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Brand creation via design and modularization – SMEs in international B2B markets

Olavi Uusitalo

Abstract: Brand theory has its origins in the consumer product market and is normally considered in relation to big business. An established brand enables customers to save time by guaranteeing the level of quality, reducing purchasing risk and simplifying customer choices. Little research, however, has been carried out to investigate the relevance of brands in industrial markets, especially within small and medium enterprises (SMEs). Loyalty to a product brand can tie the customer to a supplier. In this paper, I argue that the creation of product brands via industrial design and product modularity is important for SMEs in the international business-to-business (B2B) market. To demonstrate this, I examine brand creation in three Finnish SMEs: KPatents, Modulight and Genelec. These companies have incorporated product brand creation in new product development by using industrial design and modular products. This paper contributes to research in product brand creation among SMEs in the B2B market.

Keywords: Brand · Industrial design · Modularity · SMEs · B2B Marketing

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Introduction

Brand is usually considered to be the province of big business operating in consumer markets (Merrilees, 2007; Mudambi, 2002; Webster & Keller, 2004). Brand management focuses on how companies can build strong consumer brands that differentiate one seller from another (e.g., Aaker, 1996; Kapferer, 1997). Traditionally, brands are a market signal targeted at the end consumer: saving consumers time by guaranteeing a certain level of quality; simplifying their choices by making it easy to identify products and attributes; and answering specific customer needs – hedonistic, ethical, or individual (Kapferer, 1997). However, brands can also reduce purchasing risk for the buyer in the business-to-business (B2B) market (Brown et al., 2011; Kotler & Pfoertsch, 2006).

Research interest in industrial and B2B brands has seen a recent increase (Aspara & Tikkanen, 2008; Lynch & De Chernatony, 2007; Michell et al., 2001; Mudambi, 2002; van Riel et al., 2005; Taylor et al., 2004). There has also been increased interest in company/corporate brands in the B2B context (e.g. Lynch & De Chernatony, 2004; Bendixen et al., 2004; Mudambi, 2002; van Riel et al.,2005) as well as in the B2B context within small and medium enterprises (SMEs) (Juntunen, 2012).

According to Ahonen (2008), the use of brands in SMEs has received little attention from academics (she found only 14 related studies). Ahonen argues that empirical studies have focused more often on services companies than on manufacturing companies. Studies on corporate branding dedicated to SMEs are almost non-existent (Ahonen, 2008; Inskip, 2004). The role played by brands in B2B markets has received even less attention (Saraniemi et al., 2010). In the intersection of manufacturing SMEs and the international B2B market, we find hardly any research at all relating to brands. A number of authors have commented on a possible lack of resources (time, money, number of personnel) required for brand creation in SMEs (Ahonen, 2008; Keller, 2008; Saraniemi et al., 2010). Webster & Keller (2004), however, state that the fundamentals of brand strategy (market segmentation, targeting and positioning) apply to both consumer and B2B markets. It is clear, however, that brand research focused on consumer markets cannot be fully generalized to describe or explain the role played by brands in B2B markets (Ojasalo et al., 2008).

The value of industrial design as a core marketing element is emphasized in managerial marketing textbooks (Kotler, 2003). Product design and aesthetics are regarded as strategic tools for firms to create competitive advantage (Berkowitz, 1987; Borja de Mozota, 2002, Hertenstein et al., 2005; Simonsen & Schmitt, 1997). According to Montana et al. (2007), little research has focused on the way design can enrich the brand building process. Modularity has been a popular research topic in management and engineering literature for over forty years (Salvador, 2007). Modularity in product design provides flexibility in the mixing and matching of modular components to create customer-oriented products (Sanchez and Mahoney, 1996; Shilling, 2000). This paper examines modularity in the context of product and brand design within SMEs.

This study aims to fill the current research gap by examining the role of product brands within manufacturing SMEs in the B2B market. The paper tries to create a model

for brand creation of manufacturing SMEs. The model emphasizes industrial design and modular products as enhancing capabilities for product brand creation. The main research questions are:

- What is the relevance of a brand for SMEs?
- How can industrial design and modularization be utilized brand creation?

This paper examines product brands and their physical appearance (via industrial design and modularization) within SMEs. Corporate brands are excluded, although they are important for B2B sector and within SMEs. The paper concentrates on product brands with respect to the customer interface of B2B companies; in other words, it explores the way in which the customers of a business or organization perceive the product brand.

I apply Swan et al.'s (2005) robust design model in my analysis. Industrial design does not only define the appearance of a product; in most cases, it also increases usability. Modularity creates economies of scale (through standardization) and economies of scope (through tailoring). It also improves the options for outsourcing modules. Moreover, these brand tools (industrial design and modularity) may provide SMEs with additional resource (via higher sales revenue) and reduced costs (via more efficient production). To illustrate the argument, I make use of three case studies (K-Patents, Modulight and Genelec) to show the role played by brands within manufacturing SMEs in the international B2B market, including the creation of brands via the use of industrial design and modular products. Since the case companies come from a small economy, Finland, they have to operate the small industrial segments worldwide. This gives the international context in this paper.

This research is limited to SMEs. According to the European Commission's definition of SMEs (2005) companies are considered to be SMEs where they employ fewer than 250 persons, and have an annual turnover below €50 million. In 2013, 99.8 percent of all Finnish enterprises were SMEs. They employed 64 percent of all personnel and accounted for 53 percent of total turnover. (Statistics Finland, 2013).

The remaining part of this paper has four sections. In Section 2, I describe theoretical elements and present the product brand creation model. Section 3 presents the research methodology. In Section 4, the three SME cases (K-Patents, Modulight and Genelec) are described. Section 5 includes an analysis and comparison of these three cases, using key characteristics derived from the research literature as a basis for the comparison. Finally in Section 6, I draw conclusions and discuss implications for the future.

