

**The German Miracle Keeps Running:
How Germany's Hidden Champions Stay Ahead in the Global Economy**

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Abstract

Despite mediocre macro-economic performance of the German economy, German companies are successful players in global trade. This article explores the strategies of one of the pillars of this export success, the 'Hidden Champions'. Our empirical analysis focuses on their leading medium size companies identified by Hermann Simon in the early 1990s, and investigates their long-term progress over one decade. We show that these companies continue to prosper with family ownership combined with professional external management, strategies of market leadership in global niches and a persistent focus on operational effectiveness. Scholars and business leaders, in particular of companies based in other high-cost countries, therefore ought to consider German companies as source for lessons on how to succeed in the global economy.

Introduction

Germany's privately-held medium size companies have been a source of much envy and mystery. They have been a driving force behind the German miracle of the 1950's and 60's. In the mid 1990's the competitive strength of these 'Hidden Champions' featured in a high profile study by Hermann Simon, a German strategy expert.¹ In the new millennium, they continue their leadership as we will document in this paper. What are the secrets of success of these comparatively small, but globally competitive firms?

These firms prosper despite Germany's low economic growth of annually 2.1% over the decade 1994-2004. The German Economy has been called the "Sick Man of Europe" due to slow growth, an aging workforce, high unemployment, overregulated labor markets and high labor cost. Some leading economists² and business leaders have all but written off Germany as a location for business. For instance, the president of GM Europe once described his strategic options as "Out of Germany or Out of Business".³

Yet, this bleak performance is largely driven by sluggish domestic demand and declining investments. German exports are rising at a time when most other advanced economies lose export market shares to emerging economies in Asia and Eastern Europe. An influential French policy study thus named German companies along with Chinese companies as the winners of globalization.⁴ This success even defies a strong Euro, which is making 'Made in Germany' expensive on world markets. Collectively, German businesses have generated a trade surplus in 2006 of over US\$ 200 billion, which puts them ahead even of China and Japan – let alone the USA, who report a trade deficit of over US\$ 825 or 6.5% of GDP (Figure 1).

**** Figure 1 approximately here ****

The export is driven not only by large and well-known companies like Volkswagen, BASF and Siemens, but by many small- and medium-size enterprises (SMEs). Over 340,000 German companies export, and over 100,000 companies have some form of direct investment

abroad. We estimate that SMEs with annual revenues of less than € 1 billion account for about 40% of all German manufactured goods exports. However, not only German SMEs are prospering in global markets, similar success stories have been in large countries like the USA⁵ and small countries such as Denmark.⁶

We start from the work of Hermann Simon, who identified over 450 ‘Hidden Champions’ in the early 1990s, and analyzed over 200 in detail.⁷ These companies occupy global leadership positions despite their small size. We investigate the long-term evidence of their leadership by revisiting Simon’s set of firms and trace their development and strategies over a period of ten years.

Most of these companies are family-owned and based in small towns, yet they hold market shares of up to 90% in worldwide markets niches. Hauni (cigarette machines), Webasto (sunroofs and auxiliary heating systems for cars), or Dorma (door control hardware and systems; moveable walls) may not be household names, but they are leading global competitors in their respective industries.

We identify three elements shared by many of the Hidden Champions: First, they exploit the opportunities of private ownership by creating organizational cultures and practices that build on owner-entrepreneurs, and long-term relationships within the firm and with key external partners. Second, they concentrate their often limited resources on niche market segments that they can dominate worldwide. Their competitive positions are grounded in technology-based product leadership and close customer relationships. Third, they strive for operational effectiveness, continuously assimilating, attaining, and extending best practices.

We investigate the Hidden Champions using our database of Simon’s firms, in combination with insights from three recent studies of German companies with similar characteristics.⁸ As the name suggests, these companies are typically unknown outside their niches, mostly because they are private and relish their obscurity. German business law until recently made it relatively easy for companies to keep even basic data confidential.⁹ Our multi-

source multi-method approach aims to update our knowledge of these firms, and to relate Simon's popular work¹⁰ to contemporary strategy research.

The next section presents the evidence on German 'Hidden Champions': How did they develop over the past decade, and where do they stand today? We then proceed to discuss the strategies and practices of these firms. A case study of Alfred Kaercher illustrates the development of a world market leader in cleaning systems. We conclude with lessons for sustained success of medium-size firms.

Hidden Champions: Then and Now

The German word "*Mittelstand*" refers to a broad category of SMEs in private ownership. These companies usually share positive attributes like a certain nimbleness, long-term thinking, and concern for the interests of multiple stakeholders, including employees, suppliers and the regional communities in which they are based.

Official statistics suggest that SMEs with less than 500 employees and an annual turnover of less than € 50 million account for more than 99% of all German companies; they provide about 70% of employment in the private sector and create about 40% of turnover.¹¹ Simon uses a broader definition of Hidden Champions that incorporates qualitative aspects and a higher revenue limit.¹²

- First, they must occupy the number 1 or number 2 position in their world market, or the number 1 position in the European market.
- Second, they should not generate more than circa €800 million (DM1.5 billion). The median firm in Simon's sample had revenues of about €100 million, and exported slightly over 50% of its sales. Two thirds of the companies generated revenues over €50 million.

The revenues of four percent of them exceeded €800 million; yet they were included because they displayed characteristics typical for Hidden Champions.

- Third, a Hidden Champion had to have low public visibility.

The Hidden Champions are distinct from both small, mainly domestic family-owned businesses, and from large publicly-listed multinational companies. Many of them are large companies by most common statistical definitions, yet their private ownership, governance structure and organizational culture resembles SMEs.¹³

Ten years after Simon's work, the number of such companies has vastly increased. By 2006, more than 1,130 privately-owned companies matching Simon's criteria have been identified by the first author.¹⁴ Simon's popular book may in fact have contributed to this surge by firstly encouraging companies to identify themselves as a Hidden Champion, and by motivating others to adopt similar strategies. This increase in numbers highlights the vitality of this type of firm.

How have the Hidden Champions fared in the turbulent decade since the mid 1990s? Since detailed profitability data are for most companies still unavailable, we rely upon survival and revenue growth as key indicators for success. We have traced the companies mentioned by Simon from 1994 to 2004, and find that they outperform other businesses in Germany (Figure 2):

**** Figure 2 approximately here ****

- Hidden Champions have decoupled themselves from the slow growing German economy (2.1% GDP growth), and grew on average by 8.4% annually. This compares favorably to the average annual growth of German companies covered by tax statistics of 2.7%,¹⁵ and of the DAX 30 companies, Germany's largest publicly listed companies, which grew 4.9% annually over the same period.
- 82% of the Hidden Champions have defended or even extended their worldwide leadership, according to our estimates.¹⁶

- Even amongst the 18% of companies losing their leadership position, only a small number (about 6%) got into serious economic challenges leading to dissolution of the company.

Our investigation of the firms that have lost leadership positions suggests three key reasons for their underperformance. First, some companies faced substantial structural change in their industry due to new low cost competition. Clothing and textile manufacturers like Kunert and KBC and some textile machinery suppliers like Schoen belong to this category. A second group of companies could not cope with major technological and demand changes, mostly in IT-driven segments including consumer electronics (Fast, Hegner & Glaser and Hohner) and IT-based B2B products (Linotype and Wandel + Goltermann). A third group made serious management mistakes, notably by pursuing overly ambitious growth strategies. This can be fatal when industry growth slows, as a number of companies in the building products industry experienced, such as Glunz, Hornitex, Plettac and Roeder.

Yet success has been more common than failure among Simon's Hidden Champions. Some have grown so spectacularly that they are no longer hidden. Three companies stand out: SAP has become the undisputed world leader in business software;¹⁷ Fresenius developed into the world leader for dialysis-care; Wuerth became the world market leader in direct selling of fixing and assembly materials. In 1994, Wuerth already had revenues of €1.8 billion and was one of the largest companies in Simon's sample. He included Wuerth because it shares some of the key characteristics of the Hidden Champions. Wuerth achieved annual revenue growth of more than 25 percent over more than fifty years, despite operating mostly in mature industrial market segments. This growth can be attributed largely to its unique management model with more than 800 customer- focused profit centers.¹⁸

Since "private ownership" played an important criterion to identify Hidden Champions in 1994, it is interesting to note that most of these companies stayed private by 2004 (Figure 3).

