economy.[1] This has multiplied developing countries' links with global production networks for a wide range of products. The global value chain (GVC) phenomenon – which is associated to the reduction in transport costs and trade barriers, as well as advances in technology, mainly though not exclusively the diffusion of information and telecommunications technologies (ICT) – has been widely documented in the case of car and apparel (e.g., Memedovic 2005). Virtually all consumer products sold by developed country retailers today are made entirely or to a significant extent in offshore factories located in developing countries (Feenstra 1998; Gereffi and Sturgeon 2004). Even products that require precision manufacturing, like hard disk drives and many kinds of semiconductors, are becoming "high-tech commodities" made in capital-intensive facilities in Southeast Asia and elsewhere.

For firms in developing countries, quiet manufacturing for others initially allowed them to capitalise on their cheap labour while avoiding the expense and risk of marketing, distribution and research and development (R&D). However, expectations of a fast upgrading of such firms, partly due to the "death of distance", have proved naïve. Lead firms in the modular production network concentrate on the creation, penetration, and defence of markets for end products—and increasingly the provision of services to go with them — while manufacturing capacity is shifted out-of-house to globally-operating turn-key suppliers (Sturgeon 2002). Not only do economic activities continue to concentrate in given locations, but the contribution of large firms to innovation, as well as to the branding and marketing of products, is seemingly becoming larger, as suggested on a global scale by the experience of a number of OECD economies such as Finland, Sweden, and Switzerland.

This however does not mean that, as countries such as Brazil, China, India, Mexico or Turkey are emerging as industrial powers in their own right, the best of their consumer-goods firms may not also start to outgrow this supporting-actor role. Growth in their home markets over the past few years has been extraordinary. A few firms headquartered in developing countries and transitional economies have made the transition from "original equipment manufacturers" (OEMs) selling their own products with a foreign firm's brand affixed, to original design manufacturers (ODM), and a much smaller number have further progressed into original brand manufacturers (OBMs). The sources of corporate strength have gone from the ability to minimise cost for a given output level, to knowing "how to learn and how to combine and recombine assets to establish new businesses and address new markets" (Teece 2000, p. 106). But the "upgrading pattern, although straightforward in concept, is often far from smooth in practice", as companies discover that they are now increasingly exposed to volatility in consumers' preferences, that the competencies required to conquer and maintain brand-recognition are intimately different from those associated

[1] We don't enter here into the fundamental debate on the organisational form that is best suited to efficient provision of goods and services in this environment, on which the interested reader is directed to "Symposium: Framing Business History", *Enterprise and Society*, Vol. 5, No. 3 and Chandler (2005).

to subcontracting work and post-architectural, detailed design, and that developing own brand products imperils their status as contact manufacturers (Lester and Sturgeon 2004).

This paper further explores the internationalization of firms, including through outward foreign direct investment (FDI), by focusing on the production of large home appliances (HA) such as washing machines, fridges, dishwashers, ovens, and cookers (so-called "white goods").[2] We document the rise of three emerging multinationals from China, Mexico, and Turkey (Haier, Mabe and Arçelik, HMA), successful examples of latecomer firms from developing countries[3] that managed to upgrade their operations, evolving from the production of simple goods, generally as OEM subcontractors, into new product lines developed through their own design, branding and marketing capabilities. What are the factors explaining their success? To what extent is their experience useful (replicable) for other firms struggling to move up the value-added and technology ladder? As important as these questions undoubtedly are, "development economics has given relatively short shrift to the firm as the agent of economic development" (Teece 2000, p. 105). We contend that, given systematic heterogeneity observed in corporate competencies, it is important to dissect the fine details of the mechanisms governing the dynamics of interactions among agents (firms, governments, institutions).

The next section analyses the main challenges that companies from developing countries encounter in upgrading from OEM to OBM status, and the following one sketches the main features of the global appliances industry and the organisation of the global supply chain. Sections 4-6 present each firm's history and internationalisation trajectory, paying particular attention to product mix, ownership, corporate governance, dynamic organisational capabilities, and emphasis on research and development.

2. From OEM to OBM – upgrading challenges in global value chains

Factors that shape firms' upgrading – i.e. the process of improving the ability of a firm to move to more profitable or technologically sophisticated activities (Schmitz 1999)[4] – include firm-specific resources and efforts, the economic environment in which firms operate and their relationships with lead firms coordinating international production networks (Giuliani *et al.* 2005). The process of competitive upgrading is complex as different factors are at play in determining the position of each player along industrial value chains and different capabilities must be accumulated in order

[2] Major household appliances used outside the kitchen, such as video and audio systems, are known as "brown goods".

[3] The "latecomer firm" is a resource-poor firm (both in terms of technology and market access) seeking some connections with the technological and business mainstream (Mathews 2002). The concept has been introduced and popularised by historians and technology experts such as Hobday (1995).

[4] A slightly different concept of upgrading is proposed by Meyer-Stamer (2004, pp. 328-332). Based on Porter analysis of competitive advantages, it is suggested that upgrading means more than simple operational effectiveness (doing similar activities better than rivals), to include strategy (choosing to perform activities differently or to perform different activities than rivals). Defined this way, upgrading is not necessarily equated with moving up. In order to retain their competitive advantage, firms might also decide to "downgrade" or "sidestep", i.e. abandon some competencies to secure higher and more stable profits.

to climb them and remain competitive over the long run. Firms need to enhance their technological capability in the interests of competitiveness and profitability not just in products and processes, but also in logistics and supply chain management.

Firms from developing countries face multiple challenges in their attempt to grow in siwe and compete on exports markets: lack of resources, remoteness from the main sources of technology and R&D, small local markets and absence of sophisticated users (Keesing and Lall 1992; Hobday 1995 and 2000), and unfriendly business environments (World Bank 2005).[5] The economic environment comprises the various policies enacted by national or local governments (especially trade, macroeconomic, industrial, education, and science and technology policies), the availability of inputs, the scope for establishing inter-firm linkages, and the specific technological features of the industry to which the firm belongs. These factors are crucial in supporting firm-level efforts, based on gradual learning and technology adoption and investment in technology catch-up and assimilation (rather than in own R&D). Firms' proximity and interaction (clustering) can also foster innovation activity and upgrading through demonstration effects, joint efforts, and local rivalry.[6]

Evidence from a number of industries suggests that participation to GVC has permitted these firms to access much needed information and resources and upgrade their products and processes. As global buyers need to trade off low production costs offered in developing countries with the risks of producers' failure in meeting quality standards, they have often invested in upgrading their suppliers' capabilities. East Asian firms, in particular, learned the technology of electronics through their gradual insertion in Japanese and US GVCs and have gradually evolved from mere low-cost assemblers of imported components to OEMs, producing finished products to the precise specification of the buyer. (Hobday 1995 and 2000). OEM arrangements then allowed the most advanced sub-contractors to learn, achieve economies of scale in production and justify investment in automation technology and design capabilities. Building on these new capabilities and thanks to the licensing and technology transfer from lead firms, some OEMs evolved to ODM status, carrying out some or all of the product design and producing the finished products according to a general design layout supplied by the buyer. These suppliers have expanded their operations and taken under their responsibility a growing set of related functions (e.g. sales and customer support) becoming "turn-key suppliers", i.e. service providers with a high degree of autonomy offering a full package of service to the lead firm. In the most advanced form, these suppliers are able to manage the entire manufacturing network for a customer with minimal

[5] Hobday (2000) characterizes latecomer firms as suffering from two major competitive disadvantages: remoteness from the major sources of technology and R&D production and distance from sophisticated markets and users. The user-supplier links are particularly relevant for innovation.

[6] Schmitz and Nadvi (1999) suggest that "collective efficiency", i.e. the benefits of clustering, arise from the combination of incidental external economies and the conscious, deliberate pursuit of joint action by firms (horizontal and vertical cooperation) and local governments. These benefits can be particularly relevant for the upgrading trajectory of small enterprises, due to their thin individual resources and inherent difficulties to embark in risky activities. External economies arise from the easy of access to input suppliers, service providers and traders, from the availability of a specialised pool of workers and the generation of knowledge spillovers, as well as the ease of parallel experimentation and local rivalry (Humprehy and Schmitz 2002, p. 371).

support and input. The enhancement of suppliers' capabilities allows lead firms to progressively outsource activities previously performed in-house or by foreign affiliates. [7]

Still, while buyers might be willing to invest in enhancing their suppliers' capabilities, to ensure compliance with standards, they are less likely to provide support in terms of design, branding and marketing, which they perceive as their core competences and sources of competitive advantage (Humphrey and Schmitz 2004).[8] The experience of the Costa Rica electronics and medical instruments cluster confirms the limits of suppliers-oriented upgrading (Ciravegna and Giuliani 2005).[9] In fact, even in electronics, very few ODM suppliers have managed to set up their own marketing channels and develop their own brand. Indeed, there are even some cases of downgrading from OBM to less risky ODM.

The governance structure of a GVC has a decisive impact on the upgrading trajectories of firms. The electronics and automobile industries that best epitomize globalisation maintain a hierarchical governance structure. The lead firms dominating GVCs have begun to consolidate manufacturing in fewer locations. They govern the modular production network and rely on codified inter-firm links and the generic manufacturing capacity residing in turn-key suppliers to reduce transaction costs, build large external economies of scale, and reduce risk for network actors. Networks of firms of similar power and complementary competencies, on the other hand, seem to be more conducive to functional upgrading, i.e. taking on more rewarding functions, and chain upgrading, i.e. using the competencies developed in one chain to enter into a new one (Humphrey and Schmitz, 2004). The GVC governance structure and the opportunities for upgrading are not static and are influenced by both exogenous and endogenous factors to the chain. The most important exogenous factors include the regulatory environment, technical progress, market structure and consumers' preferences. Indeed, some of these factors can themselves be influenced by deliberate choices of participants to the GVC, which endogenously spark change and impact on suppliers' upgrading possibilities.[10] In electronics, as suppliers' capabilities and technological knowledge become more codified, the lead firm does not need anymore to closely monitor and supervise them. These suppliers, who have invested in automation and acquired a reputation, can serve multiple clients in the chain, whose governance structure evolves towards less hierarchical (modular) structures (Sturgeon and Lester 2004).

[7] Major US electronics MNC have sold their production facilities to their contract manufacturers. The most recent example involves the sale of IBM production activities to Lenovo of China.

[8] A recent analysis of the European apparel GVC shows that retailers contribute at best to improving suppliers' delivery accuracy, but not to their manufacturing capabilities or their ability to provide services (Palpacuer *et al.* 2005). These finding are in line with other analyses of American retailers that suggest a rather limited scope for functional upgrading into higher value-added activities such as design, brand-name manufacturing, marketing and retailing (Gereffi *et al.* 2002).

[9] The study finds that linkages from MNC to domestic suppliers are very limited and characterized by low technological content. MNC affiliates largely source from approved suppliers located elsewhere, especially for the higher value parts and components. Moreover, local firms often suffer a technological gap to qualify as MNC suppliers, which the limited availability of venture capital makes difficult to close.

[10] These deliberate choices include suppliers' training, investment in R&D to spur technical progress, marketing activities to influence consumers' tastes, mergers and acquisitions to increase market power, lobbying for policy reform, etc.

Even where the room for functional upgrading seems to be limited, corporate strategic choices are crucial to exploit favourable conditions. A case in point is Erak, a Turkish trouser OEM that has built its own brand-name manufacturer as a global retailer by exploiting the knowledge and information acquired through its long-standing relationship with major EU branded manufacturers and by hiring an international team of designers to develop its product line (Tokatli and Eldener 2004 and Tokatli and Kizilgün 2004). A careful branding strategy to fit the local market was also important. The company decided to distinguish itself from other foreign and Turkish producers, by choosing a Turkish name, focusing on design, choosing a high-quality, locally-produced denim, and making efforts to customize its product to the local market (e.g. by offering best-fitting sizes for Turkish customers and consumer credit). These strategic choices enabled the company to exploit some favourable local conditions, in particular, the availability of local producers of denim and trousers accessories and of a large local market for jeans. The company strategic intent to develop its own brand, enter retailing and then develop a global brand was then reinforced by its ability to make the best use possible of available public policies to promote the internationalization of Turkish firms.

The experience of Erak confirms the early insight of Humphrey and Schmidt (2000) that entry and upgrading dynamics depend not only on relationships with lead firms, but also on external conditions and each firm's strategic objectives. It also suggests that firms' efforts can be reinforced by appropriate industrial, technological and human resource policies. Power is key in the governance of value chains and knowledge is of paramount importance to locational decisions (Kogut 2004). In the remainder of this paper we analyze whether a similar upgrading trajectory is within OEM's reach in more complex manufacturing systems such as household appliances.

3. The political economy of appliance manufacturing

A number of characteristics make the HA industry (SIC 363) worth of analytical attention, although relatively few scholars have done it (e.g., Nichols and Cam 2005, Paba 1988, Perona *et al.* 2001). Products are relatively similar and simple to produce, although assembling different parts and subsystems requires the combination of knowledge domains ranging from mechanics to electronics and plastic moulding (Sobrero and Roberts 2002);[11] the industry is mature and is seen as a likely candidate for delocalization to developing countries, where not only input costs are lower, but demand growth rates are higher as ownership of major HA is strongly correlated to economic development; in high-income countries, due to relatively high levels of market penetration (above 90/95 per cent in most OECD countries) and flat unit prices, the market is driven primarily by the demand for replacements; [12] [13] environmental concerns are leading to

[11] If being a great innovator is important, marketing and distribution skills are equally crucial in appliance manufacturing – Phillips invented a technically superior video-recording system but lost the 1980s standard wars to Sony's Betamax and Matsushita's VHS.

[12] In the United States, replacements accounted for 75 per cent of sales, new housing for 20 per cent, and new household formation for about 5 per cent of sales of major home appliances. The average length of appliance ownership varies from a low of 6.8 years for disposers to a high of 11.2 years for freezers. In almost every appliance category, the average age of units has increased since 1990 (Hunger 2003).