Central Concepts and theoretical inputs

This section examines the role of brands within SMEs in the B2B market. It then looks at industrial design and modularity. The section then introduces the product brand creation model.

Brands and SMEs in the B2B Market

Most research literature concentrates on brands in consumer markets (Merrilees, 2007; Mudambi, 2002; Webster & Keller, 2004; Brown et al., 2012). Strong consumer brands are built to differentiate one seller from another (Aaker, 1996; Kapferer, 1997). According to Kapferer (1997), brand is more than just giving a brand name to a product or products: “brands are a direct consequence of the strategy of market segmentation and product differentiation”. Thus the role of brands and brand management is primarily to create differentiation and preference in the minds of customers. The development of product brands has been built around the core role of maintaining differentiation in a particular market (Knox & Bickerton, 2003).

Some research has been carried out on brands in B2B markets. According to Mudambi (2002), there are three main differences between consumer and B2B brand management. Firstly, industrial brand management relies more on branding at the corporate level with only some experiments at the product level. Secondly, when compared with consumer markets, brand management in industrial markets emphasizes risk-reduction rather than the self-expressive benefits of consumer brands. The third difference relates to the number of brands within a company. In industrial markets, an increase in the number of brands is mainly due to acquisitions. In the consumer market, on the other hand, Mudambi (2002) identifies a tendency to reduce the number of brands within a company.

Corporate brand development builds on product brands, seeking to create differentiation and preference. However, corporate brand development is conducted at the level of the firm instead of at the product or service level. Moreover, corporate brand development targets not only customers but stakeholders including employees, customers, investors, suppliers, partners, media, authorities, etc. (Hatch and Schultz, 2001).

According to brand management theory, brand information: 1) identifies products, services and businesses; 2) communicates their benefits and value; and 3) reduces the risk and complexity of the buying decision (Kotler & Pfoertsch, 2006). Buying centers are more brand sensitive, regardless of whether risk is relatively low or high (Brown et al., 2011). Brands both minimize risk and offer cues to simplify consumer choice in low-risk situations where an extensive search process may be omitted (Kotler & Pfoertsch, 2006). Brown et al. (2012) found that both purchase importance and purchase complexity have a curvilinear influence on brand sensitivity. The former has an inverse U-shaped relationship, which means that the usefulness of a brand increases when purchase importance grows from unimportant to moderate. The usefulness of a brand decreases, however, when purchase importance goes from moderate to highly important. The relationship between purchase complexity and brand sensitivity depends on the size of the organization, the nature of the product (tangible or intangible), and the nature (contract versus no contract) of the relationship between seller and buyer (Zablah et al., 2010). For small purchasing firms, brand sensitivity increases with product complexity. For tangible products, brand sensitivity increases with moderate purchase complexity.

Little research has been carried out on the role played by brands in SMEs (Abimbola, 2001; Abimbola et al., 2007; Berthon et al., 2008; Merrilees et al., 2011). Offerings in the B2B market include five elements that can be used in brands: product, service, logistics, advice, and tailoring (Beverland et al., 2007). According to Webster and Keller (2004), market segmentation, targeting and positioning apply to B2B markets. These are also the fundamentals of brand strategy. The role played by brands in manufacturing SMEs operating in industrial markets has also attracted little research attention (Ahonen, 2008, Inskip, 2004; Saraniemi et al., 2010). Some researchers argue that lack of resources (time, money, number of personnel) prevents SMEs from creating brands (Ahonen, 2008; Saraniemi et al., 2010).

Differentiation from competitors is one of the major benefits of branding (Kotler & Keller, 2009). In brand management, companies can choose which brand elements to incorporate in their brands. Kotler and Keller (2009) define two sets of criteria for choosing brand elements: building the brand and defending the brand from competitors. The criteria for building the brand include: memorability (how easily the brand is remembered), meaning (the product qualities suggested by the brand), and likeability (how it appeals to the customer). Criteria for defending the brand include transferability (how easily the brand can expand e.g. to new markets), adaptability (how easily it can be updated) and protectability (e.g. is it legally protected from competitors).

Industrial design

Industrial design, as a part of marketing (Kotler, 2003), contributes to NPD by enhancing the customer's interface with the product, including ease of use, capabilities, and appearance (Hertenstein et al., 2005). Industrial design is critical to NPD, together with research and development (R&D), marketing, manufacturing, and purchasing. NPD should be integrated with other organizational functions (Beverland, 2005). Dahl et al. (1999) and Srinivasan et al. (1997) emphasize the importance of industrial designers for product success. According to Hertenstein et al. (1997, 2005) and Walsh (1995), effective industrial design improves corporate performance.

Candi (2006) defines design "as the part of the innovation process, which enhances and communicates the value inherent in products or services (Hertenstein et al., 2005; Yamamoto & Lambert, 1994) and as such encompasses both functionality and aesthetics". Innovations also make connections and constantly challenge existing systems and the status quo (Drucker, 1985, von Stamm, 2004, Le Masson et al., 2010). Dahl et al. (1999) and Srinivasan et al. (1997) emphasize the importance of industrial designers for successful products. SMEs in Europe have turned to designers for better product differentiation, to launch new brands, to achieve design leadership, and to introduce new technology (Borja de Mozota, 2002). The use of industrial designers has become increasingly important in terms of the different areas of expertise called on by SMEs to launch new products (Borja de Mozota, 2002).