About 15% of firms changed hand from private to public or private equity ownership, usually driven by generational change or substantial changes in financing conditions: the deep restructuring of the German banking system led to a significant tightening in lending conditions, raising the costs of loans and forcing companies to restructure their balance sheets.¹⁹

**** Figure 3: approximately here ****

The evidence of survival and growth of Simon's firms ten years later adds weight to his prediction that their strategies would succeed. Revisiting the successful firms ten years later provides an unusual form of evidence of the sustainability of their strategies in the global economy. In the next section, we elaborate how these strategies have been further developed throughout the decade.

**** Box 1 approximately here ****

Business Strategies for the Global Economy

Simon proposed ten lessons from his study of the Hidden Champions (Box 1). Some of them may appear to be common sense. Yet, he points to important enduring success factors that correspond to our own findings: (1) Hidden Champions benefit from ownership and governance structure based on family-business and long-term relationship with key stakeholders. (2) On this basis, they develop long-term strategies aimed at global niche market dominance, based on strategic positioning that combines superior product quality with a focus on customer needs. (3) These strategies are implemented with a persistent focus on operational effectiveness of the value chain.

Governance and management practices: "enlighted family capitalism"

Most Hidden Champions are privately owned, which shapes their organizational culture, and lays the basis for long-term development of business strategies.²⁰ German medium-size privately-held companies use distinct governance and management processes ("family

capitalism”) that contrast with publicly-listed companies run by external managers in the interest of anonymous shareholders:²¹

- The principal-agent problems typical for large public corporations do not arise if capital-majority and management are united either in one person or shared by family members. If external management is employed, the family keeps in most cases an important oversight role.
- The organizational structure is typically based on flat hierarchies and informal channels of communication following the personal style of the owner. Management and employees cultivate a high degree of mutual trust and loyalty, leading to an implicit “life-long” contract. This is reinforced by embeddedness in local communities in which the firms are located.
- In consequence, the corporate culture tends to resemble an “extended family” with patriarchal features and strong internal cohesion. Strategic and operational independence are highly valued, which leads to a preference for self-financing, and thus indirectly to a culture of frugality. Long job tenures are common at all levels, yet unions are not welcome, and co-determination is avoided or impeded. Plant-level works councils exist as required by German law, yet they focus on company-specific employee concerns, while minimizing external trade-union influence.
- Owners are often emotionally attached to their firm, which is typically an integral part of their self-fulfillment and the family tradition, rather than ‘just’ a financial investment. Their *raison d’etre* is thus not only to maximize profits but to secure the company’s existence for the next generations. Firms are designed to stay independent and to achieve multigenerational continuity.

The continuity of ownership and the absence of stock-market driven short-term financial pressures create a supportive environment for continuity of strategy. It allows the development of unique skills and assets, and it establishes a clear identity with customers, channels, and other outside entities, while strengthening the fit across the value chain.

However, family-owned companies face unique challenges, most notably with respect to intergenerational transfer of ownership and leadership within the family. A recent study of management practices comparing medium-size manufacturing firms in the USA, UK, France and Germany suggests that “primo geniture family firms“- those that pass management on to the eldest son - are significantly less well managed than those managed by the founder or by outside professional managers.²² Family firms that appoint professional external managers or chose the best manager from within the family were better managed. The study shows that German family firms are considerably more likely to employ outside professional managers in leadership positions than companies in the other countries analyzed (Figure 4).

Family ownership with professional management may thus combine the best of two worlds: family control ensures long-term investment horizon and a balanced stakeholder philosophy, while state-of-the-art management practices contributed by professional managers.

*** *Figure 4 approximately here* ***

Strategic Positioning: dominating global niche markets

Hidden Champions typically use the advantages of patient investors to pursue niche strategies that combine product specialization with geographic diversification. Such a strategy can lead to a competitive advantage and above-average returns vis-à-vis broadly based competitors *if* (a) the firm offers differentiated products and services, appealing to a particular segment of customers and (b) the value chain that best serves the target segment differs from that of other industry segments.²³

Most of the Hidden Champions have developed their specialization continuously, while some have restructured their portfolio to shift from domestic diversification to a global specialist

strategy, a phenomenon known as ‘globalfocusing’.²⁴ In their niche, they can isolate themselves from competition by serving the special needs of a very narrowly defined target segment. They may attain a temporary ”quasi-monopoly”, though markets are typically ‘contestable’: substitute products are available, and new competitors can be expected to enter the niche if it becomes sufficiently profitable for them.²⁵ In addition to continuously striving to improve their differentiated products and services, niche companies must therefore monitor their cost base to stay price competitive.

Scholars have taken limited interest in global niche players, despite their economic importance.²⁶ Globalization has enhanced their opportunities: the opening of markets has led to an increase in product variety, while the historical disadvantages in terms of economies of scale can be overcome through global leveraging of costs across geographic markets. Moreover, the technological changes that fostered globalization create new opportunities for niche players:

- New transportation technologies substantially lower the costs, and increase the speed and reliability of sea freight and air transport; thus enhancing global product market access and creating new opportunities for outsourcing parts of the value chain.
- Innovations in telecommunication and information technology facilitate global transactions and communications by reducing telecommunications cost to virtually zero, and increasing the ability to process the transmitted information. This enables even small firms to manage transnational production and sales networks. In addition, flexible manufacturing technologies and practices reduce minimum efficient scale requirements in many industries.²⁷

Hidden Champions are typically positioned as “value leaders”, combining superior quality of products and services with a careful attention to customer needs.²⁸ Many businesses may subscribe to such a positioning, yet the Hidden Champions back this strategy up with major resource commitments in R&D, sales and distribution:

Simon emphasized R&D-led innovation as an element of the strategies pursued by Hidden Champions: "Technology is the single most important factor behind the competitive advantages and the global market leadership of the Hidden Champions."²⁹ They have pioneered many new products or created new market segments. Once technological leadership has been attained through a radical innovation, it is extended through continuous and gradual innovation. Hidden Champions are typically active in traditional manufacturing sectors like industrial machinery and components, medical instruments and automotive parts. In these sectors, technological breakthroughs are rare, making incremental innovation strategies viable.

Simon provides limited quantitative information on R&D spending to support his claims,³⁰ yet a recent large-scale questionnaire survey provides quantitative evidence. Companies closely resembling the group of Hidden Champions were found to spend about 5% of revenues on R&D.³¹ This is a high percentage, compared to the R&D spending of the manufacturing companies among the 1000 largest R&D spenders worldwide ("Global Innovation 1000"). Large companies, active in traditional manufacturing industries similar to Hidden Champions spend on average only 2.2 % of sales on R&D, which varies from 1.1% percent for companies among the top 500 largest companies to 3.1% for companies among the lower half 500 companies.³²

Other indicators such as patent counts may underestimate this strength in technology because innovations often are not covered by patents. For example, Taprogge, a world leader for cooling water systems for power plants, holds over 400 patents and uses them aggressively to defend its market position. However, it uses patents only for hardware innovations but does not patent processes. The company believes that publishing patents would give competitors crucial insights.³³

Another pillar of the strategies of the Hidden Champion is their commitment to customer needs. They typically sell their products and provide customer service and training through wholly-owned distribution channels.³⁴ Rather than contracting out, Hidden Champions typically operate these networks themselves to ensure both quality of service and close customer contact.

This control over the value chain allows feeding knowledge from and about consumers into the process of continuous innovation supporting innovations that are incremental rather than disruptive. This innovation strategy requires deep knowledge of customers' needs, which is generated through direct customer contact. Simon reports that employees of Hidden Champions engage directly with customers twice as often as large German corporations.³⁵

For example, one CEO describes this customer interaction: *"We know all our customers in the world. Some of our people have been in China 100 times. We do everything ourselves. Sometimes I am asked how we can manage all this with only 280 employees and whether we shouldn't have sales agents. We categorically reject agents. We have our own offices and some of our best guys spend 80 per cent of the time traveling. That's how we cover the world."*³⁶

Wholly-owned sales and service subsidiaries are not only a vital source for innovations but an essential element of a strong and reliable service network. As product complexity increases, customers require more support in operating and maintaining the products. For many of the Hidden Champions personalized customer support services have become an important part of their value proposition. Recent estimates suggest that services like preventive maintenance and provision of spare parts account for 50% of revenues and more than 75% of profits in industries like machine equipment.³⁷

The competences supporting these niche strategies are often specific to an industry, but transferable worldwide. Business customers worldwide have similar needs, and similar technologies may help develop solutions for them. Knowledge of particular needs of a customer in one part of the world may help developing solutions for another customer in the same industry in another part of the world. Such global knowledge transfer is especially relevant for business-to-business markets where customer needs are more similar across locations.