[13] Demand in OECD countries is sluggish and is mainly directed to substitution of older appliances. Long replacement cycles are long and an aging population contributes to explain this flat demand. Developing countries are potentially large markets, with young, growing and rapidly urbanizing population, in some cases experiences fats income growth. Asia and Pacific was the region displaying the strongest growth in demand (36 per cent over 1992-

important regulatory changes that are affecting the organization of the supply chain; and, finally, the OEM-to-OBM story explains the upgrading trajectory of industrial countries' MNCs such as Merloni of Italy (Sori 2005).

Firms are responding to these challenges by rationalising production and implementing common platforms to achieve cost savings, acquiring brands to secure market shares and achieve economies of scale and greater leverage over supply chains; adding value to their products to command a higher price (investment in marketing and design), relocating production to emerging markets to tap their growing demand and exploiting lower production cost. This is not a global industry, however: national demands and brands differ, transport costs are high, and trade is still very much regional – although smaller "brown" appliances are traded on a global scale.[14]

The value chain

The basic steps in the production of HA are stamping, casting, machining, body assembly, and final assembly. HA manufacture is basically a "metal forming exercise followed by the assembly and painting of the finished product" and manufacturers can be characterised as "metal benders" who fabricate different shapes of metal boxes out of long coils of metal (Milne 1991, p. 245). Major components include compressors, pumps, electric motors, heating elements, belts, valves, steel parts, electric engines, electronic boards and control units. Material costs account for about 40 per cent of production costs, while direct labour costs for around 10 per cent (Hunger 2003).

Figure 1 presents a simplified value chain for refrigerators, stretching from upstream metal suppliers, through manufacturers, specialised suppliers, retailers and recyclers. Producers play the lead role in the supply-chain, due to the importance of scale economies and brands in this industry. HA assembly systems are characterised by rigid, special-purpose lines, which guarantee high productivity but lower flexibility with respect to general-purpose lines.[15] Automation is quite common, although several assembly operations are still executed manually, because compliant parts have wide dimensional variations and shapes (Molfino *et al.* 2002).[16]

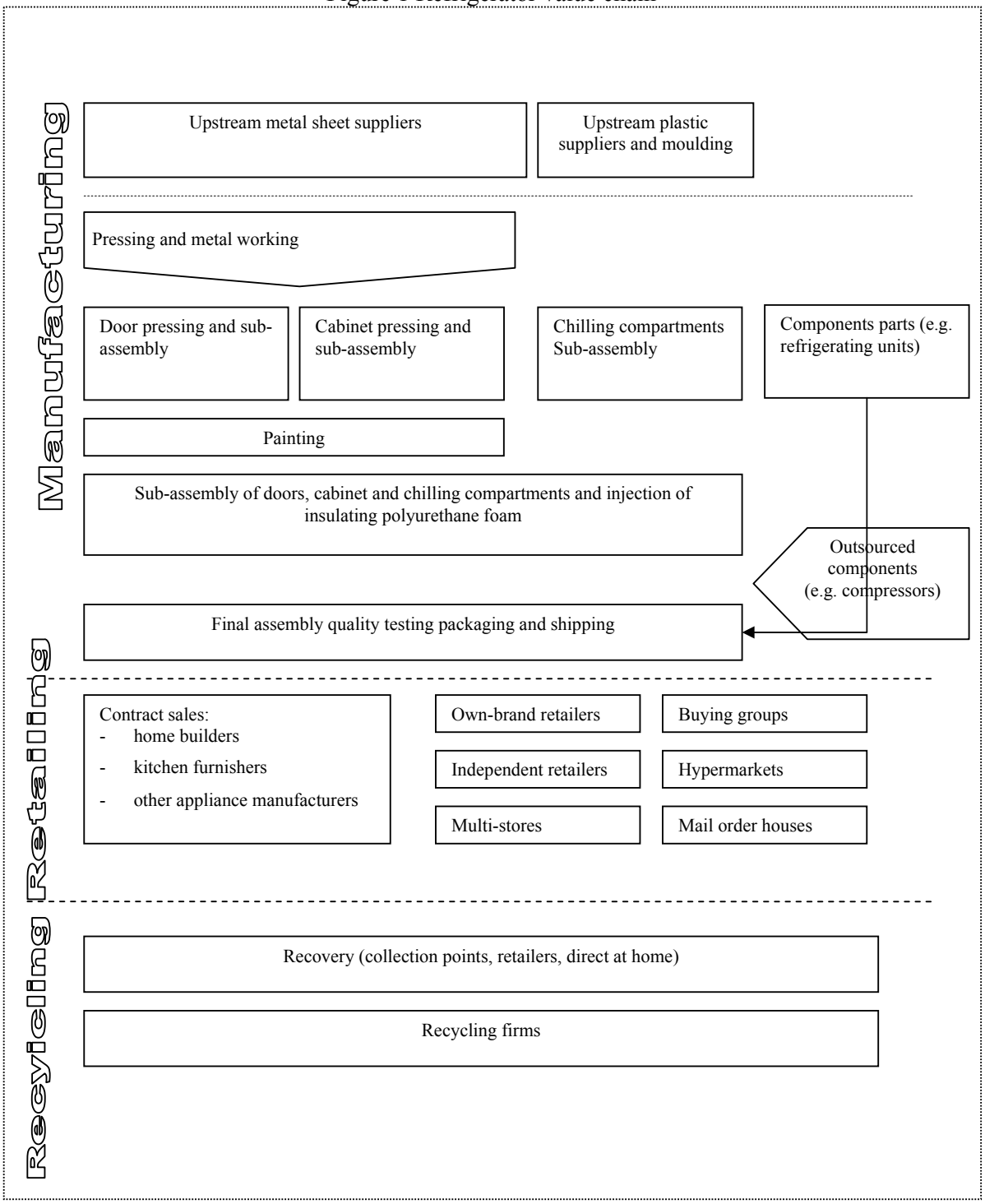
2002). Problems exist in these countries as well. Some of them already display high penetration rates (e.g. China), while the rural market is difficult to reach because of low incomes and electrification rates.

[14] In the case of small electrical appliances for food and hot drinks preparation, hair care, ironing and vacuum cleaners, made-in-China goods alone account for 90 per cent of the European market. "Un 'bianco' che non teme confronti", Banca Nazionale del Lavoro, *Focus settimanale*, 16 March 2004. A leading Italian firm, De Longhi, aims to produce a full 65 per cent of its goods in China by 2006.

[15] Although a plant's production line dedicated to the production of washing machines can be adjusted to make many different models, each product category requires its own specialized manufacturing equipment.

[16] Roughly 25 per cent of assembly and fastening operations are accomplished via semi-automated hand tooling, 50 per cent is done manually, and the remaining 25 per cent through totally automated solutions (OTA 1984).

Figure 1 Refrigerator value chain



Source: own elaboration based on industry sources and Paba (1991).

A major recent change in the industry has been the simplification and standardisation of production platforms that allow using standard engineering frameworks to which parts can be added or subtracted (Nichols and Cam 2005).[17] The development of common platforms also allows to speed up product renewal and time to market, which are necessary to avoid price erosion.[18] The introduction of computer aided manufacturing (CAM) and flexible techniques, including just-in-time, have allowed to reduce production costs. The search for greater efficiency, rather than pure price competition, had a dramatic impact on the plant organisation of labour. Flexibility means that a production line can process different models without any special tooling up time or pauses in the production flow. It also implies the minimization of on-process and finished products stocks.[19] Producers and buyers order more frequently in smaller lots and expect to track their shipments so that they can synchronize deliveries with their own production schedules and with a minimum of warehousing.[20]

As in other manufacturing sectors, such as the automotive industry, producers are striving to decrease their share of in-house production and outsourcing of strategic components is widespread. A competitive environment of growing market fragmentation, shorter product cycles, and overlapping product generations has increased the importance of close supplier relations in product innovation (Sobrero 1994). Indeed, the paradigmatic form of the flexible manufacturing model – combining responsiveness to the market, flexible use of technology, and specialised regional institutions that, by balancing cooperation and competition, allow innovation to occur (Piore and Sabel 1984) – can be found in the white goods' industrial district of the Marche in Central Italy. Specialised suppliers have evolved to become crucial partners of their clients, allowing a closer integration of the supply-chain, and have often followed them in their internationalisation, becoming global suppliers. However, parts of strategic importance to the performance or quality of the appliance, such as refrigerants and blowing agents for insulating foams, are typically developed and produced in-house. Milne (1991) observed that in the UK firms were bringing back in-house some core manufacturing activities.

For OBMs selling to the final consumers, the ability to control complexity within manufacturing and logistic systems can be regarded as a core competence in order to jointly improve supply

[17] For example, if robotic assembly is to be introduced, production processes must be simplified as much as possible because machines will always be several degrees less flexible than their human counterparts. This usually requires a reduction in overall component count, the use of as many common components across a product range as possible, and the design of simple work station approaches to manufacture.

[18] Merloni has implemented a plan that includes an aesthetic renewal every 6 months, and a platform innovation every 12 months. To better accommodate such quicker development schedule, the company has implemented a new, complete platform approach, which standardises as many components as possible. The structure of the washing machines, for example, has the same cabinet, tubs, and drums for all models and brands, while the only differentiating parts are the exterior panel and the digital control. As the CEO put it, "If you have the same product in the market for a year's time, what you only see is an erosion of the price point. Having new products, new performances, and new ideas every six to eight months allows you to keep the price point or even increase it", *Appliance*, November 2002.

[19] Restructuring had already started in the mid-1980s. As Paba (1986) observed, these organisational innovations, coupled with workers lay-off, dramatically increased productivity, reduced delivery times to market, and boosted the strategic importance of process and product innovation (since higher profits are needed to cover larger investment for plant restructuring).

[20] "Assembly at the Speed of Light", *Appliance*, May 2005.

chain's efficiency and effectiveness (Perona and Miragliotta 2004). Logistic costs, which accounts for almost 30 per cent of overall turnover, are concentrated at the distribution stage and arise from a lack of integration amongst the various participants to the chain in terms of exchange of information (Perona *et al.* 2002). Nonetheless, firms' financial size and cultural attitude prevent the broad diffusion of techniques and tools for buyer–supplier integration beyond the operations domain, where this is coherent with the responsive configuration of the supply chain, and onto coordination in new product development and strategic planning (Perona and Saccani 2004).

The leeway of retailers is rising, especially in countries where distribution has achieved a high level of concentration.[21] Distribution channels include wholesalers, retailers (such as department stores, large superstores, and specialized appliance and furniture stores), kitchen producers and remodelers, builder-contractors and plumbing contractors. The relative importance of these channels differs considerably from country to country (Bower 2003, Table A). In the United States, traditional retailers used to dominate – in 2002, for instance, Sears sold an estimated US$7 billion worth of microwaves, washers and dryers, ranges, and refrigerators, equal to 22 per cent of total turnover.[22] General retailers' market share for major Has is being rapidly eroded by more nimble competitors, especially home improvement giants that have better locations, better service, and often better prices. The four biggest retailers, which account for 65 per cent of "consumer opportunity" for all appliance makers in the US, are now Lowe's, Home Depot and Best Buy, plus Sears.[23] At a European level, big chains (e.g. Auchan, Carrefour, Dixons, and Metro) and buying groups (e.g. Expert, Euronics, and Sinergy/Trony) have grown while many independents have disappeared because of strong competition on many levels — better purchasing prices, wide product ranges, development programs, promotions and communication. Huge differences still remain from country to country (ANIE 2003).[24] A second country feature is the propensity of large retailers to have their own brands. Sears, for instance, has long been Whirlpool's largest single and most important customer thanks to products sold under Sears' Kenmore brands. This practice is less widespread in Europe. Finally, some OBMs have their own stores and channel through them an important share of their sales – in developing countries, in particular, where consumer credit is also very important. Innovations in marketing also include product bundling into kitchen suites (implying a larger share of furniture retailers as distributors).

Since HA is an experience good and reputation matters, brand loyalty is a very important competitive factor in this market. It acts as an information-based barrier to entry, reduces the amplitude of short-run demand shifts (therefore the changes in brand market shares as a result of product innovation are sluggish) and allows firms to experiment (brand reputation cannot be brushed away by a single product innovation failure). By supplying the whole product range, firms can exploit multi-plant economies of scale, and therefore save in brand image, distribution

[21] In the case of Italy, producers earn the largest share of overall profits (46 per cent), followed by suppliers (38 per cent) and retailers (16 per cent) (Perona *et al.* 2002).

[22] "Dark Days in White Goods for Sears", *Business Week*, 10 March 2003.

[23] "Whirlpool adds some spin to the Maytag fight", *Financial Times*, 20 July 2005.

[24] Specialized appliance stores accounted for two thirds of all appliance sales in Germany and even more in Italy. In France, only one third of all appliance sales are made through specialized stores, the rest going through supermarkets and so-called hypermarkets

channels and advertising. When they do not opt for OEM subcontractors, producers expand their product range and brand portfolio through merger and acquisitions.

The geography of production and sales

Global production of large HA totalled 280 million units in 2002, amounting to US$ 106 billion. The largest components in terms of units were microwave ovens, while washing machines represented the largest component in terms of value. Production is mainly located in Asia, which supplies more than one third of the total, followed by Europe (around 30 per cent), and NAFTA (25 per cent) (Prometeia – based on Freedonia). China has grown into the largest world supplier of white goods, nearly tripling its production between 1992 and 2002 (Freedonia 2004).