Modularity

Modularity enables the mixing and matching of modules in such a way that the final product fits the needs of the buyer (Baldwin & Clark, 1997). In addition, it enhances flexibility by increasing the number of possible configurations (Schilling, 2000).

Modularity can also be seen as way to organize complex products and processes efficiently. Tasks and product parts can be managed independently when they are deconstructed into basic parts. These deconstructed parts are called modules. Modules are designed separately and then put together to function as a whole. (Baldwin & Clark, 1997) Sanchez (1995) argues that one can take out or add modules to a modular product without having to change the overall product design or other modules within the product. Schilling's (2000) general model of modularity defines modularity as the degree to which the components of the system can be separated and put together to create a customer-oriented product. After any changes, the product should function as well as it did before the changes; only a small amount of functionality loss is permitted. In a well-functioning modular product, the interfaces between modules are standardized (Sanchez & Mahoney, 1996). These interfaces represent how the modules interact with each other. Another matter closely related to modularity concerns architecture. Architecture determines which modules are part of the system as well as the individual function of each module (Baldwin & Clark, 1997).

Modularity can be illustrated with the idea of a puzzle. Each piece in a puzzle represents a module. The pieces are put together to create the finished puzzle, which represents the whole product. The picture or the surface material of the pieces can be changed, provided the borders stay the same. The picture and surface materials are the characteristics of a module, whereas the borders represent the standard interfaces between the modules (Lamminen & Uusitalo, 2011).

Modularity generates advantages for both producers and their customers. Where the components have standard interfaces, mixing and matching is possible. This in turn creates the possibility for mass customization (Voss & Hsuan, 2009). When mass customization is utilized, a wide range of products can be made available for customers (Salvador, 2007). Such products meet the specific needs of individual customers; however, costs are nearly as low as with mass production (de Blok et al., 2010). In addition, modularity creates enormous flexibility (Sanchez & Mahoney, 1996; Baldwin & Clark, 1997). It enables parts of the product to be recombined quickly in a way that fits the needs of individual customers (Schilling, 2000).

According to Schilling and Steensma (2001), there are three ways to create modularity in organizations: 1) contract manufacturing; 2) alternative work arrangements; and 3) alliances. Contract manufacturing allows companies to meet market demand without increasing the workforce or committing capital to long-term investment. It also enables a focus on the company's core competence. In a sense, contract manufacturing increases flexibility and economies of scale. The downside is that companies have to be careful with the information they share with contractors. In

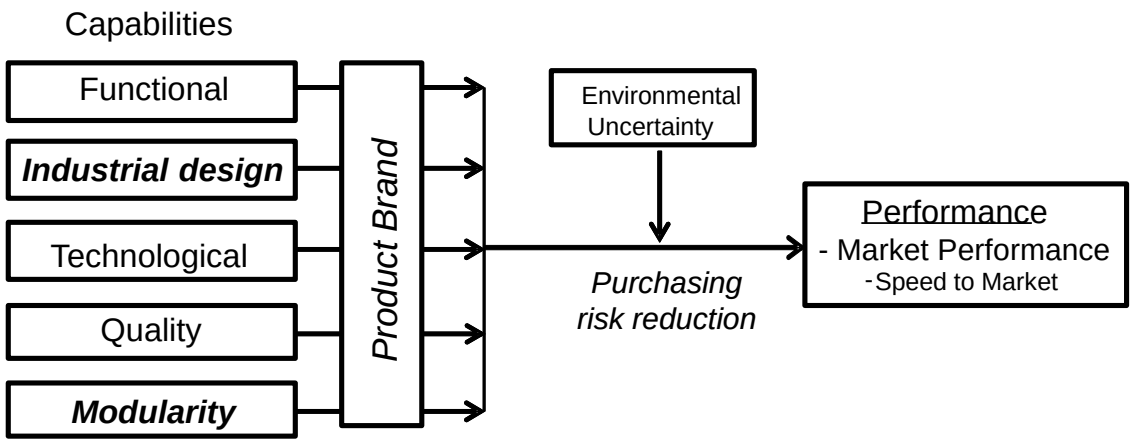
addition, transaction costs have to be analyzed as well as missed learning opportunities (Schilling & Steensma, 2001). Baldwin and Clark (1997) report similar findings.

Modular product design enables a large number of variations (Shirley, 1990; Sanchez & Mahoney, 1996), increased product variety, economies of scale in R&D (Huang & Kusak, 1998), flexible and agile manufacturing (Marshall et al., 1998), a learning curve effect, and lower prices for materials and parts (Ishii et. al. 1995 in Gershenson et al., 2003). Modular design is flexible; product variations can be leveraged by substituting different modular components into the product architecture (Sanchez, 1995).

The product brand creation model in NPD

Swan et al. (2005) created a robust NPD model used in the creation of products for varying markets worldwide. The model is built on research literature, executive interviews, and anecdotal evidence. The model has four capabilities: 1) functional; 2) aesthetic (including industrial design); 3) technological; and 4) quality. According to the authors, the model has an impact on a company's performance in uncertain environments. In this paper, analysis of the model is limited to market performance and excludes uncertain environments. Also, since industrial design has an aesthetic dimension, this study modifies the model by switching aesthetic by industrial design and by adding modularity as a fifth capability. According to Homburg et al. (2010) on the B2B market brand awareness correlates to company's market performance. Based on this I have added product brand via which all five capabilities affect the company's market performance in my model. This product brand creation model also includes reduced purchasing risk for the buyer. The additions to the model designed by Swan et al. (2005) are shown in italics (see Figure 1). The focus is on the industrial design and modularity capabilities (emphasized by bold text). In order to evaluate their impact on bran creation, I have listed their advantages and disadvantages (see Table 1).