A niche strategy thus allows Hidden Champions to exploit their industry-specific resources through a worldwide leadership position. At the same time, they can enhance industry-specific resources by strengthening capabilities through global operations.³⁸

- Serving multiple geographic markets from one production site permits MNEs to realize greater economies of scale in production.
- Global supply chains enable MNEs to take advantage of comparative cost advantages at different locations.
- Global distribution networks permit MNEs to serve global business customers requiring delivery of the same product at multiple sites around the world.
- Multiple research and development sites allow MNEs to tap into local knowledge clusters in different parts of the world.
- Exchange of operational experiences from one country to another may enhance the overall efficiency of each operation.

Global niche market leadership based on technology-driven products and global sales and service networks is thus a common characteristic of Hidden Champions. They build on competences specific to an industry but transferable and competitive on a global stage. Their strategies are implemented through persistent focus on efficiency.

Operational effectiveness: “Firing on all cylinders”

Targeting a global niche is an ambitious strategy for comparatively small firms. They need the support of long-term oriented investors and other stakeholders, and a persistent focus on enhancing operations. They thus emphasize continuous improvement of products and processes, in close interaction with R&D and customers. Hidden Champions typically succeed through persistent and coherent implementation of many small steps. Few if any engaged in large acquisitions and other risky game-changing strategic moves. This ‘business as usual’ yet ambitious strategy requires persistence:

International sales and distribution networks. Many Hidden Champions were early “globalists” that did not rest on their position but aggressively pursued large newly opening markets, especially in emerging economies. Our data suggest that they have on average more than doubled the number of their foreign sales and distribution companies over the ten years from six, as originally reported by Simon,³⁹ to 13 in 2004 (Figure 5). This is a remarkable number considering their small size, but reflects their global leadership ambition. In addition, most companies use agents as distributors in smaller markets, such that their products and services are often available in over 50 countries.

*** *Figure 5 approximately here* ***

Aggressive cost management including selective off-shoring. Hidden Champions may be “quasi-monopolists”, yet even so their market power is limited. New entry is always a threat, forcing companies to be not only innovative but cost competitive. A key element to ensuring cost competitiveness is the constant improvement of their cost position through selective off-shoring of lower value-added activities.

Hidden Champions have doubled the number of foreign manufacturing subsidiaries in the last decade to seven, with a main focus on low cost countries. In the mid 1990s, German Hidden Champions had a significant manufacturing presence in only two low-cost countries, Brazil and India. In 2005, they had a global footprint with on average three production plants in emerging economies. Eastern Europe and China have overtaken India and Brazil as main locations with over a third of the companies manufacturing east of the former Iron Curtain (Figure 6).

*** *Figure 6 approximately here* ***

However, off-shoring is only part of the success story, and in fact would not explain Germany’s persistent export surplus to which Hidden Champions contribute. Due to high labor costs, German firms have to be particularly concerned with labor productivity in their domestic operations. The above cited comparative study of management practices⁴⁰ finds that German

companies are particularly strong in shop floor operations with state-of-the-art lean manufacturing practices, and in target setting and performance management.

Recently, liberalization of the collective wage agreements led to the widespread adoption of “Bündnisse für Arbeit” (“labor pacts”), which allow firms to negotiate flexible pay and employment packages on a firm level even if they are part of the industry employers association and therefore bound by the collective bargaining agreements. About half of all German companies use these flexible arrangements to improve their cost competitiveness.⁴¹ Unit labor costs have declined in the last decade, which improved German price competitiveness by 20% compared to a benchmark of 20 large industrial countries.⁴²

Thus, successful Hidden Champions are improving operational effectiveness by assimilating, attaining, and extending best practices in key processes, while making best use of the opportunities of a global supply chain. These traits are further illustrated by the case study of Alfred Kaercher.

Case Study: Alfred Kaercher GmbH & Co. KG

Worldwide, cleanliness is seen as a typical German character trait. Alfred Kaercher GmbH & Co KG demonstrates how this traditional quality can be built on, modified and brought to world market leadership. This company, based in Winnenden, a small town near Stuttgart, is the worlds leading supplier of cleaning equipment and services for transportation and buildings.

The family-owned company generated a turnover of €1.3 billion in 2006 and employed 6,500 people in over 40 countries. It is a global player selling more than 5.5 million cleaning machines annually in more than 160 countries. Products are manufactured in fourteen factories in Germany, Italy, USA, Brasil and China.⁴³ Revenue growth averaged at 14.5% CAGR over the last 30 years (Figure 7).

*** *Figure 7 approximately here* ***

Alfred Kaercher founded the company in 1935. He was a typical inventor-entrepreneur from the region of Wuerttemberg in Southern Germany, who developed the first high pressure cleaner in 1950. However, he died of a heart attack in 1959 at the age of 58, leaving behind his wife, two young children, and a company with 250 employees, family-owned and self-financed.

Governance: “company success dominates family considerations”

In 1959, the widow took over the leadership of the firm. To further develop the company, she hired an outside manager in 1968, who diversified the company into a number of new product areas like polyester resin construction formworks, plastic gravestone moulds, and even plastic riding elephants. The company stagnated until he was replaced in 1974 by a young engineer, Roland Kamm who became a key driving force in the company.⁴⁴ After Mrs. Kaercher passed away in 1989, her son became non-executive chairman.

The overriding governance principle has been that company interests dominate over family considerations. This philosophy was reflected in the transfer of management responsibilities to non-family members, as Mrs. Kaercher recognized her own limitations. Her leadership was however crucial at a critical juncture in the history of the company: she took control back from the first outside CEO, and placed her trust into a young leadership team.

Most profits are kept in the company. Since Kaercher is privately held by the two children of the founder, it does not have to publish financial results. The growth has been mainly self-financed, supported by bank financing. The company is non-union and is also not member of an employers association. It is therefore not bound by the collective bargaining agreements and has more flexibility in negotiating wage and working time arrangements. Teamwork is stressed as a core value; special Kaercher events and family days help to create an “extended family feeling”. Sick days and fluctuation are said to be much lower than at comparable companies. All German operations are located in small communities in Baden-Wuerttemberg, which helps to create and

retain a loyal and dedicated workforce. Management is mostly recruited internally. All employees participate in a compensation schemes that are tied to business performance.

Global niche market leadership: solving complex cleaning needs worldwide

Roland Kamm, who became CEO in 1974, was inspired by an unconventional German management thinker, Wolfgang Mewes, who promoted a “bottleneck-focused strategy” (Engpass konzentrierte Strategie = EKS).⁴⁵ Essentially, EKS suggests that the key to success is to concentrate all resources, however limited, to solve a specific “burning problem” (the bottleneck) for a well-defined customer group.

In addition, Mewes advised companies to shift their objectives from profit maximization to maximize their “power of attraction” for their target group. Profit is not the objective, but rather the result of these efforts. Instead of trying to achieve maximum profits, companies should create maximum benefits for a target group, solving their most burning problems better than any competitor. Since most companies he worked with, were small and had limited resources, Mewes advised them to select specific segments of the market by building on their own strengths and avoid blindly imitating perceived leaders. Based on its own resource profile the company should analyze which specific customer problem it can solve best, and find a customer segment that matches its available resources. Successfully solving this problem would then create a “success spiral”: A supplier’s rising attraction for its target group would raise sales, and correspondingly profits, which can be reinvested to create even more powerful solutions. Since niches are typically small and subject to changing market demand, Mewes recommends focusing on the underlying fundamental needs that persist even when specific products and techniques to fulfill these needs become obsolete.

Simple though this sounds, this new strategy triggered an almost unstoppable success spiral for Kaercher. Kamm stopped product diversification and focused all resources on what he considered as Kaercher’s core competence: developing and selling high-pressure cleaning

equipment. This strategic reorientation led to a fivefold growth in revenues from € 18 million in 1974 to € 90 million in 1979, while market shares reached 40% in major European countries.

Then the company entered a phase of stagnation. The former CEO remembers: “*My problem at the time was to decide whether to go for the remaining world market share in high pressure cleaners or to offer our loyal customers an increasingly differentiated range of items to fill their basic cleaning needs.*”⁴⁶ In a seminar, he was inspired by the example of the Galápagos finches, 14 different but closely related species of finches that Charles Darwin collected on the Galápagos Islands. The birds are of similar size (10–20 cm) but differ in the size and shape of their beaks, which are highly adapted to food sources available on different islands. This discovery led Darwin to the idea that in this geographical isolation different species could have been developed from one or a small number of “ancestral finches”. Kamm viewed Kaerchner’s high-pressure steam cleaners as the “ancestral finch” that first broke into and conquered new markets. However, growth would inevitably stagnate after this core product had gained a high share in a yet unsegmented market. Like the finches with their slightly modified beaks, differentiated cleaning products could solve previously untapped cleaning problems. The company broadened its vision with the new motto “Kaercher: cleaning is our business”.