The world industry is still rather fragmented with no single manufacturer commanding more than 10 per cent of the world market (Table 1).[25] The world's top ten manufacturers, ranked by sales, include three US companies (Whirlpool, General Electric Appliances, and Maytag), four Japanese ones (Matsushita, Sharp, Toshiba, and Hitachi), and one each from Sweden (AB Electrolux), Germany (Bosch-Siemens), and China (Haier).[26] Only a few offers the whole product range and is present in all key markets. In fact, only Whirlpool, GEA, and AB Electrolux have a global orientation (Table 1).[27] Others have a strong regional position or are leaders in specific product niches (often of high quality).[28] While they may not be present on all geographical markets, most manufacturers offer complete or nearly complete lines of major household appliances. As a result, the same large companies hold the largest market share for each appliance.[29]

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[25] The European appliance industry is still more fragmented than the U.S. While in the U.S. the top five players cover almost 99 per cent of the total market, in Europe the top five only make up close to 60 per cent. "Majors: Good (Not Great) Times Ahead Worldwide", *Appliance*, 31 January 2001.

[26] Four major manufacturers controlled around 99 per cent of the U.S. market for white goods in 2001: Whirlpool (39.2 per cent), GEA (23.2 per cent), Maytag (21.6 per cent) and Electrolux (15 per cent). Whirlpool owed its leadership position to its long-standing relationship with Sears, to whom it has been the sole supplier of Kenmore (Sears' own brand label) household appliances. Electrolux was first in market share in Western Europe (16.2 per cent) in 2000, followed by Bosch-Siemens with (14.4 per cent) and Whirlpool (9.4 per cent). Japanese large household appliance manufacturers are well entrenched in Asia, but have no real competitive presence in the rest of the world. This was similar to Maytag's being strong only in North America (Hunger 2003).

[27] Whirlpool adopted a marketing strategy to making its name a global brand. The company manufactures appliances in 44 locations, 34 of which are outside the United States in 12 countries. In cooperation with its affiliates in Brazil and joint venture partners in India and Mexico, the company built facilities in those countries to produce its "world washer". Whirlpool's top management believed that the firm's global position provided a competitive advantage "by reason of its ability to leverage engineering capabilities across regions, transfer best practices, and economically purchase raw materials and component parts in large volumes. GEA realises 30 per cent of its sales abroad (Hunger 2003).

[28] Local players in other emerging markets include Godrej, Voltas, and Onida in India, Gradiente in Brazil, Slovenia's Gorenje, and Lithuania's Snaige (which is backed by Western investors).

[29] The principal exception is microwave ovens, where Japanese (Matsushita, Mitsubishi, Sanyo and Sharp) and South Korean (Daewoo Electronics, LG Electronics and Samsung) companies hold a disproportionate share of global demand. Specialization is also somewhat more important in the refrigeration equipment area (especially freezers), as illustrated by companies such as WC Wood of Canada, Norfrost of the UK, and Polar of Poland, which concentrate much of their activities in this segment.

Table 1 Competitive orientation of major home appliance manufacturers

Global Players	Whirlpool (U.S.), AB Electrolux (Sweden), General Electric (U.S.)
Global Aspirants	Bosch-Siemens (Germany), Haier (China), LG Electronics (Korea)
Strong Regional Players	Matsushita, Sharp, Toshiba, Hitachi (Japan), Samsung and Daewoo (Korea) in Asia Maytag (U.S.) in North America Miele (Germany), Candy and Merloni (Italy) in Western Europe
Strong Local Players with Some Regional Presence	Arçelik (Turkey), Mabe (Mexico), Multibras (Brazil), Fisher & Paykel (New Zealand)
Domestic and Niche Players	Sub Zero/Wolf (U.S.), Guangdong Midea Group (China)

*Source*s: Hunger (2003) and ANIE (2003).

The industry has consolidated since the 1990s, as small companies do not have the debt capacity to finance R&D investments and expansion opportunities, the power to bargain with retailers, and the volumes to optimise fixed costs and innovation investments as a percentage of sales. Larger producers increasingly target smaller producers to acquire their brands and to expand overseas. Major examples are DeLonghi's acquisition of Kenwood, SEB Group's acquisition of Moulinex, later resold to Fagor, and Indesit's acquisition of Hotpoint. According to market participants, this process is far from finished, and is not limited to high-income countries.[30]

World demand is projected to growth more than three per cent annually through 2007. Even in mature markets, the housing boom has helped to stave off stagnation as developers and home-owners rush to buy new kitchens. Innovation and fashion have also pushed up demand. Elsewhere, mounting ownership of such appliances is one of the first signals of widespread economic growth and the emergence of a middle class. In Turkey, white goods sales have outpaced annual GDP growth rate by around 3.5 times in 1995-2004. In Mexico, 2004 sales rose 13 per cent year-on-year.

International trade tends to take place within geographically proximate and relatively homogeneous markets. Given the heavy weight of most appliances, transportation costs are high. In addition, in different areas consumers have different preferences.[31] Another issue is the presence of widely different standards: safety/environmental, energy efficiency, and testing procedures. These standards had traditionally created entry barriers that served to fragment the industry by country (Hunger 2003). As the market remains largely regional, there is scope for firms to become regional champions using a few strong brands to keep the product range manageable. These companies' products not only rely on far cheaper environmental standards (using hydrocarbons rather than the hydro-fluorocarbons widely used in the West); they are also far better adapted to the tough conditions and slow replacement cycles of local markets (e.g. fridges stay cool after power cuts and washing machines have extra rinse cycles).

[30] In China, India Russia and South Africa major players are setting up joint venture with local producers, investing in production facilities, or acquiring local brands. In Brazil, the HA industry is entirely owned by MNCs (Ferigotti and Figueireido 2005).

[31] Bulky machines like warming ovens are simply too heavy to ship overseas. As per consumer taste, examples of typical British habits include the double-oven, which have the starter in the grill and the roast in the oven, and is only sold there; the 50/50 fridge/freezers split, because frozen food is more popular than in Continental Europe; larger door compartments for milk and water bottles; and in laundry, because of the wet climate, washer-dryer combinations are much more popular while washers are never in the bathroom, but in the kitchen.

Outsourcing, once limited to neighbouring firms in the industrial cluster, has expanded geographically. Maytag dishwashers use Chinese motors and Mexican wiring and are assembled in the US.[32] OEMs in developing countries are also producing on behalf of Western OBMs (e.g. Daewoo produces refrigerators with freezers on top sold under the Maytag brand). The processing is now moving further as the world's white goods – and not simply their components – are indeed increasingly being made in emerging markets. Electrolux, which at February 2005 had 27 of its 44 white goods factories in high-cost countries, said that 13 or 14 of them could be switched to low-cost countries over the next four years.[33] Premium brand Miele opened a Czech factory for horizontal-axis top loader washers for the French market. Whirlpool closed its Quebec plant, retrenched 1,000 Italian staff, and is moving much of its production from Arkansas to Mexico.[34] Indesit is adding new capacity in Poland and Russia.[35] The biggest Asian players, such as Korea's LG and Japan's Matsushita, are also busy building new plants in countries such as Russia. For some products, however, consumers are still willing to pay higher prices for goods produced in a specific country. When Whirlpool decided to sell US$1,200 front-loading washers on the American market, it opted for making them in Germany where it had a trained work force and a factory already making a European version of the front loader. Despite labour costs of US$32 an hour, including benefits, versus US$23 in the United States and a fraction of that in Asia, the company decided that this particular type of product demanded skills that could allow it to expand the capacity in Germany at a very incremental investment.[36] Major players have also set design and R&D centres in their largest overseas markets. This is the case, for instance, of Electrolux in Brazil, China and India (Ferigotti and Figueiredo 2005).

As shown in this paper, investment flows are not uni-directional. Haier and Arçelik have invested in manufacturing capacity in high-income countries to get closer to where knowledge and innovation are produced, bypass transport and tariff barriers, and build an international reputation for their brands.

Innovation patterns

In the framework developed by Pavitt (1984), the HA industry can be characterised as scale intensive, i.e. competitiveness derives from exploiting scale economies and the innovative activity chiefly concerns process and organization.[37] Companies use similar technology and

[32] "Three countries, One Dishwasher", *The Wall Street Journal*, 6 October 2003, quoted in Nichols and Cam (2005).

[33] "Electrolux moves out of its markets", *Financial Times*, 26 July 2005.

[34] In January 2004, Whirlpool announced it was moving its production line for refrigerator ice makers from Fort Smith, Arizona to China. The company reversed its decision in December, citing it had decided to work with suppliers to reduce component costs in lieu of moving.

[35] According to Merloni's managing director, Central Europe, "This shift in production capacity meets the need for a more even balance between output levels in Eastern and Western Europe. About 86 per cent of the company's total production is provided by its plants in Western Europe, a region that only delivers 67 per cent of the company's sales" ("Merloni Expanding in Central and Eastern Europe", *Appliance*, February 2004).

[36] "Globalization: It's Not Just Wages", *The New York Times*, 17 June 2005.

[37] Scale intensive sectors include transport equipment, consumer electronics and household appliances. According to the five-fold taxonomy of technological regimes developed by Marsili (2001), which expands the work of Pavitt, the

manufacturing processes. Innovation is mainly the result of development or engineering activities rather than formal research, and the innovation capacities of firms mainly stems from specific, and in great part tacit, internal capabilities and learning processes (Coriat *et al.* 2002). Firms need to have access and combine various technical knowledge and capabilities. They rely mainly on internal source of technology (e.g. internal R&D departments) to support product innovation. Innovation diffusion from other sectors largely takes place through acquisition of intermediate goods and interactive learning with specialized suppliers.[38] Patenting intensity is low and counterfeiting and pirating of rivals' goods is not unknown.[39]

HA manufacturers employ rather mature technologies, already developed by other industries. R&D spending concentrates on process improvements and product architecture, to design common production platforms and achieve multi-plant economies of scale. Component suppliers complement the manufacturer's capabilities and play an increasingly important role in new product development.[40] The successful manufacturer manages to coordinate and integrate suppliers in the innovation process.

What product innovation takes place is mostly linked to regulatory developments, mainly related to environmental protection and energy efficiency. The 1987 signature of the Montreal Protocol on the Substances that Deplete the Ozone Layer and the issuing of texts for protection of the stratospheric ozone layer, and the more recent regulations restricting certain hazardous substances and on the recycling of waste electrical and electronic equipments,[41] have turned the ability to produce energy-efficient and environmental-friendly appliances into a crucial factor in marking product differentiation and sustaining corporate competitiveness.[42] Convergence between different network technologies (including electronics, software and wireless communications) is

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technological regime of this sector is 'product engineering': low technological barriers to entry in knowledge and scale, medium-low persistence of innovation, users are major external source of knowledge, while links with academic research is not very important (but is pervasive in mechanical engineering), and innovation is mainly concerned with product development.

[38] It does not mean that relations with academic research and science-based firms are unimportant, but they concern mainly engineering disciplines or general scientific knowledge (such as mathematics and computer science). Meanwhile, the HA industry clearly benefits from the parallel development of complementary sectors, such as furniture and related materials, lighting and design (Ghedini 2003).

[39] Innovations, generally introduced for top quality products, spread quite rapidly to other producers and product ranges. In fact, aside from patented features, no one producer could successfully keep a new innovation to itself for more than a year (Hunger 2003).

[40] Greater supplier involvement results in faster releases of new devices, prompt response to competitors' moves, and substantial advantage in engineering efficiency (Sobrero and Roberts, 2002).

[41] In particular the European Directives on waste electrical and electronic equipment (WEEE, 2002/96/EC) and on the restriction of certain hazardous substances in electrical and electronic equipment (RoHS, 2002/95/EC), which entered into force on 13 February 2003. RoHS requires that any product containing any of six hazardous substances will have to be redesigned or withdrawn from the market by July 2006. Starting from 13 August 2005, producers are responsible for the financing of the management of electro-scrap.

[42] In the early 1990s refrigerators and freezers accounted for an estimated 20 per cent of the domestic electricity usage in the United States and in Germany. According to the U.S. Department of Energy minimum energy standards in effect since July 2001, the amount of energy used by a typical refrigerator must equal no more than that used by a 55-watt light bulb and by 2007 clothes washers must be 37 per cent more efficient than those built in 2001.

another driver.[43] Smart devices can be used for instance to have the appliances simulate sequential operation during the hours of cheapest electricity, so that their various cycles – such as defrosting and clothes washing – does not occur simultaneously, thereby ensuring optimum energy usage and lowest cost.[44] The use of modern sensors with intelligent control systems is a key for differentiation between different appliance products and companies (Tschulena 2005).[45] The scope for further technological innovation is larger in the "washing" and "cold" sub-sectors than for heating appliances, where innovation mostly concentrate on aesthetics.

4. The case of Arçelik

History

Arçelik is the oldest and the largest of the three firms analysed in this paper.[46] Founded in 1955 in Sütlüce to produce metal office furniture, Arçelik is the second largest member of the Ankara-based Koç diversified conglomerate, Turkey's biggest private group with activities in sectors including automotives, household appliances and electronics, financial services, food, retailing, energy, and information technology.[47] Koç Holdings, which owns 57 per cent of Arçelik shares, is ranked 389 in Fortune Global 500 ranking.[48] The company produced the first washing machine in Turkey in 1959 and the first refrigerator one year later.[49] It now operates seven manufacturing plants in the country to produce the whole range of home appliances, including cooking and heating following the full consolidation of Ardem in 1999. Arçelik had consolidated sales of US$3.7 billion in 2004, with a workforce of about 11,000. By the end of 2004, a total production figure of 7.4 million units was achieved, 30 per cent higher than the previous year. Production is still concentrated in refrigerators (44 per cent) and washing machines (33), but dishwashers (8) are experiencing a robust growth, also reflecting the strong domestic demand (plus 65 per cent between 2003 and 2004). The company is the leader of Turkey's consumer durables, accounting for more 53 per cent of domestic sales and 54 per cent of the country's exports.

[43] Whirlpool, for instance, has launched new oven/refrigerators, which can be programmed to keep food cool all day and then cook it in time for supper.

[44] These innovations, generally introduced for top quality products, spread quite rapidly to other producers and product ranges. In fact, aside from patented features, no one producer could successfully keep a new innovation to itself for more than a year (Hunger 2003).

[45] Still, the increased capacity of manufacturers to steer consumers by offering a *prima facie* increasingly diversified models mix (in particular, between bottom- and top-range products) is in practice much more limited than would seem to be the case judging by the information provided by the manufacturers (Barbiroli and Focacci 2003).