Fig. 1: The model for SME product brand creation (adapted from Swan et al., 2005)



Tab. 1: Advantages and disadvantages of industrial design and modularity

Industrial design	**Literature**
enhancing customer interface, ease of use and appearance	Hertenstein et at., 2005
is a key area with other functions of a firm	Hertenstein et al., 2005;
enhances and communicates product value	Beverland, 2005; Kotler, 2003
encompasses functionality and aesthetics	Hertenstein et al., 2005; Yamamoto and Lambert, 1994
challenge existing systems or status quos	Hertenstein et al., 2005; Yamamoto and Lambert, 1994
gives memorability, meaning, and likeability	Drucker, 1985, von Stamm, 2004, Le Masson et al., 2010
is used for differentiation, segmentation, targeting and positioning	Kotler and Keller, 2009
is important for successful products	Kotler and Keller, 2009; Borja de Mozota, 2002
	Dahl et al., 1999; Srinivasan ae al. , 1997
Modularity	**Literature**
mixing & matching of modules to fit customer needs	Baldwin and Clark, 1997
flexibility by inc. the # of possible configurations	Schilling, 2000
flexibility by quick changes	Sanchez, 1995; Marshall et al., 1998
organize complex products & processes efficiently	Baldwin and Clark, 1997
no need to change the overall product design	Huang and Kusak, 1998 Shirley, 1990
standardized interfaces	Lamminen and Uusitalo, 2011
mass customization,	Voss and Hsuan, 2009; Salvador, 2007
economies of scale and scope	Shirley, 1990; Sanchez and Mahoney, 1996
outsourcing / contract manufacturing	Schilling and Steensma, 2001
focus on the company's core competence	Schilling and Steensma, 2001
Disadvantages of outsourcing	Schilling and Steensma, 2001
high transaction cost, leakage of knowledge	Schilling and Steensma, 2001; Baldwin and Clark, 1997;
miss of learning opportunities	Schilling and Steensma, 2001; Baldwin and Clark, 1997

Research Methodology

As research into brand creation is a new area, with regard to manufacturing SMEs in the industrial market, and because this paper aims at model-building rather than theory-testing, I employ a case study methodology (Yin, 2009). According to Bonoma (1985), case studies are appropriate when the goal is description, classification and theory development, that is, the understanding of an important marketing problem or phenomenon. The case study approach is also in accord with earlier brand studies in SMEs (Krake, 2005; Rode & Vallaster, 2005; Wong & Merrilees, 2005; Bresciani & Eppler, 2010; Juntunen 2012). According to Siggelkow (2007), case studies may be used as illustrations when making a conceptual contribution and to sharpen existing theory by identifying gaps and starting to fill them.

An abductive (with induction and deduction) research process assumes that theoretical insights gained during the research can modify the data and the theoretical framework; in addition, matters arising from the data can lead to new questions and theoretical views (Peirce 1955; Eisenhardt, 1989; Dubois & Gadde, 2002). Triangulation (Jick, 1979; Pettigrew, 1990) was applied to various data sources including interviews, histories of the company, datasheets, promotion material, articles in magazines, trade journals and newspapers, and Internet pages.

This study focuses specifically on brand creation factors, such as industrial design and modularity, unique to manufacturing SMEs in global industrial markets. In 2012, K-

Patents, Modulight and Genelec, were picked as examples of innovative Finnish SMEs operating on the international/global market (Saarnio and Hamilo, 2013). For the purposes of this study (brand creation via design and modularization), the case selection was random. These companies have been followed for research purposes for 23, 12 and two years, respectively. The focus of the studies has been such as innovation (Uusitalo, 1999), entrepreneurship (Uusitalo, 1999), internationalization (Uusitalo, 1999; Uusitalo et. al., 2009), networking (Uusitalo, 1999; Uusitalo & Voipio, 2013), customer value creation (Uusitalo, 2013a, 2013b; Uusitalo & Voipio, 2013) and positioning (Uusitalo, 2008). This has involved abductive research process with data triangulation. The case study of K-Patents has been used in management training and master level degree courses for 20 years. In 2012-2013, a case study with analyses of all three companies was written (see Uusitalo, 2013a, 2013b; Uusitalo & Voipio, 2013). Findings have been presented at conferences (Uusitalo, 1999, 2008, 2013c; Uusitalo et al., 2009). The case studies are based on long term follow-up, in-depth interviews with both closed and open-ended questions, work in management training, a thesis for a master's degree, and visiting lecturers from all companies (see Appendix 1).

The SME Cases

In this section, I explore three Finnish SMEs with global industrial markets. K-Patents, Modulight and Genelec represent the process industry, the laser industry, and the professional audio monitoring industry, respectively.

K-Patents: The process industry case

K-Patents (founded in 1978) delivers process refractometers to processing industries such as the sugar, pulp and paper, chemical, food and semiconductor industries. All these industries are looking for better process control. Environmental aspects have played a crucial role in generating the need for better process measurement. Refractometers (see Figure 2) measure the concentration of the main component (sugar) in a process medium (coffee). In 2012, K-Patents had 40 employees and a turnover of €8 million. K-Patents exports 95% of its production to 75 countries. Its largest markets are in Europe, the US and Asia. K-Patents has delivered approximately 11,000 refractometers in 35 years. Approximately 800 new devices are sold each year. Devices from K-Patents can be seen in use in both a Chinese chemical plant and a Californian semiconductor plant. K-Patents has exported more than 90 percent of its production for 25 years. It has subsidiaries in the US and China. The company has a dealer network for other regions (Uusitalo & Voipio, 2013).