The company transformed itself from a manufacturer of high-pressure water cleaners into a “think tank” that specializes in solving the difficult cleaning challenges of an increasing array of customer groups. Kaercher focused on the broad sectors “cleaning needs in buildings and transportation”, and developed specialized devices adapted to the cleaning needs of target customer groups in these two sectors; much like the finches had done on the Galápagos Islands (Figure 8).

*** *Figure 8 approximately here* ***

In 1985, the company took the bold move to enter the consumer business with a completely new product, a portable pressure washer. Kaercher created a new market and became the leading manufacturer of cleaning high-pressure cleaning equipment for homes and cars. By

2006, Kaercher sold about 2,500 products addressing cleaning needs of finely defined customer groups, with almost half of its cleaning systems going to private households.

Thus customer-driven innovation is probably one of its core strengths. Kaercher is continuously developing new solutions to solve cleaning challenges following the motto “we convert customer problems into products”. Growth has to come from new products because the life-cycles of most products are long, which limits replacement demand. Thus, 80% of products sold are less than four years old. This rapid pace of innovation is supported by R&D investments of 4 to 5% of revenues. More than 400 engineers and technicians in the central R&D unit create a steady stream of new products. Their R&D budget is about double that of its closest competitor, Danish Nilfisk-Advance A/S.

This R&D approach formed the basis for the rapid growth in the 1970s and is still dominant. The repositioning as cleaning specialist was initiated by analysis of customers’ cleaning needs on a very fine-grained level.⁴⁷ For example, the cleaning need of each type of vehicle was analyzed by talking directly to customers: How was the cleaning done? What were the most “burning problems”? Based on this analysis, products are developed for specific target customer segments.

New product development is thus a key element of Kaercher’s strategy. The “customer-driven innovation routine” has become ingrained in the organizational culture, and illustrates a key trait of Hidden Champions. Kaercher probably knows much more than its customers about cleaning problems. This know-how is based on intellectual property accumulated over thirty years, and continuously developed further. The company holds more than 300 patents and files 30 to 40 new patents per year. Innovation is mostly incremental but leads in some cases to major customer benefits: for instance a redesigned turbo/rotary nozzle increased the cleaning efficiency of building surfaces and roads by a factor of five.⁴⁸ This accumulated know how, and its continuous development, enable Kaercher to defend its leadership position.

Operational effectiveness: world class in key processes

Typical for a Hidden Champion, Kaercher started to internalize early. Even before its strategic reorientation in the 1970s, the company had operations in Austria, Switzerland and France. An aggressive international market penetration targeted European countries from in 1974, then the USA in 1982 and Japan 1987. By 2006, the company had over 40 wholly-owned sales and service subsidiaries worldwide. Kaercher aims to serve key markets direct and not to rely upon importers or other intermediaries.

The international expansion was implemented with engineering-driven precision.⁴⁹ In countries with a comparable standard of living, cleaning needs are fairly similar. Therefore a simple methodology combining Kaercher revenues per inhabitant with the number of inhabitants of a country was used to estimate the market potential. The mature and highly penetrated German market served initially as a benchmark. In the following years, revenues have grown on the back of regular benchmarking of countries and aggressive growth based incentives.

The preferred mode of entry was Greenfield with the recruitment of one or few key persons who were trained on the company philosophy in the headquarters. The exception is the USA, where several established companies were acquired.

Marketing is another key strength. The company has received numerous marketing awards like the highly-acclaimed Superbrand-Award. Kaercher has aimed to build its brand by demonstrating cleaning expertise as well as corporate citizenship in high profile restorative cleaning projects of cultural monuments such as the Colonnades of St. Peter's Square in Rome or Mount Rushmore, U.S.A. Kaercher developed such event cleaning in the 1970s out of necessity when its marketing resources were scarce, yet it has since become a hallmark of Kaercher with a history of over 80 high profile projects all over the world.

Many of Kaercher's products are under pressure from Asian low-cost producers, while the success has attracted larger competitors into their market. Kaercher therefore has to be a low

cost producer in the industry and remain price competitive in addition to being innovative and customer-centric to provide unique products and services.

Kaercher still manufactures about 50% of its worldwide production in Germany, while Germany accounts for about 20% of its revenues.⁵⁰ The company has four of its largest factories in Germany, employing about 1,250 people, with other plants located in Italy (3), USA (3), Mexico, Brazil and China. How can they compete in view of German labor costs being amongst the highest in the world? Several factors contribute to the competitiveness of their German plants:

- The Kaercher product range is fairly complex, ranging from high volume consumer products to sophisticated small series of large professional cleaning equipment. All products are continually improved, such that proximity between production and R&D, which is mostly in Germany, is crucial.
- This complex product range requires a high degree of flexibility. Moreover, seasonal variations in the demand for consumer products require flexible responses. Kaercher created its own production system to manage these demands, the “Kaercher-Produktionssystem” (KPS) modeled after the Toyota system. All products are built to order. Several hundred temporary workers are employed to cover seasonal variations. Factories are segmented into lines focusing on specific product types: within each line, employees can substitute for another, which substantially enhances flexibility.
- Factories focus each on one of the major product groups producing mainly on a world scale, therefore achieving substantial economies of scale.

Kaercher has from the start of its rapid expansion strategy worked with outside suppliers. It therefore differs from many Hidden Champion, who have a ‘deep’ value chain and do not outsource extensively. Kaercher’s decision to outsource was to a large degree driven by necessity, since resources were limited. Suppliers were needed to jointly develop new products and to share

the high investments for new production equipment. Components are to a high degree outsourced: about 70% of the production value is bought in. We estimate that manufacturing labor costs for large series products thus are only between 10% and 15% of total cost.

However, the company has decided against total outsourcing and is keeping most of the final assembly of its products in house. It is constantly reviewing the mix of parts outsourced but keeps strategically relevant parts (e.g. nozzles) in-house. In addition, the company strives to keep all key production technologies at least to a small degree in-house to be able to competently negotiate with outside suppliers.

The case of Kaercher illustrates many of the features that our wider investigations suggest are typical for German Hidden Champions: family ownership combined with professional management provides the basis for a long-term strategy focused on global niche leadership. Market leadership is based on a constant stream of innovative products and services solving complex cleaning problems. Products and processes are continuously improved by taking advantage of the global footprint of the operations and the relentless drive for efficiency in the core R&D and production sites in Germany.

Conclusions

In recent years, international business researchers and business leaders have, for good reasons, focused on the consequences of the emergence of new players such as Russia⁵¹ and China on the global stage. Yet, it is time to look at the old industrial powerhouses such as Germany again, as they have rejuvenated and continue as major players on world markets.

We have studied a particularly interesting group of German companies, coined ‘Hidden Champions’ by Hermann Simon. These companies produced many success stories, thus providing positive outliers and hopefully valuable lessons for management practice in Germany in beyond. With some simplification, we can summarize their management model as follows:

- Family ownership and cooperative corporate cultures combined with outside professional management,
- Global market dominance through positioning in niche markets, and thus exploiting and enhancing resources and capabilities on a global scale,
- Continuous endeavor to raise operational effectiveness of all major processes and functions.

Many of these lessons from Hidden Champions are relevant beyond Germany. Companies with similar characteristics can be found in several other countries.⁵² An interesting area to explore in future research is that globalization creates favorable conditions for these mid size companies. These “global medium enterprises” are positioned between the widely researched big publicly-listed multinationals and the traditional privately-held domestically-focused SMEs.

However, the preponderance of such firms in Germany almost certainly has roots in the specific nature of German capitalism as well. The Germany economic system has been characterized, as ‘coordinated market economy’ as economic agents to a large extent rely on long term relationship.⁵³ Future research may beneficially explore these linkages between the structural features of the economic system and the types of competitive advantages of firm originating from a country, as we have illustrated here for the case of Germany. For example, how does the German education system, with a strong traditional emphasis on vocational training and long company tenures, foster the development of highly specialized capabilities? How do applied research institutes, such as the Fraunhofer Institute, facilitate the transfer of scientific research into innovative products and services?