[46] The Beko name was first introduced in 1956 when the company reorganized its corporate structure.

[47] The Koç household appliance segment ranks first in terms of revenues and operating profits. Arcelik itself accounts for 22 per cent of the group consolidated revenues, closely trailing the Ford Otosan automotive firm. A predecessor of Arçceli was set up in 1946 as General Electric agency. In 1950, the company pioneered the general agency system in Turkey with General Electric light bulbs. The GE-Koç light bulb factory started production in 1952.

[48] The Burla Group holds 20 per cent of the stock and the remaining 23 per cent are publicly traded at the Istanbul Stock Exchange.

[49] In 1975 the non-durable goods division was spun off to Düzey and in 1990 sales of Arçelik brand goods waere transferred to Atılım, in both cases companies that were established by Beko's own staff.

The internationalisation process follows a two-pronged strategy, fostering exports and acquiring new companies to enter or consolidate the company's position in foreign markets and complete its product range. Exporting started on an opportunistic basis in neighbouring countries, to eventually become a core element of the company growth strategy. As Turkey agreed a schedule of phased tariff reductions with the European Community in 1988, exporting gain in importance to counter the increase in imports and make the most of heavy sunk investments in new machinery and equipment. In the Americas, a OEM contract was secured with Sears Roebuck in 1988 to supply refrigerators under the Kenmore name, followed a nine years later by a similar, but much larger, European deal with Whirlpool for dishwaters (Root and Quelch 1997). As parts of these deals, Arcelik committed not to sell similar products in Europe under own brands. The Beko brand was used in the three main EU markets, mostly for tabletop height refrigerators that were targeted as an underserved market niche.[50] By the late 1990s, the company had set up sales offices in France, Germany and the UK and identified specific strategies to enter each market.[51] In 1996, 50 per cent of washing machines exports and 30 per cent of refrigerators were OEM. In 2004, foreign sales represented 44 per cent of total turnover (up from 16 per cent in 1997), and approximately two thirds of sales corresponded to own-brand products (Arcelik 2004).

The second pillar of the internationalisation strategy consists of targeted acquisitions of foreign competitors, to enter new markets and reinforce technological and productive capabilities. The first experience with direct investment took place in developing countries, but did not live up to expectations. In Tunisia, Arçelik sent semi-knocked-down (SKD) refrigerators to Tunusdan, a company in which it held a 55 per cent stake. This venture was eventually shut down in 2003 [elaborate on why]. In Uzbekistan, it signed a US$77 million agreement in 1999 to establish a joint venture with Sino OJSC and the European Bank for Reconstruction and Development (EBRD) to initially produce 150 000 refrigerators to be gradually increased to 250 000. Arcelik would have a 30 per cent stake in this company which would have paid-in capital of US$43 million. However, this project has been put on hold due to political conflicts between Turkey and Uzbekistan.[52]

The macroeconomic crisis, which saw 2001 GDP fall by 7.5 per cent and the demand for consumer durables contract even more, made the need to internationalise even more pressing. In 2001 Arçelik made its first bid in Europe, although the Commercial Court of Nanterre eventually sold France's Brandt to Elco.[53] The next year, building on the experience acquired while bidding for Brandt, Arcelik acquired three foreign companies – Blomberg (a subsidiary of Brandt) in Germany, Elektra Bregenz in Austria, and Arctic in Romania[54] – and the Leisure (cookers) and

[50] Beko Elektronik is one of Europe's largest television producers, but this a different line of business and hence it is not covered in this paper.

[51] In light of the different market structure, Arcelik decided to develop as an OBM in the UK and in France, leveraging on the Beko name, while initially focussing on OEM in Germany (Root and Quelch 1997).

[52] The EBRD board approved the project in April 1999, renewed the approval in May 2000 and finally cancelled the project in 2001.

[53] Arçelik had proposed to operate the six factories of Brandt located in France and to employ 4,105 workers. The Israeli company took over seven factories and agreed with the Court to employ 4,197 of 5,300 workers.

[54] Established in 1970, Arctic is Romania's only producer of refrigerators, with one 50,000 square meter site in Gaesti, approximately 70km from Bucharest. Arctic was privatised in 1997 and was also listed on the Bucharest stock exchange. The main shareholders at the time were EBRD (31.81 per cent), Société Générale Romania Fund (25.48

Flavel (appliances and TV sets) brands in Britain.[55] Commenting on the acquisition, Arçelik CEO Nedim Esgin stated, "Known brand, new market share, competitive production cost, and potential of additional capacity are not only great opportunities for our business goals, but also values that contribute to our target to become a "global company". In June 2005 Arçelik launched the construction of a refrigerator and washing machine greenfield plant in Russia, located 110 kilometres from Moscow.[56] The corporate investment program is partly supported by the International Finance Corporation (IFC), the private sector arm of the World Bank Group, which signed a €160 million loan in April 2005.[57]

Over the last four years the company has doubled its turnover. Management has set for 2005 the ambitious goal to become the fifth-largest European producers of white goods and pass the bar of US$3 billion turnover. The strategy is paying off in terms of larger market shares, especially in European countries, which make up 86 per cent of overall international sales. According to company data, Arcelik/Beko holds a 7 per cent share of the European free-standing appliances market and 5 per cent of the OBM market. Beko products account for approximately ⅔ of Arçelik international sales and are among the top brands in many markets – including the UK (14 per cent share in refrigerators and 7 per cent share in washing machines) and Poland (5 per cent share).

Explanation

Manufacturing, technology, marketing, and distribution appear as the main reasons behind Arçelik's success. Quality Safety Units were created in 1990, various types of ISO certification were secured in the early 1990s,[58] and in 1992 management decided to approach Total Quality Management globally and systematically and do its first self-evaluation according to the Malcolm Baldrige model. Systematic total quality operations (6 Sigma) and three-year product guarantees were introduced in 1998, when Arçelik first qualified as a finalist in the National Quality Award. Later, Arcelik continuing its self evaluations according to the Perfection Model, first brought to Turkey by KalDer, won the TUSIAD-KalDer National Quality Grand Award. Arcelik, the first and only company in the appliance sector to win a national quality award, was a finalist in the 1998 EFQU European quality Award and in 2000, won the Success Award for the large-scale institutions and work units category. In 2000 Arçelik won the second prize (Category for Large Businesses and Business Units) at the European Quality Award EFQM and in 2001 Beko

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per cent) and Romanian Investment Company Cyprus (17.6 per cent). Its plant is located in Gaesti, 70 km away from Bucharest. The US$20 million deal was done through Ardutch, a wholly-owned Dutch subsidiary. In 2001 Arctic had 2,100 employees, a turnover of €41 million, 45 per cent domestic market share, and spontaneous brand awareness of 35 per cent. At the time of the acquisition, Arçelik targeted an increase in yearly production from 350,000 refrigerator units (of which more than half were exported, mainly to East European countries) to 750,000 units.

[55] When the ultimate owner of these products, Glynwed International, changed its name to Aga Foodservice in 2000, this was said to signal "the decline of the once-mighty Midlands metal-bashing industry" (Guthrie 2001).

[56] The factory, with initial capacity of 500,000 units gradually increasing to 900,000 units annually, is due to become operational in April 2006 and generate full-year revenues of US$120 million from 2007.

[57] IFC has invested in projects of the Koç Group across a wide range of sectors in Turkey, Russia, Romania, Kazakhstan, and Azerbaijan.

[58] In 1992, the central functions of the Cayirova and Eskisehir Plants were certified according to the ISO 9001. Today, all production facilities possess the ISO 9001 Quality Management System Certificate given by the Turkish Standards Institute (TSE) and the ISO 14001 Environmental Management System Certificate given by SGS Yarsley.

Elektronik won the TPM Excellence Award. In 2003 Arçelik was included in the instructors' training book for 6 Sigma. Local and foreign sub-suppliers are also required to share Arçelik's Quality Culture, obtain ISO 9001 quality system certification, and apply principles such as just in time manufacturing, and Kanban. In 2004, the international jury of the European Energy+ Appliance Awards Competition awarded Arcelik as winner in the category two door refrigerator freezer and gave the company a special mention for presenting the most efficient "energy+" model. Arçelik Turkish coffee machine received the IF Design award in 2004. In November 2005 Arçelik launched the first domestic dryer of Turkey, mostly (85 per cent) directed to export markets. The dryer won the Plus X Award 2005 in the innovation category with the lowest energy consumption level in Europe and an A-class energy performance.

The innovation management change process is also focused on both consumer needs and core competencies, the latter defined through benchmarking and past experiences, with the gap filled through acquisitions.[59] The R&D Centre was inaugurated in 1991, and the investment in training is substantial – over 25 hours/year for workers and over 40 hours/year for engineers. The company earmarks approximately 1.5 per cent of its total annual turnover to R&D and employs, in 2004, 455 researchers in its central and operational R&D department (up from less than 50 in 1990). [Robots, CAD/CAM stations, patents Arçelik has made 10 per cent of all patent applications in Turkey in the past three years.] Arçelik has also forged a strategic partnership with Ubicom, a Californian company, to use Internet processors and networking software that enable device-to-device communication.[60]

Management claims that these impressive results stem from the fact that Arçelik has a less hierarchical culture than, for instance, its Italian competitors – "a marketing manager has more power here and will solve his own problems instead of relaying everything to the boss."[61] Although slightly outdated, available evidence paints a fairly different picture – the expression "*Kaizen* from above" seems better suited to define the situation (Nichols *et al.* 2002). Workers at Arçelik facilities appreciate the changes that exposure to modern Western management techniques and shop-floor practices have brought about, but it would be incorrect to conclude that a fully democratic workplace has emerged. Similarly, Beko "introduced participatory practices as part of its competitive strategy but failed to sustain [them] once its production and increased, [workers were] denied participation due to the primacy of meeting the production targets" (Ozkan 2003, p. 42).

Marketing and branding is a third pillar. In January 2001 Arçelik took over from Beko Ticaret the marketing and sales activities of Beko branded products, including brown goods. Although Arçelik has consistently been ranked Turkey's most widely known brand by AC Nielsen surveys,

[59] The general rule is to implement a maximum of six innovation projects per year. "Adapting to Change", *Appliance Design*, 1 June 2004.

[60] At Domotechnica 2001, the global appliance trade fair held in Cologne, it demonstrated a networked home application, consisting of a Beko-brand refrigerator, oven, TV, washing machine, and dish washer. All of the appliances are linked using Bluetooth wireless technology and use device-to-device communication chips and software. "Ubicom and Arcelik/Beko Demonstrate Wireless Home Networking", *Appliance Manufacturer*, 16 March 2001. Arcelik also bought a 1.92 per cent stake in a California-based company called Scenix which produces chips to be used in smart household devices.

[61] "AMDEA 2005 Reveals UK Market Trends", *Appliance*, June 2005.

it suffered from an association to the poor quality prevailing in the old days of import substitution industrialisation. In 2002 it adopted a new logo, designed by the same American corporate graphic studio which had created the Koç Holding logo in 1987, and introduced the popular Çelik character, a technology spokesperson (Enberker and Ergin 2003). The objective was to signal the transformation of the company into a serious player in a global industry hitherto dominated by Western firms and in which Arçelik wished to compete on the basis of high technology and innovation, as opposed to low labour costs. The Beko brand is used on international markets for built-in and stand-alone appliances, televisions, air conditioners, heaters and small household appliances. Determined to turn it into the group's global brand, Blomberg was launched with a new image in Germany, Denmark, Belgium, Russia, Israel and Switzerland in 2004.

A final strength for Arçelik has been the control over Turkey's largest distribution and after-sales service network. In a country with a history of chronic inflation and high debtor delinquency rates, a crucial advantage for Arçelik as a group has been the possibility to rely on other Koç affiliated companies for extending consumer credit on top of factory-sourced finance, often at slightly negative real interest rates (Root and Quelch 1997). A separate Beko dealer network was established in 1993, although for this brand other outlets were also used. More recently, Arçelik has entered the furniture market, where most sales are unregistered, with the Arstil brand name.[62] Arçelik and Beko franchise operators have the right to sell Arstil products as well and the number of stores is projected to reach 100 by the end of 2005.

In the internationalization strategy, the company has leveraged some of its strength on the domestic market. In terms of products, in the United Kingdom a new 70-cm refrigerator line (a width traditionally only used in Turkey) has been a big success. In Romania, Arctic has gone from being only a refrigeration brand to offering all of the range of household appliances and constituting the logistics base for Arçelik in the Balkans and beyond. Arctic sold around 250,000-270,000 fridges in 2001. In 2003 it released a new line of products including washing machines, ovens, and vacuum cleaners. In 2003 the company saw its receipts raise by over US$1 million as Premier Adrian Nastase urged local authorities to buy Arctic refrigerators in order to keep the roll and milk snack for elementary school students.[63] The fridges were sold at a 15 per cent discount based on credits to be taken out from the Romanian Commercial Bank (BCR) and guaranteed by the county or local councils. Arctic domestic sales went up by 20 per cent to US$ 117 million in 2004, and financial results (turnover) hit US$ 157 millions, with the company's market share also going up to 45 per cent in 2004 as compared to 40 per cent in 2001.[64] The number of refrigerators manufactured at Gaesti reached 750,000 pieces, the final production being double as compared to late 2003. The Arctic officials said that the production capacity increase is the result of a 17.5 million euros investment scheduled for 2003-2004. Arctic intends to increase its production capacity from 350,000 pieces/year to 1.5 million pieces/year by 2006.

[62] "Arçelik grows in furniture sector", *Turkish Daily News*, 27 June 2005.

[63] *Evenimentulzilei*, 30 September 2002.

[64] Arctic is the second best-known Romanian brand, with an instant recognition factor of 26.3 percent in 2005, according to the High Impact Brands 2005 study by research company Synovate and Biz magazine.