K-Patents applies the refraction of light to measure the concentration of components. The company's refractometer combines a linear charged coupled device (CCD) camera where hundreds of light cells are assembled in one row within a single integrated circuit (see Figure 3). To give an example of its precision, the length of a row with 256 light cells covers only three millimeters. The device uses a digital measurement technique; each light cell is on the light or in shadow. The advantage of using digital measurement technology rather than analogue technology is the complete reliability of the

measurements (i.e. no drift) and its compatibility with digital process control. The refractometer is a highly accurate measuring device that can be used in several applications. It is also easy to assemble within the process pipe of a plant. The manufacturing costs of a product with better quality (more accurate) are higher. The buyer expects a better product to be more expensive. The price of the K-Patents refractometer is about 40 percent higher than competitor prices (in 2012, the average factory price was approximately €10,000). K-Patents products are at the high end. In addition to the digital measurement principle, the measuring head of the K-Patents refractometer has been designed so that the same size fits both a large and small pipe (Figure 4).

Fig. 2: K Patents process refractometer

Fig. 3.: Light source, prism and digital CCD-camera

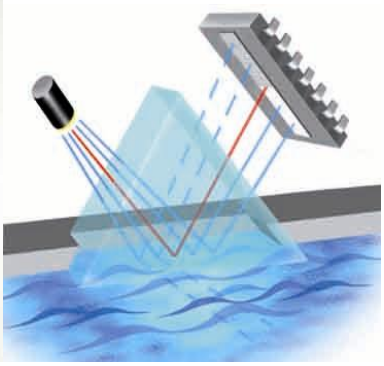


Fig. 4: Brand creation by the shape and color of the cover

A microprocessor handles the linearization of the signal and the control of the measurement. The cover of the measuring head is painted red and designed so that the K-Patents device is recognized immediately when it is seen at the plant; this is called the “Coca Cola bottle effect” (Figure 4) (Kåhre & Kamrat, 1990). The products have several modules, but the cover always has the same shape and color (Hämäläinen, 1992). In the early years, the company participated in a number of annual trade fairs. In the early 1990s, K-Patents display stands were consistent with the appearance of the product brand (see Figure 5). After 25 years in the business, the company was able to change the color of the cover when new applications required the introduction of stainless steel covers (see Figure 6). Recently, a number of industries have been working to reduce wastage of raw materials and chemicals as well as to lower energy consumption. All these improvements have increased the technical requirements of K-Patents’ products and services.

Fig. 5: Brand creation by the shape and color of the display Stand

Fig. 6: A stainless steel model

K-Patents has applied “openness” in competition. K-Patents datasheets reveal the technology used. Nobody can steal their ideas and present them as their own. In the same manner, the company publishes the reference list (Kåhre and Kamrat, 1990). K-Patents has a light organizational structure. From the beginning, the company outsourced as much as possible. The K-Patents device was designed in a modular way in order to decentralize manufacturing. Only the final assembly and calibration is carried out at the company’s own facilities. It has been easy to take on new technology, such as new connections in the circuit boards, because the company does not have its hands tied by the limitations of its own production plants and machinery (Hämäläinen, 1992).

Modulight: The laser industry case

In 2013, the size of the global laser market was €6.34 billion. Segments include communications and optical storage and materials processing and lithography, which were the largest segments (covering about 76 percent), followed by medical and aesthetic, R&D and military, instruments, and displays and printing. The laser industry is highly concentrated. The turnover of four German and US companies (Trumpf and Rofin-Sinar, and IPG Photonics and Coherent, respectively) make up more than 60 percent of the market (Overton et al., 2014).

Modulight (founded in 2000) manufactures vertically-integrated laser diodes. The company has design and manufacturing capabilities that range from chips via tailored-laser solutions to optical subsystems and turnkey deliveries. The company is a spin-off from the Tampere University of Technology. In the last five years, Modulight has co-operated successfully with PerkinElmer in the medical sector. The company’s customers are in the medical, defense and security, industrial and optical communications markets. Modulight’s turnover in 2011 was €2 million and it had 17 employees. The company has a semiconductor plant in Finland and suppliers in Asia. Modulight markets laser solutions via two sales companies and a worldwide agent network to five continents and over 20 countries. Modulight works with customers, suppliers and partners on a long-

term basis. It frequently introduces new products and offers strong technical support and flexible customer service. It is an ISO-certified supplier of lasers. Modulight's robust products work even in the harshest environments.

In 2010, its main markets were:

- entertainment, display and projection (3D cinemas, TV and laser shows), 7%;
- defense and safety (perimeter security, range finding, target designation), 11%;
- communication 16%;
- medical, 35%;
- industrial and environment, 23%;
- R&D, 21%; and
- others, 16%.

In 2008, Modulight introduced SparkLight (see Figure 7), a new turnkey laser platform. Designed to support both research and industrial activities, the turnkey laser platform offers versatility and ease-of-use to the expert and novice alike. The system embeds everything required to operate Modulight's acclaimed broad-area lasers, from the laser driver to cooling and monitoring, all in a compact package. A microprocessor-controlled supervisory circuit ensures the safe and smooth operation of the system. The laser platform operates in continuous-wave mode, with optional low-bandwidth modulation capabilities. The SparkLight turnkey laser platform can be adapted to power any of Modulight's high-power laser arrays, offering a broad wavelength coverage. The system output is fiber-coupled by design; however, alternative configurations can be supplied on request. All the features of the module are modifiable to suit the needs of the end customer. The control circuit can range from a simple analog interface to a computer-controlled digital assembly, whereas cooling can be air-based or water-based, depending on power levels and user requirements. The SparkLight turnkey platform is available for three applications: 1) OEM systems; 2) rack-mounted for industrial applications; and 3) a desktop case with an easy-to-use touchscreen interface for research and industrial application development.