Appendix: Database and Methodology

The original work of Simon is based on a group of over 500 companies he identified as world market leader.⁵⁴ Since they were by definition “hidden” and in many cases relished their obscurity, he did not claim that these companies, identified through various unconventional sources like newspaper articles or chance encounters, represented all of the hidden champions, they were only the “tip of the iceberg”. In addition, financial information on these companies was extremely difficult to find. Simon interviewed more than 100 companies personally. In addition he utilized 122 questionnaires administered as part of a PhD dissertation written under his supervision⁵⁵ (the questionnaire had been sent to 457 companies). Drawing on these sources, he mentioned 220 Hidden Champions by name in the book. These 220 companies form our base population.

We verified basic information like revenues and number of employees for the original date of the research, mostly the year 1994, since this quantitative information was reported only for a smaller number of these companies in the book. Then we analyzed these companies 10 years later. All companies, except for one, could still be identified. In total, revenue and employee numbers could be generated for 141 companies, covering both the first year 1994 and the second year 2004. In several instances, when only employee numbers were available for one of these two years, revenues were estimated based on average revenue per employee of other sample companies. To keep data sources consistent, the Hoppenstedt Handbuch der Großunternehmen⁵⁶ was used as main source for both time periods. Our data gathering led to somewhat different results in several aggregate numbers, especially in a higher median revenue of about €120 million compared to Simon's median revenue of about 100 million € and a higher mean revenue of about €290 million compared to €255 million. Since information on the smaller companies was much more difficult to get than on the larger ones, this certainly biases our results somewhat towards the larger companies.

In addition to this quantitative comparison, each company's world market position and selling and manufacturing network was analyzed in detail, using again publicly available information. The focus of this work stream was to determine, if the company was able to keep or extend its position or lost its world market leadership. In addition, two research assistants independently assessed the potential reasons for these developments based on public information on company homepages as well as independent sources, if available, like press reports or industry analysis (double-blind approach). Their independent assessments were then combined by the lead author overseeing the research to a summary assessment.

Figure 1: Champions of International Trade: Learning from Germany?⁵⁷

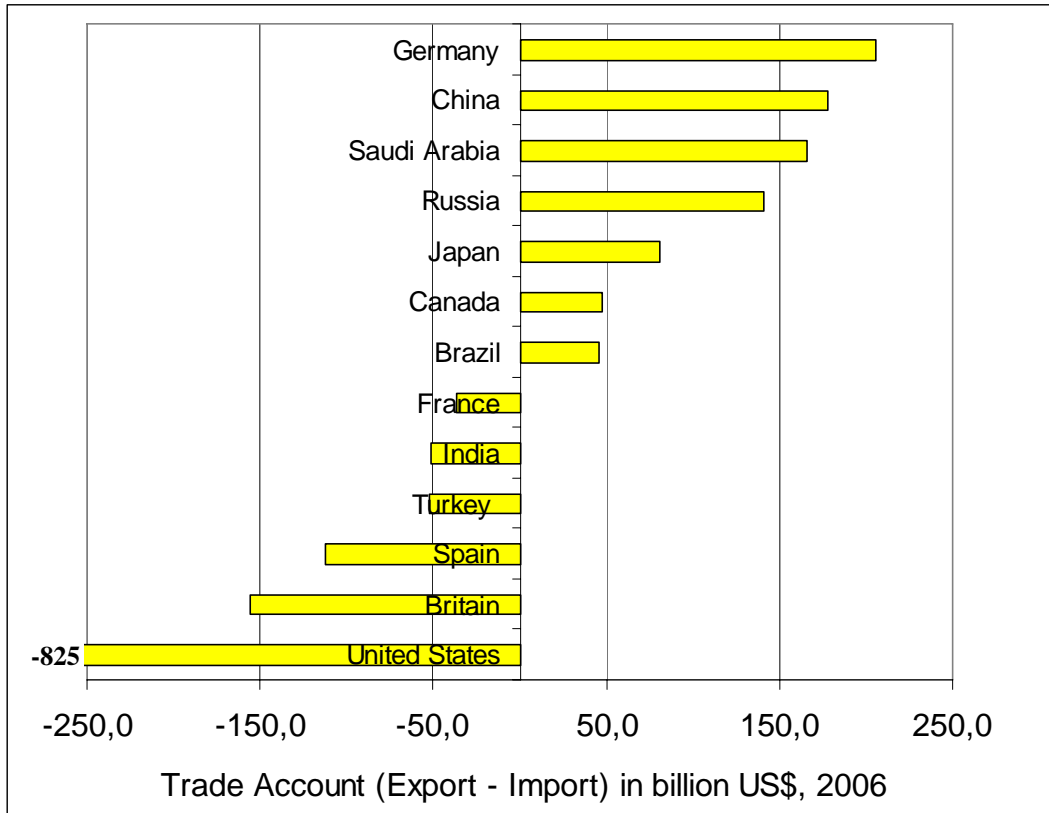


Figure 2: Annual revenue growth rates (1994-2004)