5. The case of Mabe

History

Founded in 1947 by Basque immigrants to produce metal kitchen cabinets, Mabe is the oldest of the three companies examined in this paper. Today it is one of the leading HA manufacturers in Central and Latin America, producing more 12 million appliances per year, employing about 18 000 employees in 12 factories (ten of which are in Mexico, one in Colombia and one in Ecuador) and selling products worth about US$2 billion in 70 countries. The company ranks 146th in 2004 in terms of revenue amongst the top 500 Latin American companies (it ranked 151st in 1998 and managed to reach 141st in 1999) and is ranked 66th in Mexico.[65] In 2004, exports to the U.S. and Canada under the export agreement with GE totalled US$752 million, representing about 35 per cent of total sales. The other major export markets were the Andean Pact Region (12 per cent of total sales), Brazil (12), Central America (2) and Argentina (1).

The name is a contraction of the surnames of the founders, Egon Mavardi and the two (later three) Berrondo brothers. The former sold out his share to the Berrondo and Saíz families, and Mabe has always been managed by members of the Berrondo one. In 1953, Mabe began manufacturing gas ranges in one block of industrial property that the company owned near the Mexico City airport. As it then expanded into built-in ovens and cooktops, water coolers, and related parts and components, factory buildings were added and expanded within this one block. In 1976 the decision was taken to move to Queretaro, where the plant started producing in 1978. From the start the emphasis was put on quality, labour training, and modern management practices – whereas operation in Mexico City were characterised by entrenched, antiquated management and labour practices, Queretaro never had any labour problems (Vietorisz 1996). Regional exports of gas ranges started in 1974 and expanded from 1977 on with refrigerators.

In 1984, two years after General Electric (GE) first approached Mabe with a possible interest in a joint venture to produce gas ranges,[66] two crucial changes took place. Second-generation Berrondo family members (José and Luís Jr.[67]), who had accumulated considerable overseas experience, began taking over many top responsibilities; and the decision was taken to establish a new culture of work teams and more open communication, with emphasis on management and worker training. Although Mexico was still a protected economy, barely recovering from the aftermath of the 1982 debt crisis, management came to the conclusion that major strategic changes were needed – a commitment to building or acquiring additional gas range fabrication capacity, to acquire a complete product line in major appliances, and to seek association with a partner that would give Mabe access to advanced international manufacturing technology, export markets, and modern management practices.

[65] Data come from *AmericaEconomia* and *Expansion*, respectively

[66] GE has been active in Mexico since 1896. In the early 1980s a joint venture in which GE held a 49% share, CONFAD, was competing with Mabe in the market for refrigerators.

[67] Luís Berrondo Avalos, in particular, became Director General in 1992, aged 42, and President in 1996. He had previously lived six years in Venezuela.

In 1987, Mabe signed a joint venture agreement with General Electric (GE).[68] In exchange for a 48 per cent equity share, GE became Mabe's main business partner and largest customer: it contributed the refrigerator component separated out from its joint venture with Grupo Industrial Saltillo, plus US$25 million in cash, and a commitment to provide management training and technological support. Pursuant to this joint venture agreement, GE licensed trademarks and patents, provided technology and technical advice and distributes Mabe's OEM products in the US, while Mabe retained entire management responsibility. In 1987-88 Mabe rounded out its own major appliance lines (refrigerators and washing machines) by purchasing IEM (Industrias Electricas de Mexico) Westinghouse from government and the entire capacity of the GE-Grupo Industrial Saltillo. With a major infusion of GE design, technology, and credit, a major export-oriented gas range plant at San Luís Potosi began production in 1990.[69]

Since 1989 Mabe has held a 50 per cent share of the domestic market for each major home appliance that it produces. In recent years it has lost market share in the washers and refrigerators segments, where competition, from both local and foreign (especially Asian) players has grown stronger.[70] In 1994 the company had to face accusations of anti-competitive behaviour filed by two domestic competitors. The Mexican fair trade commission ruled that the company had not sufficient market power to influence competition by itself, but it had, however, colluded with its strongest competitor, to exclude these companies from the markets for refrigerators and gas stoves.[71]

It then became clear that further expansion had to be driven by technological excellence and international diversification away from the Mexican market. In 1993 Mabe opened a new technology development centre in Queretaro and acquired a Venezuelan manufacturer of washing machines and gas ranges (Menaca) and a manufacturer of refrigerators in Colombia (Polarix). The deals were made on behalf of the investors on the Mexican side of the Mabe-GE joint venture, but

[68] Previously, GE had considered alternative joint venture options with Grupo Industrial Saltillo, a producer mainly of washing machines, and Monterrey-based Vitro, a diversified conglomerate, and Mabe had done the same with Whirlpool. GE also has international partners in India (40 per cent of a joint venture with Godrej & Boyce), the Philippines (Philacor), and Japan (Toshiba).

[69] "The design and building of the new plant was a major challenge for both Mabe and GE. Mabe had never taken on a construction project of comparable scope and complexity; GE on its part, had not previously designed and manufactured gas ranges for sale in the U.S. market. It is noteworthy that the gas range produced at the new plant was destined from the start for the high end of the line both in the American and Mexican markets; it was, for example, designed with self-cleaning features" (Vietorisz 1996, p. 35).

[70] Mabe also controls a large part of the built-in kitchen appliances market, supplying its products especially to small and medium furniture producers.

[71] The local subsidiary of Singer (which sells under the Singer and Premier by Singer brands appliances manufactured by Mabe) and two domestic appliance producers (Sim and Grupo Bler) filed a complaint with the Mexican fair trade commission (FTC) against Mabe, its subsidiary Distribuidora Cónsul, and Vitro. The plaintiff alleged *inter alia* that Mabe had engaged into anti-competitive behaviours, such as refusal to sell, collusion, and preferential trading arrangements, to damage Singer. The FTC ruled that Mabe had not enough market power to distort competition. However, it had colluded with Vitro, in theory its strongest competitor, to exclude Singer and Sim from the markets for refrigerators and gas stoves in which they held a combined share of 86 per cent and 86 per cent, respectively. The FTC ordered Mabe and the other companies to modify a number of contractual arrangements.

with a Mabe management contract.[72] In 1995 the expansion into Central and South America continued with the purchase of a ⅔ share in Durex in Ecuador, of rights to the "Centrales" brand in Colombia, and with the establishment of distribution organizations in Guatemala and Costa Rica. These investments were concluded despite the macroeconomic crisis following the collapse of the Mexican peso in December 1994. In 1995, the domestic market for major appliances contracted by some 26 per cent in volume terms. Mabe saw its domestic sales fall by a slightly lower margin (21 per cent), while the cost of imported parts and components, in national currency, more than doubled. With strategic advice from GE, Mabe quickly accomplished a major substitution of imported components by Mexican-supplied components and increased exports. Sanyo is Mabe's other strategic partner in the area of compressors. The joint company, where Mabe has a 65 per cent stake, has the capacity to produce about 1.8 million compressors per year, and sells half of its production in the domestic market and export the other half to the US.

1987 Industria Eléctrica México México	1989 División de Electrodomésticos (GIS) México	1993 Ceteco Venezuela	1995 Polarix Colombia	1995 Electrodomésticos Durex Ecuador	1998 Inresa Perú	1998 Madosa Venezuela	1998 McLean Argentina	1998 GE-Dako Brasil	2005 CAMCO Canada

In parallel with this expansion, the Berrondo family also gained in influence in Mexican business circles. During the privatization of the domestic banking sector, the Berrondos bought a controlling stake in Banco Bital, together with ING and Santander, and promoted the expansion of the consumer credit business.[73] Luís Berrondo became president of the Consejo Mexicano de Hombres de Negocios, and the main heralder of dollarization in Mexico. Faced with increasing domestic competition, MABE is seeking product differentiation, by servicing the higher end of the market with its premium line, and tapping into new opportunities related to housing development.

In September 2005, Mabe made a successful US$59 million takeover bid for Camco, a Canadian manufacturer of dishwashers and clothes dryers, controlling 17 per cent of the local appliance market.[74] The acquisition was largely financed out of debt, which Fitch, the rating company, gave a 'BBB – 'rating.[75] Mabe has an already healthy Canadian export and procurement track record.[76]

[72] EXIN's transnational ventures pay a royalty to Mabe that entitles them to the use of Mabe designs and production technologies, together with short executive visits of less than one week duration. More extensive technical and management services rendered by MABE are being accounted for by specific, itemized additional charges.

[73] The Berrondo family, propietaria del 49% del grupo mexicano y la de otros accionistas que sumarían en total el 52% del capital. Pero hay otros accionistas mayoritarios en el grupo. Uno de ellos, el banco holandes ING, que recientemente pagó 200 millones de dólares (204 millones de euros) por aumentar su participación hasta el 19,2%. Y el otro, el SCH, que controla el 26% del capital de Bital y el 30% de los derechos políticos.

[74] GE bought back its 51 per cent stake in CAMCO and sold it to MABE, which eventually control 98 per cent of this company. On Sept. 26, 2005, GE sold to Mabe its former 51/49 joint venture in Canada after delisting it from the public stock market and buying back its Canadian partners' stake.

[75] On 1 November 2005, Fitch Ratings has assigned Mabe senior unsecured foreign currency and local currency ratings of 'BBB – ' and a preliminary foreign currency rating of 'BBB – ' to US$200 million of guaranteed senior notes due 2015. Proceeds will be used to fund the acquisition of Camco and to refinance existing short-term debt.

It is estimated that, thanks to this acquisition, the company will increase the proportion of revenues earned in hard currency from 41 in 2004 to an about 50 per cent in 2005.

In terms of expansion in production capacity, however, the thrust of the effort has been made in South America. Free trade gives Mexican firms a trading edge through the G-3 pact with Colombia and Venezuela, whereas tariff protection makes it difficult to export to Argentina and Brazil. In 2003 Mabe bought CCE refrigerator business in Brazil for US$40 million and gained control over GE-DAKO, the joint-venture that GE set up in 1996 with a local stove manufacturer. Mabe has a 16-18 per cent market share, which it aims at increasing to 23 per cent by 2008, employs 2300 staff in two plants (Campinas, stoves, and Itu, refrigerators and washing machines), and 2004 sales reached R$855 million. It is investing US$70 million to double production and is working with Estúdio Índio da Costa, a five-time winner of the Industrie Forum Design Award (iF Design) since 1998, to design a new product line.[77] A parallel objective is to increase exports from 25 per cent of total production to 30 per cent and become the Mercosur market leader. In Argentina, Mabe bought the 50 per cent stake it did not held in Mc Lean (Kronen Argentina, Patrick brands) in early 2003 from Spain's Fagor Electrodomésticos and Mondragón Corporación Cooperativa (MCC). The two subsidiaries form Mabe Mercosur and are run as an integrated business – the San Luis plant, where Mc Lean used to produce three models of refrigerators, is only responsible for one now and has increased production six-fold.

The second axis is the Andean region comprising of Venezuela, Colombia, Ecuador and Peru, where Mabe Andina has a 40 per cent market share. In Colombia, following the purchase of Centrales, Mabe increased its share from 29 per cent to 40 per cent, at the expenses of local brands (of which only Haceb survives). In Venezuela it bought Swiss-owned Grupo Ceteco – which already marketed Mabe and GE goods and had a staggering 60/80 per cent market share – in 1999.[78] In 2001 Mabe de Venezuela had 1,600 employees. The plant in Zulia province is the main production platform of kitchens and washing machines for the whole Andean region, while those in Colombia and Ecuador specialize in dishwashers. Comoponents for assembling kitchens are imported, mainly from Brazil.[79]

The acquisition of Camco in Canada is intended to increase Mabe's production capacity in North American and to enlarge its product and brand range. With annual sales of US$643 million in 2004, Camco manufactures clothes dryers and dishwashers sold under GE, Profile, Monogram, Hotpoint, Moffat, and BeefEater brands, and is the primary supplier of clothes dryers to GE in the US. Mabe has today a wide portfolio of brands, and target different market segments using these different brands.[80] The business strategy is to consolidate the position in countries where it is the

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[76] In January 2005, Export Development Canada (EDC) took a US$22.5 million position in a new US$400 million syndicated credit facility.

[77] "El trabajo de Índio es de calidad internacional", says João Sérgio Ramos, Mabe general manager Mabe in Brazil. "El cacique del diseño", *América Economia*, 22 April 2005.

[78] "Corto circuito doméstico", *Producto*, April 1999.

[79] "Padre negocio", *Producto*, February 2001.

[80] In the United States, products are sold under various GE brand names and the Kenmore (Sears) brand name. In Canada, through the acquisition of CAMCO, products will be sold under the GE, Hotpoint, Moffat and McClary brand names, as well as private brands for leading department stores. In Mexico and Latin America, high-end

market leader and aggressively growth in North, Central and South America, by leveraging its brands through existing and new products.

Explanation

Mabe has leveraged its knowledge of GE corporate culture to behave like a turnaround specialist at its South American subsidiaries, which in many cases it bought from the founding family. Instead of following an incremental pattern, moving from pure trading to distribution and finally to direct investment, Mabe decided to form a group of managers capable of identifying appropriate targets and then managing them.[81] It has also invested heavily in design and R&D and introducing standard and homogeneous business practices at its various operations. [82] Over the last decade, Mabe invested over a billion US dollars to modernize its plants, and currently devotes about 1.5 (1997 data) per cent of its total sales to R&D. Faced with an inadequate distribution system, Mabe has invested to improve its logistic supply chain and is planning to expand the system outside Mexico. Moreover, as GE had done with its own suppliers, Mabe convinced some key producers of parts and components to invest in South America – Beijing Kendy Co. Ltd., in particular, has a cooperation agreement for the acquisition of refrigerating spare parts.