Fig. 7: The SparkLight laser platform

Genelec: The professional audio monitoring industry case

Genelec was found in 1978 to manufacture 340 units of the speaker, the S30, for YLE, the Finnish broadcasting company. Genelec introduced then active speakers in the professional audio monitoring industry. The company made also sound reinforcement contracting which made once upon time half of the turnover. The

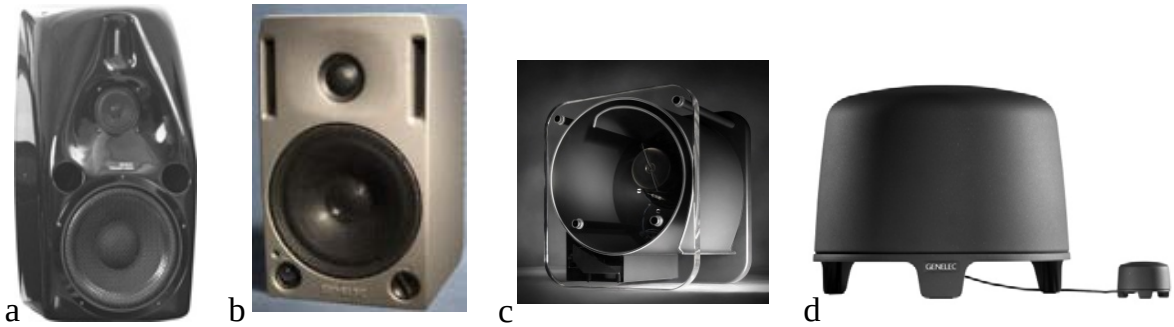
company installed many drama theatres in several prestigious places in Finland and abroad. This business was quitted in 1989. Genelec is the industry leader in active monitors. The company's products offer reliability and neutral sound reproduction, regardless of size and fit for the listening conditions. Industrial design has been on its agenda for more than 25 years. In 2011, the company's turnover was €17.5 million with 100 employees. Genelec exports most of its products to over 60 countries. Genelec has three main markets comprising: 1) professional audio monitoring systems for broadcasting companies; 2) equipment for recording studios; and 3) audio systems for home theatres (Uusitalo, 2013a).

People usually think that a good speaker enclosure must be made from wood-based materials. In 1985, Genelec introduced a new speaker shape, made of glass fiber, for the 1022A (Figure 8a). The aim was to eliminate diffraction by the use of a rounded shape and to control directivity. The result was breathtaking in acoustic terms. The controlled directivity made the off-axis response flat, which meant a wider listening area (Genelec, 2008:51). In 1987 Genelec's British distributor told that "the sound of your products is excellent but is difficult to believe that they come from the same factory so different they look." This comment was well taken by Genelec and it directed their design and brand creation more than a decade (Martikainen, April 2 2014). In 1996, the company introduced the first die-cast aluminum model (1029A, Figure 8b). Its introduction was triggered by the company's foreign distributors who saw the need for a smaller product. Die-cast aluminum offered, among stiffness and other benefits, large internal volume in relation to the external enclosure size. Co-operation with Harri Koskinen, one of the most highly-acclaimed industrial designers in Finland, led first to the development of the 6040A (2002) and then to the launch of the 8000 Series (2004). With their optimized, curved, die-cast aluminum structure, their high performance reflex port design, their novel, low-distortion drivers with sophisticated filtering techniques, and their versatile mounting features, these products set a new standard in two-way monitors.

When a prototype of the Genelec Laminar Spiral Enclosure™ (LSE™, Figure 8c) subwoofer was shown to distributors in 2001, the first reaction was astonishment: "This can turn out to be a total flop or a great success. Basically a subwoofer cannot look like this. On the other hand, if somebody is to redefine the subwoofer, it should be Genelec" (The Genelec Story). Introduced in 2002, this subwoofer has proved a great success. The spiral-shaped design yields an extremely rigid enclosure exterior, which also forms the subwoofer's integral port. With optimal construction, the subwoofer is an extraordinarily accurate and responsive low-frequency system with very low distortion, matching the quality of the main speakers. Genelec's bass management system gives a seamless link from the subwoofer to the main speakers. The idea for the shape of the 5040A (Figure 8d) emerged when one of Genelec's acousticians visited a pressure die-cast manufacturer. The acoustician had a kettle with him and used it to design a new subwoofer. The final design was created in co-operation with designer Harri Koskinen. Genelec's products have won several domestic and international awards. The Laminar Spiral Enclosure™ (LSE™) and 5040A subwoofers are two examples representing

Genelec's unique industrial design. These products are so different from existing products in the market that professionals immediately link them to Genelec.

Fig. 8: Genelec products: a) 1022A (1985), b) aluminum case 1029A (1996), c) LSE™ (2002) and d) 5040A (2008)



Analysis of findings

This section intends to answer the research questions

- What is the relevance of a brand for SMEs?
- How can industrial design and modularization be utilized brand creation?

by analyzing the findings of individual cases. The relevance of brand on SMEs is evaluated by significant events in the company development. The impact of industrial design and modularization on brand creation is evaluated by the model for SME brand creation (Figure 1) and Advantages and disadvantages of industrial design and modularity (Table 1). K-Patents and Genelec have used industrial design and modularization in product brand creation from the beginning.