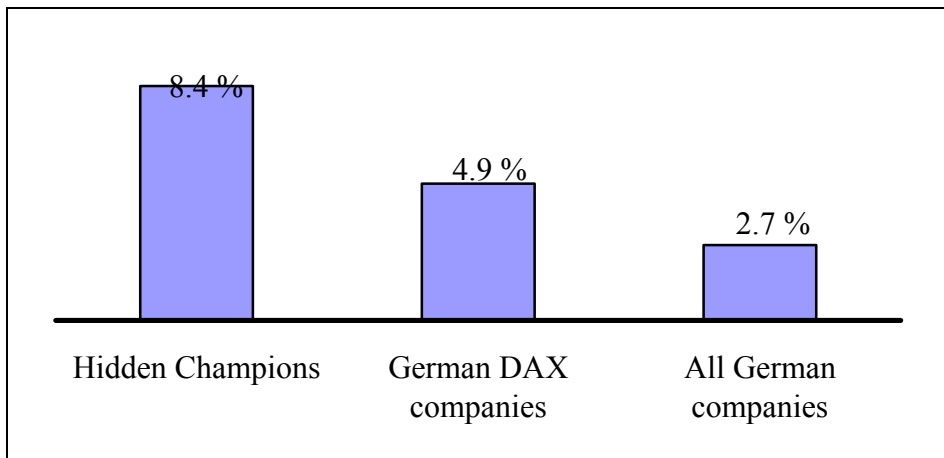


Figure 3: Ownership structure of Hidden Champions 1994 and 2004⁵⁸

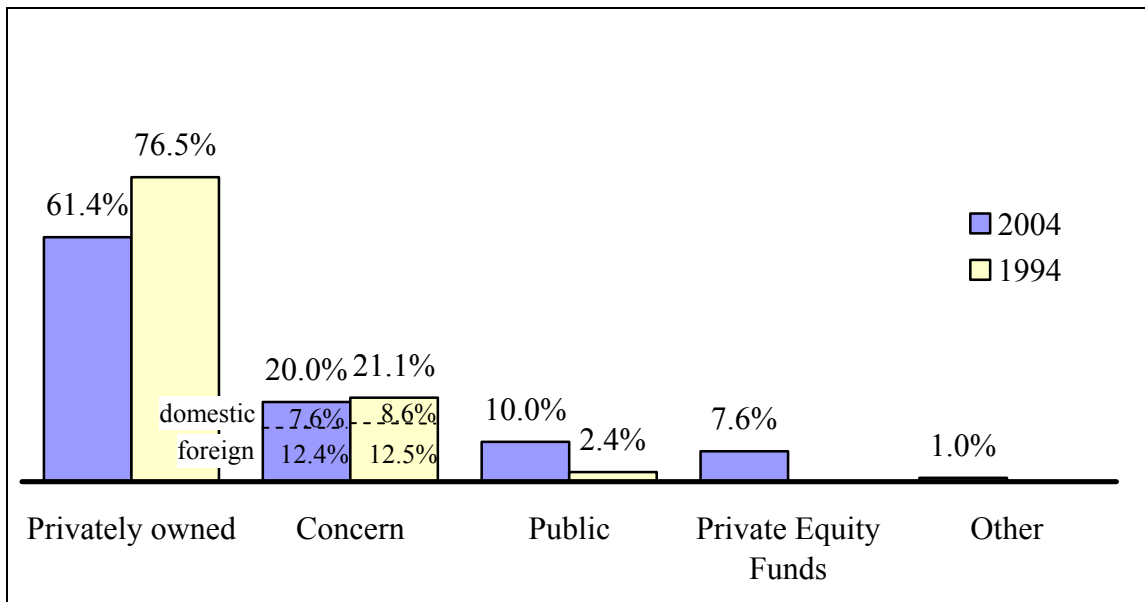


Figure 4: Management in family-owned companies⁵⁹

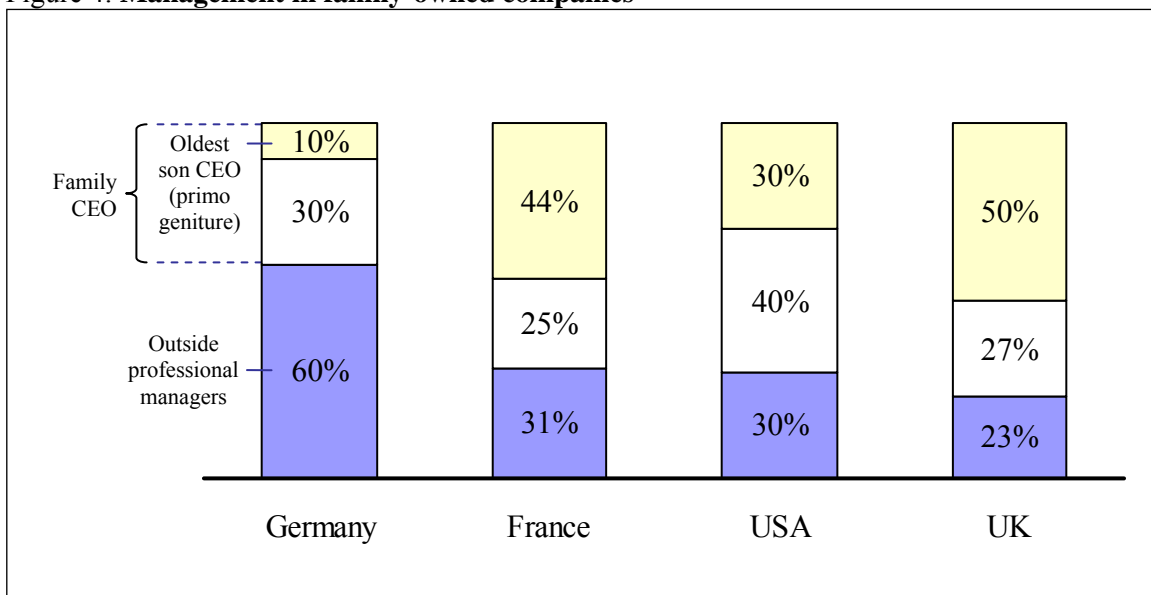


Figure 5: Foreign subsidiaries of Hidden Champions⁶⁰

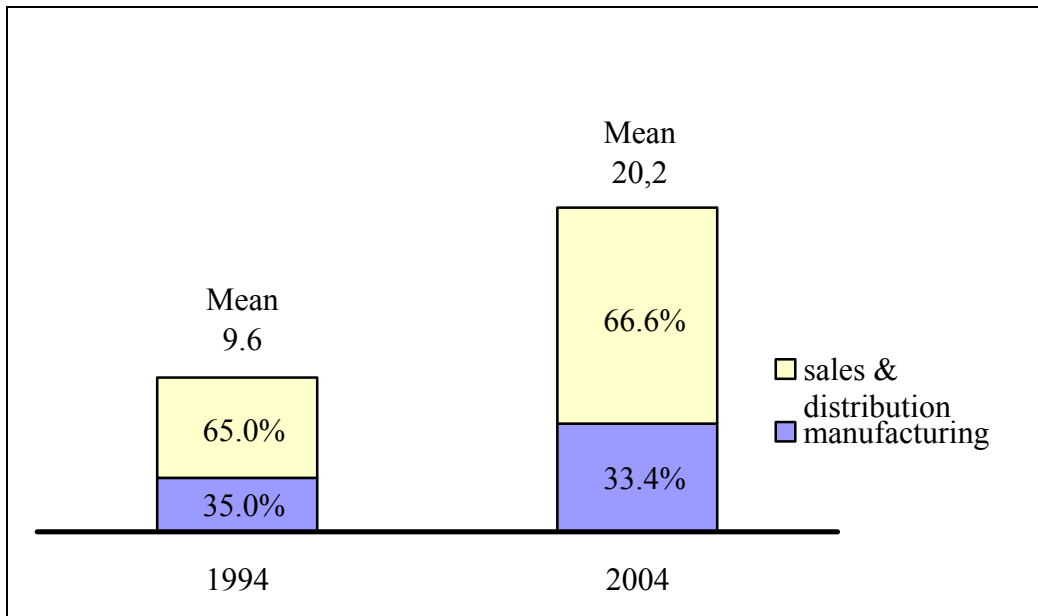


Figure 6: Percentage of Hidden Champions with manufacturing subsidiaries in low-cost countries 2004