It is interesting to observe that this proximity to a firm that, probably more than any other, symbolizes American capitalism does not extend to corporate governance. At press conferences to launch new products, it is a recurrent question whether Mabe intends to go public on the Bolsa Mexicana de Valores (BMV) – and it is a standard answer that no, thanks, the company "descarta totalmente financiarse a través de la cotización, pues cuenta con el flujo necesario para la consolidación de sus operaciones".[83]

NAFTA has driven the growth of Mabe, and of the Mexican HA sector, over the past decade. Mexican exports of refrigerators jumped from less than US$ 100 million in 1994 to about 230 million in 1999.[84] By the early 2000s, more than one-third of all gas ranges and mini-refrigerators sold in the U.S. were being manufactured in Mabe plants (Hunger 2003). Mabe and GE claim that their side-by-side refrigerators can be found in one every four American homes.[85] With NAFTA, Mexico has been the principal manufacturing location for HA in North America. In 2004, Mexico exported US$ 623m two-door refrigerators to the US, where it has a 64.5% market share.[86] Major

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products are sold under the GE, Mabe and Easy brand names, middle market products under the Mabe brand name and middle and low-end products under local brand names such as IEM (Mexico), Regina (Venezuela), Durex (Ecuador), Inresa (Peru), Centrales (Colombia), Dako (Brazil) and Patrick-Fagor (Argentina).

[81] "Hasta la cocina latinoamericana", *Expansión*, 17 December 1997.

[82] For example, the use of PeopleSoft Global Payroll Mex 8.8 for salaries payment was first tested in Peru and later expanded to Venezuela and Colombia. Grupo Quanam de Uruguay.

[83] "Este año, primer repunte en ventas de línea blanca", *La Cronica*, 6 April 2004.

[84] About 94 per cent of HA exports are directed to the US market. Of these, some 17 per cent is eventually directed to Canada, Central and South America. The sector, which employs 60 000 workers, represents almost 30 per cent of the electrical manufacturing value added and 1.2 per cent of the whole manufacturing value added

[85] GE transferred production of low-margin minibar fridges to China in 2000. Mabe also closed its washing machines plant in Monterrey in 2003 where 550 people worked and moved production to San Luis Potosi.

[86] The trend is upwards, with shipments equal to US$ 226m in the first four months of 2005, a 36.4% annualized growth rate.

investments have been made by Samsung Electronics, LG, Electrolux, Whirlpool, and Maytag (Table X). Some American suppliers of GE also decided to invest in Mexico. Beach Mold & Tool (BM&T) has factories both in Querétaro (where it makes 110 different components, from door handles to trays and drawers and San Luis Potosí. REHAU also has a plant in Celaya to develop the top-range Quantum refrigerator jointly with GE and Mabe and provide just-in-time components. BM&T opened its Querétaro factory when Mabe decided to establish a new plant in Salvatierra, which they should have supplied. When Mabe decided not go forward with this plant, BM&T, which had already aquired molding equipment and hired employees, had to find new customers and began to supply Valeo Sylvania, Moulinex and Seaquist Closures.

The company has invested to modernize and improve the productivity of its supply chain management. In the early 1980s, the investment in training blue- and white-collar staff and in equipping the Queretaro plant with IT was possibly larger than in any other Mexican joint-venture at the time. According to company sources, each worker is entitled to three weeks of training per year.[87] Mabe has also integrated the 6 Sigma quality control program at every level of operations, implemented a "just in time" supply system with major suppliers to reduce inventory costs, adopted a standardized purchase and sale accounting control mechanism to maintain low inventory levels and adopted a flexible work week system that allows for employment level fluctuations based on market demand. Mabe has contracted one of the leading US provider of dynamic value chain management solutions (i2 Technologies) to develop and implement its eBusiness strategy. The new system aims at establish through the Internet a closer relationship with its distribution channel and to optimize its supply chain management from manufacturing to distribution, marketing, sales and delivery.[88] Serviplus, the product service division, is expanding to provide after-sales support service to customers in all countries where Mabe products are sold (in the US after-sales support to customers is provided by GE).

If the development of a competitive Mexican industry provides Mabe with opportunities, however, it also means losing domestic market shares to rival Asian brands.[89] This, plus the intent to become Latin America's predominant white goods company, inspired Luís Berrondo to turn to the Madrid office of Wolff Olins, now the independent Saffron (in which Wally Olins is a partner, along with Jacob Benbunan) in 1995. The goal was to express a fresher, stronger brand presence, both in the category and as a corporation. Saffron replaced Mabe's muted red swoosh-mark, reminiscent of Samsung's oval (but not as strong), with a confident, simpler logo it calls "congenial". Beyond the logo, Saffron provided a visual system of bright Mexican colours,

[87] At Mabe's refrigerator plant in Celaya, new hires – mostly young women from the countryside – are put through eight weeks of training that covers topics such as proper hygiene in addition to basic math. The state government covers half of the cost of the training program--which averages US$350 per worker--but it's up to Mabe to design and administer it. "Is the Magic Starting to Fade for Manufacturing in Mexico?", *Business Week*, 6 August 2001.

[88] The Entrega Directa ("Direct Delivery") enables customers to order appliances at Palacio de Hierro, one of Mabe's most important retail channels, using an interactive catalog. Once an order is placed, Mabe delivers the order directly to the customer, eliminating on-site inventory.

[89] Paradoxically, Samsung, one of Mabe's strongest competitors, decided to set up its new factory in Queretaro. As the Korean director explained, the choice of the location was motivated by the proximity to Mexico City (where almost 70 per cent of sales are made), but also by the pre-existence of Mabe's plants, which made it easier to recruit qualified and trained workforce and simplified procurement of raw materials and components. "Entrevista Ahn Jae Hack", http://www.manufacturaweb.com, 1 July 2003.

patterns and icons to create an appealing corporate personality "imbued with a bright sense of humour". MABE is now aggressively targeting the premium segment with new, more appealing products.[90]

6. The case of Haier

History

Qingdao Refrigerator Factory (the former name of the company) was set in Qingdao, a port city south of Beijing home of Tsingtao beer, in 1984 to manufacture refrigerators based on technology transferred from Germany's Lieberhaier.[91][92] Haier's sales have grown by 70 per cent a year on average over the past two decades to reach US$1.84 billion in 2004 (US$583 million in 2000) (Table x).[93] Chairman and CEO Zhang Ruimin played a pivotal role in the company's turnaround. Zhang gained government's approval to buy the production lines of Libher, a German company, and expanded beyond fridges into a range of white goods by taking over other moribund state enterprises including Qingdao Electroplating, Qingdao Air Conditioner, Qingdao Red Star, and the controlling stake in the Wuhan Freezer Factory. Although many such acquisitions were made at the behest of the national government and local authorities, Zhang has argued that he picked the firms according to the quality of the product mix and management and access to major markets.[94] By 1991 Haier was market leader in China and took the crucial decision to list in Shanghai and raise the necessary funds to build an industrial park to produce multiple products.

The company currently has 89 product categories and 13,000 SKUs (Stock Keeping Units) (15,100 varieties of items in 96 product lines in January 2005). Haier enjoys leading domestic market shares in washing machines (24 per cent), refrigerators (23 per cent), vacuum cleaners (18 per cent), and air conditioners (13 per cent). In addition, Haier has developed its own logistics

[90] By 2004, thanks to the results of research on the use of a new family of halogenated refrigerants that eliminate up to 90 per cent of the harmful environmental effects of the currently used chloro-fluoro compounds, Mabe earned the right to use "Sello Fide" energy efficiency label. In 2003 it won the national technology contest and in 2004 its washing system got the third place at the innovation technology contest of the Mexican Association of Directors of Applied Research and Technological Development

[91] Germany (through GTZ and Liebherr) and the United States (through EPA) assisted Haier to produce refrigerators that use hydrocarbures rather than CFC and HFC.

[92] In 1985 the Chinese government launched an international tender to build various plants to produce refrigerators in partnership with Chinese enterprises. Merloni Progetti won about a third of these projects, built a few plants, and provided technical assistance and training to local producers. When the government launched another tender to build washing machines plants, requiring that the foreign company enter into a formal partnership with the Chinese partner, Merloni decides to enter the Chinese market and started a joint venture with Haier. The Ariston brand was already well know in China and associated to "refrigerator" – although Ariston had never produced refrigerators and never authorised the use of its brand in China. Merloni (now Indesit) holds 30 per cents stakes in Haier Merloni Washing Machine Co. (QuingDao) and Haier Merloni Electrical Appliance Co. (QuingDao).

[93] *Fortune* data. Disclosure and transparency are a problem, however, lamented by partner companies as well. According to the company, overall revenues amounted to US$10 billion and overseas sales to US$1.2 billion in 2003. These figures are often mentioned in the press.

[94] If Haier attributes its success in large measure to the new value system it has sought to instil throughout the organization, when it took over the Yellow Mountain television factory in Hefei province, workers went on strike against the Haier culture and what it stands for.

capabilities to ensure efficient and cost-effective distribution throughout China, especially outside the major cities such as Beijing and Shanghai. As China's transportation and logistics infrastructure remains under-developed and plagued by bureaucracy, this is the only way for Haier to keep inventory levels low. Nonetheless, aggressively chasing large contracts and courting chain retail stores is pressuring margins. Although in 2004 Haier boasted higher margins on fridges and air-cons than many domestic rivals and the appliance arms of South Korean rivals, it still lags the 20 per cent for the appliance arm of Philips Electronics.

Haier has also moved beyond white goods into computers, mobile phones (in collaboration with CCT Telecom Holdings Limited, a Hong Kong-based integrated information technology services provider), and even interior design and pharmaceuticals. In 2002 Haier and Sanyo, Japan's third-largest consumer electronics maker, agreed to jointly market their products in China and Japan and one year later Sanyo started supplying cellphone handsets to Haier on an OEM basis. The Japanese company also makes own-brand mobile phones for China Unicom, China's second-largest mobile carrier. Haier is in talks with Thailand's Charoen Pokphand Group to build a plant in Qingdao that will make 8-in wafers used in computers and home appliances. The business logic is that of using production execution capabilities across a wide range of consumer durables, but the risk is to spread such resources too thin.

Haier realized early on that the benefits from economies of scale that derive from huge factories in China are often offset by the cost of being insufficiently responsive to fast-changing market signals.[95] The internationalisation process initially focussed on Southeast Asia, with investments in Indonesia, Philippines and Malaysia to produce refrigerators and air conditioners (Liu and Li 2002). Haier has 22 overseas plants, sales outlets in over 160 countries, and a US$15 million American headquarters in mid-town Manhattan – the 1924 landmark Greenwich Savings Bank Building. In 1999 Haier announced its intentions to locate in Steeplechase in Camden, South Carolina, thus becoming the first Chinese company to operate a US manufacturing facility.[96] The US$40 million, 300,000-sq-ft plant opened in 2000. One of the plant goals is establishing a supplier base in the U.S., as opposed to using its parent company's Chinese connections. Haier is currently getting pre-coated steel from a major U.S. steel supplier, and Morton Custom Plastics, Inc. in St. Matthews, SC, is doing most of Haier's injection moulding work. Much of the company's extruded plastic sheets are also supplied domestically, although it also utilizes sources in Asia. Haier has said it owns enough land to build seven more plants in the surrounding area.[97]

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[95] "The objective of most Chinese enterprises is to export products and earn foreign currency. This is their only purpose. Our purpose in exporting is to establish a brand reputation overseas. (…) [Many Chinese enterprises] will usually explore easier markets first and difficult markets later. (…) But our strategy is the other way around: we go to easier markets after we first penetrate difficult markets such as the United States and Europe". Interview with Zhang Ruimin, *The McKinsey Quarterly*, No. 3, 2003.

[96] Since 1995, five more companies, including APT, Howden-Buffalo, Kawashima USA, SC Yutaka, and Target, have located operations in Kershaw County, and nine companies, including BBA Nonwovens, Clariant, Dana, DuPont, Kendall, Mancor, Oak Mitsui, SCYT and Wateree Textiles, have undergone expansions. The companies have invested some US$576 million and created 2,554 jobs. See "Alliance aids drive for county economic development", *Camden Chronicle Independent*, 10 January 2005.

[97] South Carolina, whose population is less than 1 per cent Asian and whose exports to China rank 22nd in the nation, has become the leader in a race among the states to attract Chinese manufacturers. Chinese companies have invested more than US$126 million in South Carolina-based operations and now employ almost 1,250 people in the state. China State Construction and Engineering, that built the Haier factory, saw so much potential for success that it

Haier also invested €80 million in Europe in 2001-04. It purchased the 250,000 units per year refrigerator plant belonging to Meneghetti Equipment in Padua, also buying Meneghetti-produced built-in ovens and hobs to market them in China under the Haier brand name. Haier saw this acquisition as providing the opportunity to develop new products from a European manufacturing base. Also in Italy, in 2000 Haier Europe Trading opened a warehouse facility in Varese, core of one of the country's white goods' districts, in view of tapping its rich availability of specialized suppliers and managers. From Varese, Haier Europe also runs logistic activities through four distribution centres located in Spain, United Kingdom, Holland and Italy respectively. A TV plant in Hungary is planned for 2005.

Haier is also present in many emerging markets. Chinese appliances majors have two options in India, either to join hands with regional players which need new products to differentiate their offerings, or to go alone and aim at a pan-India reach in competition with companies such as Videocon or Onida, which have themselves multinational ambitions After a disappointing experience in a 30:70 per cent joint venture with tube maker Hotline, Haier now operates two leased factories in India and is planning to open a new US$3-5 million factory with a capacity for one million TV units. In October 2004, Haier announced it is opening an R&D centre and factory in India, where it also has five Plant Haier showrooms. It has launched a detergent-free washing machine that works on the principle of membranous chemistry and uses electrolysis and activated water treatment technology. In Africa, where Haier billboards are conspicuous in many cities, Haier operates SODINCO (Société de Développement Industriel & Commerciale) in Algeria.[98] In 2005 a 20,000 m² factory was opened in Amman, Jordan, to produce both for the regional market and the EU.