In the early 1980s K-Patents offered a better solution for measuring concentration in the international Finnish process industries such pulp and paper industries (Uusitalo, 1999). The excellent functional capability (elimination of drift) together with industrial design and the bright color ("the Coca Cola bottle effect") enhanced and communicated product value and made the product easily recognizable and memorable. The brand recognition reduced the purchasing risk for potential customers. This gave relevance for the brand. K-Patents also uses modularity in its products and exploits economies of scale in manufacturing (modules are produced in series of 20 to 50 units, see Appendix 2) and economies of scope in matching (by standardizing) customer demand. Modularization and outsourcing have also brought the company flexibility; K-Patents can demand the latest manufacturing technologies from its suppliers.

Since Genelec offered audio monitoring systems for national broadcasting companies its business was from early on international. The first foreign customer was RAI in Italy in 1978 (Genelec, 2008). In 1987 the British distributor's comment on design and brand was very crucial. The comment not only told the company that brand (appearance via design) was important but also made the company to focus on its main business (active speakers) and to drop the sound reinforcement contracting. Thus,

brand creation had relevance on a SME. Genelec has used both industrial design and modularity to improve both the functional and technical capabilities of its products and to increase the aesthetics of its products. It is crucial that designers and engineers respect the work of each other. Flexibility is needed on both sides (Neva, 2010). The design of products has been selected based on their good acoustic characteristics and on environmental benefits (products are long-lasting and can be recycled). For instance, in 1985, Genelec eliminated a significant amount of diffraction (increased functional capability) by using rounded speaker cabinets. Industrial design has also challenged status quo by introducing new material (glass fiber and aluminum) and unique shapes for products (LSE™ and 5040A). In 1985 the company started to use modular units in electronics of its products.

Since Modulight was a spin off from an international research team at Tampere University of Technology its business has been international since the beginning. It received start financing from a French investor (Uusitalo, 2013b). The trigger for Modulight's use of industrial design and brand creation came from its first customers in the medical sector. Laboratory workers enjoy aesthetically-pleasing instruments. Industrial design brought modular product platform which also enhances brand creation.

This study contributes to the research literature by identifying the unique characteristics of brand creation in SMEs in the international B2B market. Functional and technical capabilities are crucial for brand creation in international industrial market. However, industrial design and modularity capabilities can enhance the product brand creation abilities of SMEs. Industrial design brings ease of use, better functionality, and improved appearance (Hertenstein et al., 2005). Modularity also provides other advantages: economies of scale (a 40 unit production is of great help); economies of scope (flexibility); (Sanchez, 1995; Sanchez and Mahoney, 1996); and compatibility. Moreover, it allows companies to create organizational modularity by outsourcing. Only the assembly functions crucial for the quality are retained within the SMEs. Based on this research industrial design and modularity seem to be quite general in international industrial market which make them good capabilities for brand creation in the global market.

Table 2 illustrates the impact of the five key attributes (functional, industrial design, technological, quality and modularity) on product brand development in each case.

Tab. 2: Case comparison

Capability	K-Patents	Modulight	Genelec
Functional	eliminates drift (need) positioning (leader) differentiation	tailored solutions compatible differentiation	active principle (need) industrial design is of help positioning (leader) segmentation differentiation
Industrial design	*red, appearance* *"the Coca Cola bottle effect"* *positioning (leader)*	*industrial designer* *appearance*	*Aesthetics, appearance* *combines art and technology* *positioning (leader)* *challenging status quo* *international awards*
Technological	optics & electronics positioning (leader)	university spin off photonics & mechanics robust solution	active principle material, electronics international awards
Quality	inhouse assembly/testing	ISO certified	inhouse assembly/testing inhouse electronics
Modularity	*fit customer needs* *standardized interfaces* *makes things simpler* *flexibility* *economy of scale & scope outsourcing*	*standardized* *interference* *flexibility* *economy of scale & scope* *outsourcing*	*economies of scale in product families* *outsourcing* *modular electronics*
Product brand	Industrial design and modularity enhanced	Industrial design and modularity enhanced	Industrial design and modularity enhanced

Conclusion

The brand has been important for the case SMEs on international market as the following significant events show. The brand helped K-Patents in its internationalization within international process industries. The brand creation changed the focus of Genelec only on its internationally enlarging audio monitoring business. The brand helped Modulight in its entry into the international medical sector. Industrial design and modularity were found out to be excellent capabilities enhancing the brand built only first on customer focused functional and technological capabilities. Thus, the model for product brand creation in SMEs (Figure 1) gives a comprehensive view (with emphasizing industrial design and modularity) of the options for SMEs to create product brands while operating in international markets.

Modularity can be seen as way to organize complex products and processes both effectively (externally that is creating products to suit customer needs) and efficiently (internally that is to reduce manufacturing costs) but not only efficiently as Baldwin & Clark (1997) say. According to Schilling and Steensman (2001), contract manufacturing and alliances help create modularity in organizations. Contract manufacturing allows

companies to match their offering with market demand without increasing the workforce or committing scarce capital to long-term investment. It also enables a focus on the company's core competence (K-Patents keeps final assembly and calibration inhouse). By subcontracting design, the SME can use the latest technology for its products. Contract manufacturing increases flexibility and economies of scale.

The use by K-Patents of the "Coca Cola bottle effect" refers to Morgan's (1999) notion that "Unconventional communications can get people talking". Genelec's continuous innovation and product branding (showing new technical features in new physical shapes) relates to Morgan's (1999) "idea centered" rather than "consumer centered" approach. Product brand creation can be based not only on the physical similarity of a company's products but also on the dissimilarity of physical products. Genelec uses both strategies. Products in the loudspeaker series are similar and use a modular construction, whereas the subwoofers (see Figure 8 c and d) have totally different shapes.

In the large and highly competitive laser market, Modulight has created a competitive advantage by using a recognizable product brand. The company has used an industrial designer to design the appearance of the SparkLight laser platform, making it instantly recognizable as a Modulight product (Figure 9).