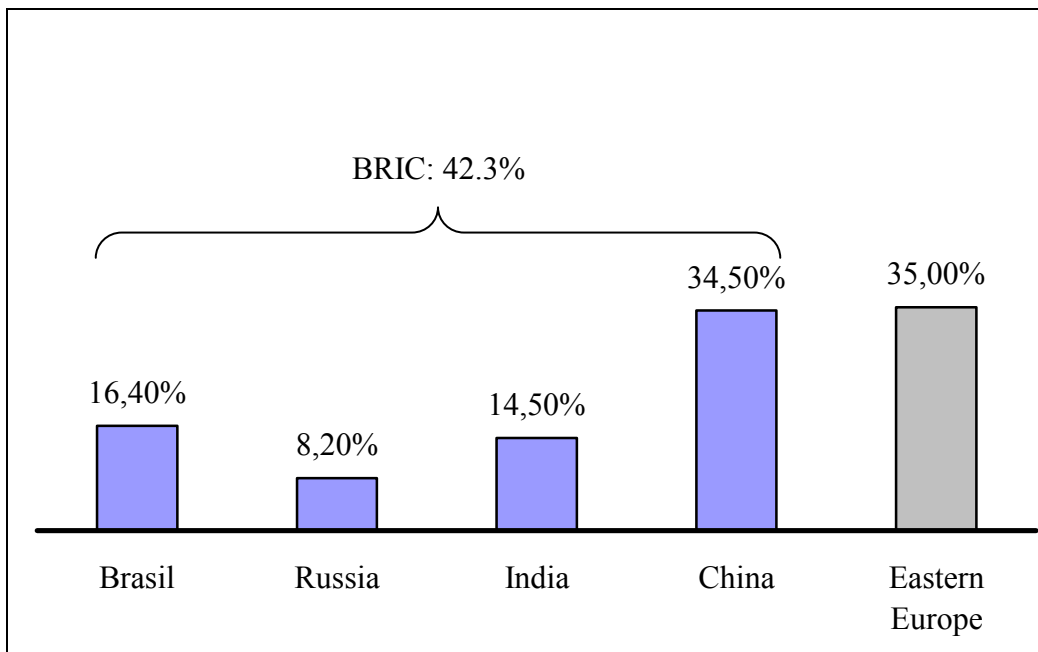


Figure 7: Revenue Growth Rates Kaercher (1975 – 2005) ⁶¹

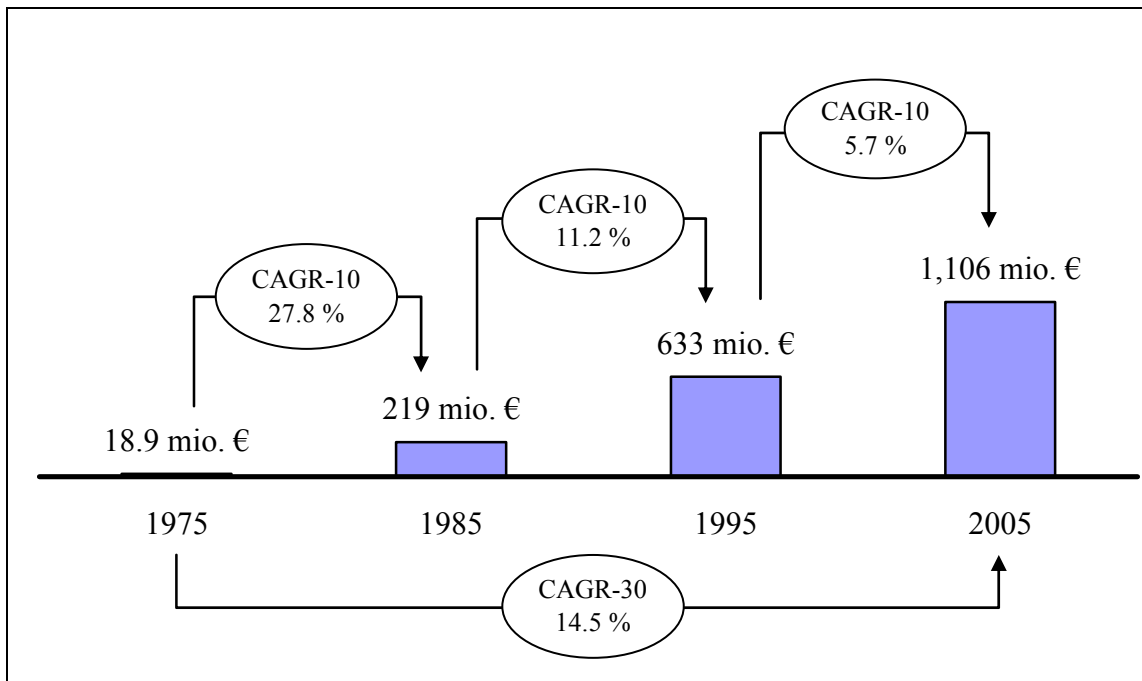
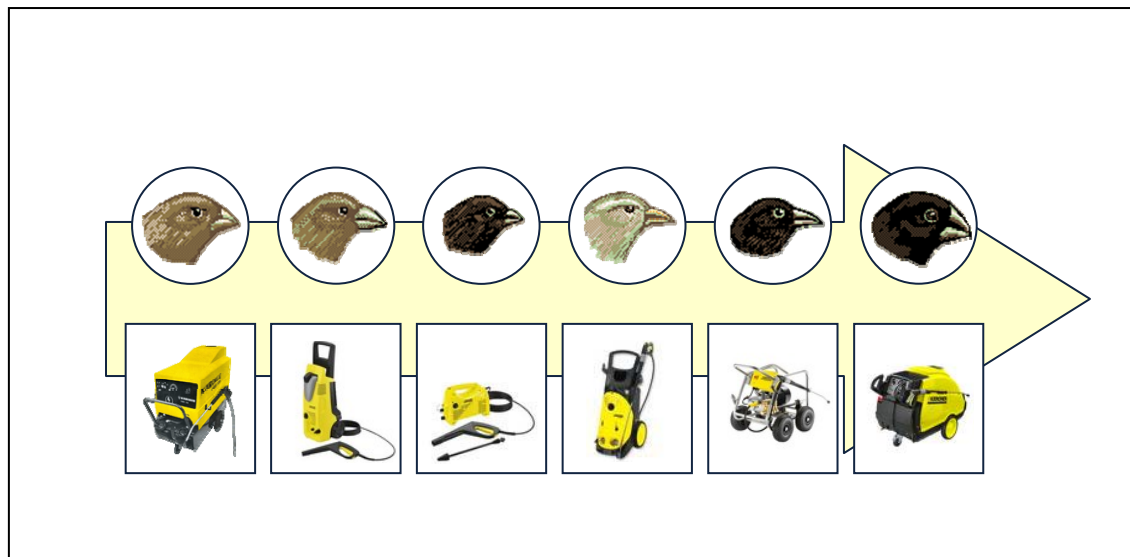


Figure 8: Kaercher product portfolio: The Galápagos Finches analogy ⁶²



Box 1: Lessons from Simon's analysis of Hidden Champions⁶³

1. *Hidden Champions strive for world market leadership to become No. 1 in the world in their markets/segments.*
2. *Market definition is an important part of strategy development, usually leading to narrowly defined markets, both from a customer and technology perspective and a highly focused strategy.*
3. *Specialization in product and know-how is combined with global selling and marketing. They serve the target markets through their own subsidiaries and do not delegate the customer relationship to third parties.*
4. *Hidden champions are very close to their customers in particular to their top customers. They are value, not price oriented.*
5. *They are highly innovative in both products and process, not only confined to technology. Innovation activities are globally oriented and continuous.*
6. *The overall company orientation is not one-sided but both technology and market driven.*
7. *Hidden champions create competitive advantages in product quality and service. They are close to their top competitors and defend their position ferociously.*
8. *They rely on their own strengths. They mistrust strategic alliances and outsource less than other companies. Their value chains are deep. They see the foundation of their competitive superiority in things which only they can do. Together with lesson 2 their strategies could be defined as "deep rather than wide": Deep in their value chain, not wide in their coverage of different markets with different needs.*
9. *Hidden Champions have very strong corporate cultures associated with excellent employee identification and motivation. Selection for jobs is sharp.*
10. *Their leaders are very strong and stay at the helm for decades.*

Endnotes and references

¹ H. Simon, *Hidden Champions, Lessons from 500 of the World's Best Unknown Companies* (Boston, Harvard Business School Press, 1996). The English version differs in a number of details from the German version H. Simon, *Die heimlichen Gewinner* (Frankfurt, Campus Verlag, 1996). For data consistency, we used the German version when comparing data, numbers quoted in DM currency were converted to €. Text quotes are mostly referring to the English version. The book draws on a dissertation supervised by Simon: E. Schmitt, *Strategien mittelständischer Welt- und Europamarktführer* (Wiesbaden, Gabler Verlag, 1997).

² H.W. Sinn, *Ist Deutschland noch zu retten?* (Berlin: Econ, 2005).

³ Quoted in U. Jürgens, M. Kryzydzinski and C. Teipen, Changing Work and Employment Relations in German Industries: Breaking Away from the German model (WZB Berlin Discussion Paper SP III 2006-302, 2006, p. 3).

⁴ L. Miotti and F. Sachwalk 'The old economy in a new globalisation phase' (Paris: Institute Français des Relations International, 2006).

⁵ T. Peters, Rethinking Scale, *California Management Review*, Vol. 24/3 (1982) ; G.R. Carroll, The specialist strategy, *California Management Review*, Vol. 26/3 (1984),(focusing on domestic niche players); D.K. Clifford and, R.E. Cavanagh, *The Winning Performance. How America's High-Growth Companies Succeed*, Toronto: Bantam Books 1985; B. Mascarenhas, The strategies of small and large international specialists, *Journal of World Business* 34/3 (1999): 252-266.

⁶ M. Schultz and M.J. Hatch: The cycles of corporate branding: The case of the Lego company, *California Management Review* 46/1 (2003): 6-26; K.E. Meyer: Globalfocusing: From Domestic Conglomerate to Global Specialist, *Journal of Management Studies*, 43/5 (2006): 1109-1144.

⁷ Simon 1996, *Die heimlichen Gewinner*, op. cit., p.14-19.

⁸ J. Meffert, P. Radtke, H. Klein, J. Freiling and T. Hutzschenreuter, *Unternehmertum Deutschland* (Duesseldorf, McKinsey & Company 2005). This study focuses on German companies with annual revenues between € 50 million and € 3 billion; in total about 600 companies were analyzed based on an extensive questionnaire survey.

N. Bloom, S. Dorgan, J. Dowdy, J. Van Reenen, and T. Tippin, *Management Practices Across Firms and Nations* (Center of Economic Performance, London School of Economics and McKinsey, London, Working Paper, June 2005). This study compares management practices of about 730 medium-size manufacturing companies in the USA, UK, Germany and France, with employment between 50 and 10,000 workers. The German sub-sample includes 154 companies.

H. Haussmann, D. Holtbrügge, D. Rygl, and K. Schillo, *Erfolgsfaktoren mittelständischer Weltmarktführer*, (University of Erlangen-Nuremberg, Department of International Management, Working Paper 3/2006). This study analyzes German companies that are world market leaders in their respective segments and have no more than 10,000 employees based on 44 qualitative interviews with owners and CEO's.

⁹ Up to January 2007, German laws regarding the filing of financial information were fairly lax. Although companies above a certain revenue size had to file paper-based financial reports with local authorities, non-compliance was usually not enforced. Most private companies therefore reported only the required minimum, rarely providing profit information. Often only some aggregate data on revenues and/or employees are available. However, from January 2007 a digital database with public access has been created and non compliance is to be fined.

¹⁰ Simon's book has been translated into 15 languages and featured on the cover of Business Week in 2004.

¹¹ B. Guenterberg and G. Kayser, *SMEs in Germany, Facts and Figures 2004* (IfM-Materialien Nr. 161, Bonn).