Revenues from overseas operations were US$314 million in 2004. While organic growth has been impressive, the great leap forward demands an acquisition. In June 2005 Haier in association with US private equity groups Bain Capital and Blackstone presented a "indicative offer" for Maytag, valuing the company at US$1.28 billion in cash. The offer came after Brandes Investment Partners LP, a California company holding 10.5 per cent of Maytag stock, said it would vote against the proposed purchase of Maytag by Ripplewood Holdings and three partners for US$1.13 billion in cash and assumption of US$975 million of debt. Haier envisaged keeping the sales and distribution teams of Maytag, a highly unionised company in the US while moving manufacturing to China. The board of directors of Maytag had approved the Ripplewood Holdings offer. In July Whirlpool unexpectedly made a third offer, which people involved . The Chinese withdrew from the bid battle because of concerns over price, the complexities of integrating the two businesses, and fears of a US political backlash. According to people close to the negotiations, the inability to navigate rapidly through the pitfalls of a cross-border takeover battle had also created stress within Haier.[99] In August Whirlpool and Maytag signed a definitive merger agreement in which Whirlpool will acquire all outstanding shares of Maytag in a cash and stock merger valued at US$1.44 billion.

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opened a three-person operation in in the Palmetto State. This has grown to about 25 employees and recently bid successfully on a contract to build a school. Others include Techtronics, a Hong Kong-based tool company, whose operations in the state (OWT Industries in Pickens and Ryobi Industries in Anderson) employ 1,874 people.

[98] SODINCO was created in 1999 by Tunisia's GMH, jointly with the Maghreb Private Equity Fund.

[99] "Price concerns a factor in Haier withdrawal", *Financial Times*, 21 July 2005.

Explanation

The personal imprinting of CEO Zhang on Haier is a distinctive feature of the company trajectory. His "militaristic" style of management is legendary: he once ordered the smashing of 76 faulty refrigerators with a sledgehammer – now preserved for its symbolism in the company's museum.[100] From that day, 'quality supreme and sincerity forever' became the company slogan and has become a core value on which the company's new routines are formed. In the mid-1990s Zhang Ruimin introduced the vision to turn Haier into one of the world's top three home appliance manufacturers. To unleash the entrepreneurial energies of the workforce and compete on the basis of knowledge, he constructed so-called "accountability chains" from the market directly into those corporate services that typically never see the customer or feel the market forces. Today Zhang, rated one of the 25 most powerful business people outside America by *Fortune*, is an alternate member of the Communist Party Central Committee — a rare honour for a businessman which was celebrated by releasing the *Shou Xi Shi Xing Guan* (CEO in Chinese) movie. Haier, as Lenovo and a few other similar companies, is entrusted with a mission to become an internationally-known champion.

Outside the staff canteen at Haier headquarters is a "hit chart" with the names of all Haier's 80 divisional chiefs. Beside each name is a percentage figure, which is their latest monthly performance rating, and an arrow pointing up or down. Under Zhang's so-called 10/10 policy, the top 10 per cent are singled out for rapid advancement while those consistently in the bottom 10 per cent are marked for demotion or the sack. In the past year, 13 of the 80 top executives have fallen off the board and been replaced.[101]

In its quest for technological excellence, Haier had been a heavy and early user of ICT. An Enterprise Informatization Development Plan was formulated in 1992, which emphasised the use of CAD systems.[102] The website was launched in 1996, the enterprise Intranet and Extranet in 1997, and by 2000 all raw materials purchases were on the Internet. Haier Moulds, which specializes in the design and manufacture of high-precision and complex plastic injection moulds, purchased the first of seven Cimatron seats in 1994.[103] In August 2000, the Ministry of Science and Technology granted Haier Moulds an honorary title of "National Model Enterprise in CAD/CIMS Application".

Haier has so far concentrated on niches – it claims 30 per cent of the market for small fridges and half the market for wine coolers in America, and a tenth of Europe's air-conditioner market. To continue to grow Haier will have to penetrate larger and more established white-goods markets, such as those for full-sized refrigerators (where its market share in America is 2 per cent only) and washing machines. Haier lacks the R&D and design skills of Western rivals – although it spends 4 per cent of revenues on research, it employs just ten researchers in America. The company is probably the most innovative Chinese firm, but it still remains highly dependant on foreign key components (Liu and Li 2002). Additionally, competitors have filed patent design infringement

[100] "China's Haier Power", *Fortune*, 15 February 1999.

[101] "Making a name for themselves", *The Sidney Morning Herald*, 18 October 2003.

[102] www.ecdc.net.cn/newindex/chinese/page/sitemap/reports/IT_report/english/08/02.htm.

[103] A sister subsidiary, Haier Equipment, has two additional seats.

complaints. Haier is now creating local product-development teams in Tokyo and the U.S. to differentiate its line and move upmarket. In Japan, for instance, Haier offers washers that use less water, are quieter, and are narrow enough to fit cramped Japanese homes. R&D activities have been sub-contracted to other firms – two in Australia and in France for mobile telephony, one in Korea for TVs. Haier is working with Helicomm to integrate IEEE 802.15.4 and ZigBee wireless communications into products and has an ongoing co-operation with Ericsson to develop home electrical appliances using bluetooth technology. In January 2005 Haier and ON Semiconductor (one of the world's largest suppliers of power management devices) inaugurated a joint power laboratory at Haier's R&D centre which will focus on providing a single, standardized ac mains input voltage platform that can equip all Haier's next-generation products. Haier is currently in talks with Sanyo and Samsung over the co-development of network-enabled digital appliance operations.

For Haier and other Chinese brands of consumer durables such as Konka, the 2008 Beijing Olympics is a major opportunity in the transition from OEM to OBM, like the Koreans managed at the 1988 Seoul Olympics. Brand-building, however, demands very different skills from technological upgrading and manufacturing excellence, and few Asian firms have achieved this. In the past, most of its ads were limited to brand promotion on billboards and airport luggage trolleys, and different logos were used for different purposes. Haier and GK Design, a leading industrial design consultancy firm based in Tokyo, set up Qingdao Haigao Design and Manufacturing Co.[104] Haigao started to carry out research on consumers' habits in the country, going out to rural and semi-urban areas to collect information on people life style. On the basis of this evidence Haigao has drawn Haier's visual identity and designed the new logo. According to a 2005 worldwide survey of *Financial Times*' readers, Haier has the strongest corporate brand of any Chinese company – it was voted top in all categories.[105] In November 2005 Haier was one of the three brands officially designed as "world famous" by the China State Administration of Quality Supervision, Inspection and Quarantine.[106] Haier now wants to reach global shoppers directly and is starting to do consumer advertising – even if the company's first effort, an ad in the September 2002 issue of *Good Housekeeping* for the Access Plus freezer, looked old-fashioned.[107]

Enhancing the distribution network constitutes an additional problem. Haier sells products in Japan through a tie-up with Sanyo and sells in Taiwan through an alliance with Sampo. In South Korea, on the other hand, it has so far failed to sell its goods to Himart, the country's biggest electronics store chain, which is worried by low brand recognition for Korean consumers, stiff competition with Samsung and LG, and poor after-sales service networks. In France, IT Haier's sole distributor went bankrupt a few weeks after securing the right to use the trademark.

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[104] This paragraph is based on an interview conducted in Tokyo on 17 July with Kenji Ekuan and Michio Kinoshita Kenji Ekuan, one of the world's most famous industrial designers, had been approached by Haier in 1984 after giving a lecture in Beijing. At that occasion he had espoused his philosophy and the crucial importance of highlighting local specificities and adapting the product to the needs of the local communities..

[105] The survey measured perceptions of quality, trustworthiness, innovation, and management, as well as branding. While Haier came tenth only in current brand awareness, it was ranked second for future potential. See "Haier tops China brand survey", *Financial Times*, 30 August 2005.

[106] There are 925 officially-designated "Chinese famous brands".

[107] "China's global brand?", *The Economist*, 18 March 2004.

Finance is an additional issue. In 2004 Haier injected the 41.9-per cent stake in A-share Qingdao Haier Refrigerator, as well as the unlisted refrigerator and air-conditioner businesses, into CCT Holdings Ltd., a small listed firm in Hong Kong. Now renamed Haier Electronics Group, of which in turn CCT Telecom holds a 23.98 per cent stake, this company will be used for overseas acquisitions. A related headache is hiring good managers, since Haier cannot pay as well as foreign rivals and cannot offer stock options. Haier's autocratic management style has also been something of a culture shock to its American employees.[108] Industrial relations at Haier Italy have also been very tense, with workers blaming Chinese managers for improvisation and the latter firing a trade union leader.[109] On the other hand, the company's CEO has argued that the reluctance of Haier's American managers to adhere to his ambitious targets reflects "the cultural gap or the communication problem" (Zhang 2005).[110]

7. Discussion

Upgrading is conditional on the peculiar technological features of the industry, in particular, the degree of tacitness or codified nature of knowledge, the dependence on basic or applied research, the degree of appropriability of the innovation. In appliance manufacturing technology is mature and can be easily adopted from abroad. Margins have been squeezed in the past few years as the price of inputs such as stainless steel, a fashionable finish for fridges, and oil, used for plastic shelving, has risen sharply. Distribution channels moreover are changing fast. Retail concentration and product harmonization impose a different strategic game: shorter product cycles, common product platforms, strategic sourcing, and so forth. This may drive more players toward seeking greater scale.

The main elements currently reshaping the industry are hence consolidation, delocalization, and outsourcing. Lead companies are moving from a traditional focus on "doing things better," which was an idea heavily dependent on cost savings, to a greater emphasis on "doing better things," specifically with the consumer in mind.[111] By refocusing marketing and service efforts on the customer, manufacturers are hoping to move consumer purchases to higher-end products, where the margins are higher. The three companies analyzed in this paper have followed somewhat similar trajectories to surf on such broader industry trends.

They all begun from a strong domestic basis, gained experience through OEM contracting and joint ventures with foreign companies, deployed resources to start exporting as OBMs, and are now increasingly active as foreign investors. Strategic and long-standing alliances with a leading OBM and, in some cases, with specialised component suppliers helped with building or upgrading existing production plants, transferring technology, introducing new management techniques and training employees. This strategic alliance, combined with production commitments under OEM

[108] "Haier Reaches Higher", *Fortune*, 12 September 2002.

[109] "Il padronato «giallo»? Riga dritto o ti licenzia", *Corriere della Sera*, 18 October 2004.

[110] A 1998 Wanxiang deal to buy Guidion Manufacturing in Muskegon, Michigan, fell apart when its union balked at the Chinese suitor's insistence on slimmer benefits. The engine-parts company went bankrupt, dealing a blow to the Muskegon economy. See "China Investing in Rust-Belt Companies", *The Wall Street Journal*, 26 November 2004.

[111] "2004 IATC - A New Perspective", *Appliance Magazine*, May 2004.

contracts, which allowed achieving economies of scale, helped them to overcome the obstacles related to unsophisticated and (at least initially) sluggish domestic demand.

Nonetheless, upgrading in GVCs has a far-from-linear nature. Knowledge transfer from OBMs to OEMs is not an easy, nor a rapid process. That each of the three companies had a strategic intent, had set for itself an ambitious goal – Haier wants to become a *Fortune 500* corporation, Arcelik wants to become the xth European producers, Mabe wants to be the leading appliance *multilatina* – and could access the necessary resources to achieve it, are the factors that made it possible to commit to a massive and sustain effort to gain the necessary capabilities. Faced with inadequate infrastructure and logistics, each company also found sometimes innovative solutions to manage logistics.

As this paper has documented, EMNCs may follow quite different patterns to reach, or at least approach, global competitiveness.

- Arçelik has remained relatively focused on white goods, despite leveraging the membership in Turkey's largest diversified conglomerate. Its internationalization strategy has been two pronged – buying established brands in "old" Europe and adding manufacturing capacity in "new" Europe. It has also invested heavily in manufacturing, organizational excellence, R&D, innovation and quality. and
- Haier has built up an impressive variety of product lines and varieties, a choice that can be explained by the fact that China, despite very high growth rates over the past two decades, remains a poor country with weak infrastructures and institutions. Vertical integration is therefore an apt strategy to offset the lack of some key markets and associated sunk costs can be better recovered by expanding product range. Haier has also started exporting to OECD markets and investing overseas (especially in Africa and the Middle East where no competitor was present) at an early corporate age. The major risks are related to overstretching, both geographically and functionally, especially in view of the well-documented difficulties that Japanese and Korean investors have had in the past in operating multi-country production operations. The company still relies heavily on foreign components and technology. Although listed, it shares with other Chinese champions a close relationship with public sector institutions.[112]
- Mabe, finally, has made the most of geographical and "psychic" contiguity with the United States, partnering with one of its most celebrated enterprises, General Electric, and building in the process the necessary skills to expand at a later stage beyond the Mexico market and into South America. The key issue here is scale and capacity to rapidly develop new products as demand starts to grow and become more differentiated. Mabe has been able to interpret the Latin American *gusto*, while at the same time producing stoves to US taste.

One of the key observations from the case studies is that building a brand and a distinctive image is a key challenge for companies from emerging economies. This aspect receives preciously little emphasis in the literature (e.g. there is no "brand" entry in Matthews 2002). Manufacturing companies demand designers with strong creative skills who are capable of both identifying new

[112] AHAM has argued that, while Haier is one of its members, the China Household Electrical Engineering Association does not still allow U.S. companies to join as members. AHAM has been successful in having provisions eliminated for Chinese distributors which also happen to be government agents.

ways in which people can interact with technology and strategies to design a creative identity. Integrating these tasks into the corporate strategy is always difficult – indeed particularly so for companies which have strong engineering-driven personalities (often the founder or the heirs) at their helm Cultural positioning and framing become crucial factors in achieving sustainable success. Front-end design activities driven by contextual-based research and reflective design practice (research, positioning/framing, and concept generation) will become increasingly important for maximizing future brand experiences.

In this endeavour, Arçelik, Haier and Mabe have followed similar approaches – long-term relationships with OECD-based specialists – and the pairings seem to depend on the degree of psychic distance. Differences, however, are even more interesting. According to GK Design, Haier chose a Japanese firm over, for instance, an American one because of cultural affinity, and yet interviews with the former suggests that the latter's ambition to grow rapidly put strains on the relationship, as the haste may imperil attention to factors that GK Design considers important.