Fig. 9: A sample showing the consistent world of Modulight. Photos: Daddy Finland Oy

Research literature highlights many benefits from product modularity (see extensive studies by Gershebson et al., 2003 and 2004). However, this paper identifies a new benefit that is specific to SMEs. This is the notion of product brand creation via modularity. Any particular module should be easily recognizable. The combination of modularization, brand creation and unique customer value delivery (especially in the international process industries) provides a good platform for the SME. This is particularly the case with the K-Patents refractometer. First, the product design combined optics and electronics to solve the problem of drift. The company dared to create a unique modular design, which was instantly recognizable on the factory floor. K-Patents successfully exploited the "Coca Cola bottle effect".

The message for managers is clear: using both modularity and industrial design in brand creation may free up existing resources or bring in new resources for the SME. This counters the argument that SMEs lack sufficient resources for brand creation (Ahonen, 2008; Keller, 2008; Saraniemi et al., 2010). This study also shows that brands are particularly important for SMEs operating in international markets.

Limitations

This research has several limitations. The number of the companies was only three, which means that more SMEs should be studied to more thoroughly validate the product brand creation model (Figure 1). From the brand point of view, the case companies were selected randomly. However, when looking at innovative, international SMEs, product brand creation may be embedded in them from the start. Another limitation is that all case companies come from Finland. The results may be different for companies selected from other countries. In Finland, as in Italy, there exist a number of highly-acclaimed industrial designers such as Harri Koskinen who worked with Genelec. This research was limited to product brand creation within SMEs. In this context, the research should be enlarged to include corporate brands.

Further Research

As mentioned earlier, this paper focuses on the creation of product brands and the physical appearance of the product by industrial design and modularization. Aspara and Tikkanen (2008), Mudambi (2002), van Riel et al. (2005), and Taylor et al. (2004) argue that brands are particularly important for corporates in the B2B context. Juntunen (2012) found corporate brands important for SMEs in the software business. In startups, image, awareness, trust and credibility are considered as external elements of the corporate brand, whereas delivery times, product quality, communications and staff behavior are internal elements of the corporate brand (Inskip, 2004). This is in line with current research on corporate brand creation (see, for example, Urde, 2003; Balmer & Gray, 2003; Hatch & Schultz, 1997, 2001). The K-Patents display stand design supported not only their product brand creation but also their corporate brand building. Similarly, the consistent world of Modulight (see Figure 9) reflects corporate brand creation. All the issues mentioned above suggest the need for further research from the corporate brand perspective on these three cases as well as on other SMEs operating in the international B2B market.

Wong and Merrilees (2005) distinguish three different branding strategies (minimalist, embryonic, and integrated) in the SME context. A minimalist strategy applies to a company with a low interest in marketing. An embryonic strategy applies to company with a stronger emphasis on marketing, but which views branding as optional and unimportant. An integrated strategy applies to a company that places a strong emphasis on marketing and branding. In integrated strategy, branding is an essential part of business. It would also be interesting to look at brand creation in SMEs using this framework.

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Appendix 1: Primary Data in the Study

Data gathering method	Person(s)	Date	Duration/ role of the author
Management training Visiting lecture Visiting lecture/analysis	 CTO (A) CEO (A)	 14 Feb. 1992 6 Mar. 2002	 1 hour 30 min 1 hour 30 min
Master level classes Visiting lecture/analysis Visiting lecture/analysis Visiting lecture Visiting lecture	 CEO (A) CEO (A) Marketing Man. (B) Marketing Man. (B)	 5 Nov. 2003 24 Nov. 2009 6 Mar. 2009 6 Sep. 2010	 1 hour 30 min 1 hour 30 min 1 hour 30 min 1 hour 30 min
Management book launch Visiting lecture	Chairman (C)	5 Mar. 2013	25 min
Studies Marketing assignments Master thesis (K-Patents as a benchmark target) Master thesis/Modulight	 Marketing assist. (A) An outsider Marketing Man (B)	 1992-1993 2000 2004	 Evaluator Supervisor Supervisor
Management training As a participant Strategy assignment	 CEO (B) CEO (B)	 2001-2002 12 May 2002	 Program director Supervisor
Interviews	CEO (A) CEO (A) CEO (A) CEO (A) CTO (A) CEO and Marketing Man. (B) Chairman (C) CEO (C) CEO (C) CTO (C)	10 May 1996 22 Feb. 2002 5 Nov. 2007 14 Aug. 2012 14 Aug. 2012 18 Jun. 2012 20 Jun. 2012 20 Jun. 2012 25 Mar. 2014 25 Mar. 2014	1 hour 1 hour 2 hours 3 hours 2 hours 2 hours 2 hours 3 hours 3 hours 2 hours
Writing a book chapter	CEO (A)	Autumn 2013	Co-author

Appendix 2: Creation of a Production Network

Presentation by Chief Technology Officer, Arto Hämäläinen, 14 February 1992

Principles in Production

- Production is based on customer orders
- Part assemblies or modules are made in small lots of 10, 20, 50 or approximately 100 pieces
- Partners make as much as possible and are as ready as possible for the job. For example, assembly, testing and ageing of electronics
- K-Patents is responsible for the final assembly and calibration of the product according to the customer specification
- K-Patents takes care of all After Sales deliveries

In the Future

- The size of production lots of modules will increase
- Partners will be even more responsible for material handling
- High quality production will be emphasized (ISO)
- Long term co-operation will be continued, provided that a partner's machinery, technology and ability to respond to more demanding products continues to fit with K-Patents' new product generations