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- ¹² H. Simon, 1996, Die heimlichen Gewinner, p. 14 and p. 19; Schmitt op.cit., pp. 140 -141. According to Schmitt the mean revenue of these companies was €261 million.
- ¹³ H. Haussmann, D. Holtbrügge, D. Rygl, and K. Schillo, op.cit., pp. 5-6.
- ¹⁴ Reference omitted to permit anonymous reviewing.
- ¹⁵ Umsatzsteuerstatistik des Statistischen Bundesamtes, Wiesbaden, (VID/37331100).
- ¹⁶ See appendix for details of the methodology.
- ¹⁷ B. Iyer, C.-H. Lee and N. Venkatraman, Managing in a “Small World Ecosystem”: Lessons from the Software Sector, *California Management Review* 48/3 (2006): pp. 28-47.
- ¹⁸ B. Venohr, *Wachsen Wie Wuerth*, Frankfurt, Campus Verlag 2006, especially pp. 11, 12 and 84.
- ¹⁹ D. Schuhmacher, Capital Markets and the End of Germany Inc. (Global Economics Paper No:144, Goldman Sachs, August 23, 2006).
- ²⁰ Bloom, and J. Van Reenen, *Measuring and Explaining Management Practices Across Firms and Countries*, (Working Paper, November 14th 2005, Department of Economics, Stanford University and Centre of Economic Performance, London School of Economics), pp. 6-7 and 31. This paper is based on the same data. as N. Bloom, et al., op. cit.
- ²¹ H. Berghoff, *Moderne Unternehmensgeschichte* (Paderborn: Schoeningh Verlag, 2004), p. 120-126.
- ²² N. Bloom, and J. Van Reenen, op. cit.,pp. 6-7 and 31.
- ²³ M.E. Porter, *Competitive Advantage, Creating and Sustaining Superior Performance*, New York/London, Free Press 1985, pp. 15-16 and pp.264-272
- ²⁴ K. Meyer, op. cit.
- ²⁵ G. Saloner, A. Shepard, J. Podolny; *Strategic Management*, New York: John Wiley & Sons, Inc. 2001 pp. 149-183. M.E.Porter, op.cit., 266 -272
- ²⁶ B. Mascarenhas, op. cit., and K. Meyer, op. cit...
- ²⁷ M.E. Porter, op.cit. ,p. 266 and T. Peters, op.cit. pp. 14-15, very early described these effects.
- ²⁸ H. Simon, *Hidden Champions*, op. cit., pp. 113 -119, 155-163.
- ²⁹ H. Simon, *Hidden Champions*, op.cit., p. 124
- ³⁰ H. Simon, *Hidden Champions*, op. cit, p. 140 “Their R&D spending does not appear to be particularly high; they average 6.3% of sales”. No further support is given for this number. Based on comparative data for other industrial companies we do not agree with Simon: this spending is high.
- ³¹ J. Meffert et.al, op. cit., pp. 53-59.; out of the 600 companies, we took a subsample of about 350 companies that most closely resemble the Hidden Champions. On average, the 600 mid-sized companies in the study spend 4.4 % of revenues on R&D.
- ³² B. Jaruzelski, K.Dehoff, R.Bordia, *Smart Spenders: The Global Innovation 1000, strategy and business*, Winter 2006, Special Report, p. 6 and p. 10.
- ³³ A. Warren and G. Susman, *Review of Innovation Practices in Small Manufacturing Companies*, Working Paper, The Pennsylvania State University, PA. 2005, p.83.
- ³⁴ H. Simon, *Hidden Champions*, op.cit., pp. 98 – 118.
- ³⁵ H. Simon, op.cit, p. 105.
- ³⁶ Dr Wolfgang Pinegger, president of Brueckner, the world-leading manufacturer of bi-axial film stretching systems quoted in H. Simon, *Hidden Champions*, p. 73.
- ³⁷ Mercer Management Consulting and HypoVereinsbank, *Maschinenbau* 2010, Munich 2003

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- ³⁸ K. Meyer, op. cit.
- ³⁹ H. Simon, *Hidden Champions*, op. cit. pp. 71-73. His numbers were based on a sub-sample of 39 Hidden Champions. Our analysis for 2004 is based on information on the homepages of these companies, counting only legal entities majority- or fully-owned but excluding other forms of market presence such as agents.
- ⁴⁰ N. Bloom et al., op. cit.
- ⁴¹ S. Kohaut and C. Schnabel, *Tarifliche Öffnungsklauseln: Verbreitung, Inanspruchnahme und Bedeutung*, Friedrich-Alexander-Universität Erlangen-Nürnberg, Diskussionspapiere, No. 41, Mai 2006.
- ⁴² Deutsche Bundesbank, *Deutschland im Globalisierungsprozess*, Deutsche Bundesbank Monatsbericht, Dezember 2006, p. 26. Additional comparative data is reported by the Bureau of Labor Statistics, US Dept. of Labor, *Unit labor costs in manufacturing 19914-2005*, national currency basis.
- ⁴³ Company Homepage. <http://www.karcher.com> (accessed: February 2007).
- ⁴⁴ The former CEO wrote a book about his leadership at Kaercher, on which the following description of the corporate strategy is based: H. Witzel and R. Kamm, *Unternehmenswachstum, die natürlichste Sache der Welt* (Hamburg: Books on Demand, 2006).
- ⁴⁵ The EKS concept was mainly spread through expensive correspondance courses and seminars. A brief overview is contained in K.Friedrich/L.J. Seiwert/E.K. Geffroy, *Das neue 1x1 der Erfolgsstrategie: EKS-Erfolg durch Spezialisierung*, (Wiesbaden, Gabler Verlag, 9th edition, 2003). Several other Hidden Champions like Wuerth and Rational AG, world market leader in cooking technology for professional kitchens have been influenced by this concept as well.
- ⁴⁶ H. Witzel and R. Kamm, op. cit., pp. 130-135, quote from H. Hass, *Der Hai im Management* (Munich: Langen-Müller and Herbig., 1988, Chapter: 5).
- ⁴⁷ H. Hass, op. cit.
- ⁴⁸ T. Rupp, Ein Gluecksfall für Kaercher, *Strategie Journal* 2004/6, p. 11.
- ⁴⁹ H. Witzel and R. Kamm, op. cit., pp. 136-137.
- ⁵⁰ Interview with the head of production, Bernhard Graf, *Leitbild: Produktion und Beschaffung, Kaercher News* 2/2005; and *Environment Report* 2006, <http://www.karcher.com> (both accessed February 2007)
- ⁵¹ I. Filatotchev, R.E. Hoskisson, T. Buck and M. Wright: Corporate Restructuring in Russian Privatizations, *California Management Review* 38/2 (Winter 1996), pp. 87-105; S. Michailova and K. Husted: Knowledge Sharing Hostility in Russia Firms, *California Management Review* 45/3 (Spring 2003), pp. 59-75.
- ⁵² This was early-on recognized by Simon: H. Simon, You Don't Have to be German to be a "Hidden Champion", *Business Strategy Review*, 7/2 (1996), pp. 1-13
- ⁵³ P.A. Hall and D. Soskice, David, eds.: *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage* (Oxford: Oxford University Press, 2001).
- ⁵⁴ H. Simon, *Die heimlichen Gewinner*, op. cit., pp. 14-15.
- ⁵⁵ E. Schmitt, op.cit.
- ⁵⁶ *Hoppenstedt Handbuch der Grossunternehmen*, various editions, available online: <http://www.hoppenstedt-grossunternehmen.de/> (accessed December 2006).
- ⁵⁷ IMF; World Economic Outlook Database (accessed February 2007) .
- ⁵⁸ Source 1994: H. Simon, *Hidden Champions*, op. cit., p. 18; 2004: authors' database. In addition, several cases the former single owners are the largest shareholders in companies which went public so that we estimate the number of family-dominated companies to be higher.
- ⁵⁹ Own calculations based on data provided by N.Bloom and J. Van Reenen, op. cit., pp. 6-7 and p.31.

⁶⁰ Source 1994: H. Simon, *Hidden Champions*, op. cit., p. 69.

⁶¹ Company Homepage. <http://www.karcher.com> (accessed February 2007...), H. Witzel and R. Kamm, op. cit., pp. 130-135, pp. 126-127.; revenue growth in 2006 was 13 %, ending a period of somewhat slower growth.

⁶² H. Witzel and R. Kamm, op. cit., p. 134.

⁶³ H. Simon, *Hidden Champions*, chapter 2-11.