A lessons emerging from leading HA manufacturers, is that success depends on firms' internal resources as much as it does on the collective efficiency of the cluster in which they operate and are imbedded. The degree of such efficiency reflects the availability and type of horizontal and vertical relationships with specialised suppliers, customers and retailers, as well as public policies. The availability of efficient components suppliers (electric motors, compressors) is fundamental for the assembler to stay competitive. In this respect, Eastern European countries (especially Poland) have good suppliers. This is not the case in Russia yet. Turkish suppliers are OK but not yet as competitive as the Polish ones. The success has also led to emergence or entrance of new domestic players in the market. In Turkey Vestel, a Turkish-Cypriot OEM producer of TV (which is now the major OEM TV supplier in Europe) is moving into white good production. They were once partners of Merloni.

8. Conclusions

The focus of this paper has been on the process of corporate internationalisation and on firms' linkages with their home countries and final consumer markets. These companies have successfully upgraded from OEM to OBM status, becoming leader on the domestic market and establishing themselves as regional player with global ambitions. As the previous section highlighted, their success lies in a combination of elements: strategic alliances, investment in key assets and branding, and strong vision.

As EMNCs – Arçelik, Haier, and Mabe, in particular – now start to invest in other developing countries, the impact of their behaviours on the host economies becomes by itself worth of additional research. What upwards and downwards linkages do they establish? How effective are they proving as instigators of changes? Is there any notable difference in their behaviours compared to those of traditional OECD appliance manufacturers that can back the claim that South-South investment is "development-friendly"? Further research at the OECD Development Centre will explore these issues. In the Marshallian tradition, grounding analysis in the direct observation of production processes and in the practical experience of industry enhance the scientific foundation of economics and its social effects.

What are the implications for other OEM firms which aim to upgrade to OBM status? What lessons can be learned? Some Asian (and far fewer) Latin American firms have entered the ranks of first-tier clothing, electronics, and auto suppliers with ODM (original design manufacturing) capacity. A select few, such as Samsung, have emerged as OBMs (original brand manufacturers), but the vast majority remain second- and third-tier producers of standardized commodities. If firms from emerging, transition, and developing economies are to grow and enhance their profitability, they will need to vie for the role of first-tier suppliers for lead firms, to operate on a global scale, and, in certain instances, to co-locate plants near the facilities of lead assemblers. Developing research and original design capability can further strengthen competitiveness, enable firms to take responsibility for entire modules, and eventually make a transition to original brand manufacturing on a regional or global scale.

Although competitiveness will be determined by the performance of firms, converting "strategic options into reality [will depend] on policies, institutions, and politics" (Doner, Nobel, and Ravenhill 2004). Government investment in information technology infrastructure can assist in the upgrading process, but the principal bottleneck is the shortage of skilled workers and research personnel. Investment in human capital and R&D by local firms—although geared more toward learning—are necessary to absorb technology from overseas, to maximize the spillover benefits from FDI, and to start the cycle of domestic innovation.

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Table 1. The World's 10 Largest Appliance Manufacturers

Company	Country	Sales 1990 (ranking)	Sales 2004 (ranking)
Whirlpool	United States		
Electrolux	Sweden		
GE Appliances	United States		
Matsushita	Japan		
Bosch-Siemens Hausgeräte	Germany		
Merloni/Indesit	Italy		
Maytag	United States		
LG	Korea		
Haier	China		
Arçelik	Turkey		
Fagor	Spain		

Top ten makers of large kitchen appliances

	Units sold (thou)		Market share	
Companies	**1999**	**2000**	**1999**	**2000**
Whirlpool	32,104	34,085	11.3%	11.3%
Electrolux	23,113	24,782	8.1	8.2
General Electric	14,523	14,952	5.1	4.9
Bosch-Siemens Hausgeräte	12,344	13,506	4.3	4.5
Samsung Electronics	7,277	8,593	2.6	2.8
Haier	7,986	8,346	2.8	2.8
Private label	6,107	7,391	2.2	2.4
LG Electronics	5,556	7,243	2.0	2.4
Matsushita Electrical Industrial	6,184	6,287	2.2	2.1
Sharp Electronics	6,080	6,234	2.1	2.

Table 2. How competitive pressures are changing the value chain: the case of Merloni

Type of components	"Fordism"	"Toyotism"
Passive = mainly connected to structural or aesthetical functions, and thus without moving parts (e.g. plastic shell, gasket, cable, etc.)		
Active = mainly dedicated to deliver control or energy functions within a white good (e.g. engine, compressor, controller, timer, etc.)		

Arçelik awards in foreign markets

European Commission	Granted a Green Dove award in 1996 for attention to the environment in design and production and named the Blomberg refrigerator Europe's "Most Energy Efficient" in 2004.
Germany	Based on functions, technical features and practicality, *Stiftung Warentest*, recommended the Beko GS 5543 dishwasher model as the best product due to its "performance and price" balance. Blomberg's WARF 1560 washing machine received Plus X best design award in November 2004. Design Centre North Rhine Westphalia gave Blomberg's Logitronic Dishwasher GSN 1580 X the red dot award 2005 for innovativeness and outstanding design.
UK	*Which* recommended the Beko LSA 426W refrigerator as the "best choice" in the categories

	of cooling performance and practicality. Energy Saving Trust (EST) recommended the Beko 3761F and 3762F dishwasher models as the best model in the category of energy efficiency.
Belgium	The Beko D 8879 FD dishwasher was chosen by *Test-Achats* as best buy for excellent price-performance ratio.
US	Best Presentation Award at the 1999 Society of Plastics and Polyurethane Industry. "Design Procedure and Numerical Analysis of Air Flow Channels for a Tumble Dryer" by Kemal Sarioglu, Levent Akdag, Deniz Seker, and Ewald Weber received an Award of Excellence at the 2004 International Appliance Technical Conference.

Table 1. The Innovation Profile of World's 10 Largest Appliance Manufacturers

Company	R&D spending	US patents granted 1995-2005	Number of IATC papers	Stock of industrial robots
Whirlpool			10	
Electrolux			3	
GE Appliances				
Matsushita				
Bosch-Siemens Hausgeräte			3	
Merloni				
Maytag				
LG				
Haier				
Fagor				

	Refrigerators			**Washing machines**		
	Unit sales, 2004	**Unit sales, 2009**	**% growth**	**Unit sales, 2004**	**Unit sales, 2009**	**% growth**
US	15,252	17,705	16.1	8,274	9,773	18.1
China	9,741	14,270	46.5	12,245	20,977	71.3
Brazil	4,951	5,940	20.0	1,151	1,465	27.3
Japan	4,840	5,169	6.8	3,954	4,311	9.0
Germany	3,971	4,351	9.6	2,550	2,866	12.4
India	3,884	5,902	52.0	1,662	2,705	62.8
UK	3,452	3,876	12.3	2,122	2,384	12.4
France	3,146	3,494	11.1	2,323	2,638	13.6
Russia	2,359	2,992	26.9	1,725	2,308	33.8
Turkey	2,318	3,004	29.6	1,536	2,143	39.5
Source: Euromonitor, Economist Intelligence Unit. Ranked by top ten markets for fridges						

ARÇELÝK A.Þ. ÇERKEZKÖY VACUUM CLEANER AND MOTOR PLANT

	Vacuum Cleaner	
1965		Established as "Türk General Elektrik Endüstrisi".
1966	Production of the first Arçelik vacuum cleaner with Hotpoint license.	Refrigeration components and washing machine motor production.
1969	Production started in Çayýrova Plant with bucket type model.	
1979	Vacuum cleaner production moved to Ýzmir.	Named as "Türk Elektrik Endüstrisi A.Þ." after GE sold its shares to the Turkish partners.
1981	Production with Siemens licence.	
1984		Vacuum cleaner motors production with Siemens licence.
1992	New plant in Ýzmir.	
1993	Production with Sanyo licence.	ISO 9001 Certification.
1994		Vacuum cleaner motors production with Sanyo license.
1995	First Vacuum Cleaner Plant design carpet Washing machine. ISO 9001 Certification	
1997	Technology Award Finalist with "X in 1". TÜSÝAD-KALDER Quality Award. SGS-YARSLEY ISO 14001 Environmental Management System Certification.	M4, first Motor Pump Plant design washing machine motor production. Technology Award Finalist. Ýstanbul Chamber of Industry Environment Prize.
1998	Flexible production with new assembly lines. Capacity reached to 1.000.000 vacuum celeaners / year.	TÜSÝAD-KALDER Quality Prize. SGS-YARSLEY ISO 14001 Environmental Management System Certification.
1999	Commencement of Vax-England export.	EFQM European Quality Award finalist. TÜSÝAD - KALDER Quality Prize. Merge with Arçelik A.Þ.
2000	New dry compact vacuum cleaned in co-operation with LG. EFQM Quality Prize.	
2001	Factory moved to Çerkezköy. New dry "Millenium Series".	Factory moved to Çerkezköy.

Table 1. Global production of major “white goods”

Dishwashers

Dryers

Freezers

Microwave Ovens

Ranges

Refrigerators

Washers, Automatic

Water Heaters, Electric

Water Heaters, Gas

Water Softeners

	Arçelik	Haier	Mabe
Ownership	Private/conglomerate/family	Public	Private/family
Horizontal diversification	Medium	High	Low
Vertical diversification	High	Low	Low
Domestic dominance	High	High	High
Patenting intensity	High	Low	Medium
Geographical reach	Regional	**Global (?)**	Regional

Major foreign investment in Mexico – the case of home appliances

Samsung Electronics	En 2003, invirtió 50 millones de dólares en la construcción de una planta de ensamblado de refrigeradores y sistemas de aire acondicionado en el Parque Industrial Querétaro, en el centro del país. Directivos de la firma coreana estimaron que las ventas anuales de esa fábrica sumarían unos 80 millones de dólares al año, aunque por las características de ese proyecto, calcularon que la inversión escalaría hasta 300 millones, en un plan programado hasta 2008.
LG	En 2003, también inauguró una nueva línea de producción de refrigeradores en Apodaca, Nuevo León, cerca de la ciudad de Monterrey. Con esa ampliación, en la que invirtió 35 millones de dólares, su capacidad de producción se incrementó a 700 mil unidades al año.
Electrolux	En Julio 2005 puso la primera piedra de una nueva planta de refrigeradores en Ciudad Juárez, donde invertirá 150 millones de dólares y empleará a unas 1,500 personas, al tiempo que cerrará una fábrica similar en Greenville, Michigan. La empresa estima que obtendrá un ahorro anual de 81 millones de dólares en costos. Electrolux ya emplea a 1,300 trabajadores en Ciudad Juárez en una planta de su subsidiaria Eureka, donde se fabrican partes para aspiradoras.
Whirlpool	Pasará parte de su producción de Fort Smith, Arkansas, a una nueva planta en Ramos Arizpe, un proyecto en el que desembolsará 200 millones de dólares, y que iniciará operaciones en 2006 y dará empleo a otras 1,500 personas.
Maytag	Continúa el proceso para trasladar su planta de refrigeradores de Galesburg, Illinois, a la ciudad mexicana de Reynosa, en una operación de la que aún se desconocen los detalles.

Table x. Arçelik – Main Financial Data

in €m

	Average 1990-94	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Gross revenues					1039	1115	1293	1071	1571		
Of which (in percentage)											
Domestic market									54		
Foreign markets									46		
Operating income					30	82	94	10	112		
Exports					165	201	229	295	725		
Imports											
Net balance											
Investment											
Research & development											
Number of employees								5717	9349		
Revenues p/employee (‘000)											
Memorandum items: values in millions of chained 1996 dollars											
Gross revenues											
Exports											
Imports											
Research & development											

Table x. Haier – Main Financial Data

in US$ m

	Average 1990-94	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Gross revenues											
Of which (in percentage)											
Domestic market											
Export											
Net earnings											
Exports											
Imports											
Net balance											
Investment											
Research & development											
Number of employees											
Revenues p/employee (‘000)											
Memorandum items: values in millions of chained 1996 dollars											
Gross revenues											
Exports											
Imports											
Research & development											

Table x. Mabe – Main Financial Data

in US$ m

	Average 1990-94	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Gross revenues											
Of which (in percentage)											
Domestic market											
Export											
Net earnings											
Exports											
Imports											
Net balance											
Investment											
Research & development											
Number of employees											
Revenues p/employee ('000)											
Memorandum items: values in millions of chained 1996 dollars											
Gross revenues											
Exports											
Imports											
Research & development											

Table 2 Patents granted to HAM

	Arcelik	Arcelik Beko	Arcelik total	Mabe	Haier	sources
USA	8	16	24	189	40	http://patft.uspto.gov/netahtml/search-bool.html
Europe	28	1	29	3	2	http://www.plutarque.com/plutarque/ and also "http://fr.espacenet.com/espacenet/fr/fr/e_net.htm"
World	541	48	589	107	1494	http://fr.espacenet.com/espacenet/fr/fr/e_net.htm

	Total sales				Market share		Employees				R&D spending				R&D employees
	2004	Domestic (%)	2003	Domestic (%)	2004	2003	2004	Domestic (%)	2003	Domestic (%)	2004	%	2003	%	
Electrolux	17.0	3.6	14.3	3.5	21.6		72 382	9.0	77140	8.6	288	1.7	187	1.3	
Whirlpool	13.2	**63**	12.2	**58**	39.2		68000	**41.2**	68407	**45.3**					
GEA	**7.2**		**5.8**		23.2		18000								
BSH	8.5	22.9	7.1	25.9			34561	41.4	34400	43.0	203	3	182.6	2.9	1630
Merloni/Indesit	4.0	43.9	3.4	55.2			18138	31.2	19000	30.7					
Haier															
Arcelik	3.3		2.4	52.0			10841	18.4	9725	25.1					
Mabe	2.2	37	1.9	30			19133		15321						