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Sustainable New Product Development – a Market Oriented View

Abstract

Corporate sustainability, as an overall strategic question is a topic often discussed in recent years. Besides the predominant environmental questions, social issues concerning the responsibilities of corporations are also handled. Nevertheless, the translation of these overall strategic questions into the daily operation of functions is left out.

This is true for the field of new product development (NPD), too. This is even imperative considering its role in corporate sustainability that several papers draw attention to. Nonetheless, while several studies are labelled as dedicated to sustainability, only few attempts are made at involving social issues. The present study discusses NPD in a marketing management context, where the main aim is not only to answer consumer demands, but also to fulfil real, sometimes hidden consumer needs.

Introduction

The concept of sustainability was formed on the international governmental sector, but its implication for business was induced soon. The dominance of environmentalism in early sustainability discussions is obvious. As Borghesi and Vercelli (2003) stated, despite the original definition of sustainable development (Bruntland 1987) in which '*inequality and environmental deterioration are conceived as equally important and interdependent conditions of sustainability*', later *'the focus concentrated on the environmental condition as if it were fully independent of the social condition of sustainability*'. This means that environmental issues get greater emphasis and efforts than the social ones (Vágási 2004, 245–246).

Consequently, environmental requirements are better understood than social ones. The translation of *environmental* criteria from a global to a local level, and the conversion of the theoretical requirements into the practice (i.e. drafting the concrete actions needed) is a well discussed area. At the same time, business tends to reveal the possible benefits of *social issues* to competitiveness. Nevertheless, while business started to integrate these into the strategy, there is a lack for a widely accepted 'comprehensive view' in the social area. The topics discussed concerning the social requirements of business sustainability are mainly international equity, as well as safety and health issues (Kőszeghy 2005).

Sustainability Approach in Business

Parallel to the global understanding, primarily environmental business responsibility was handled. However, this is required but not enough for achieving sustainability: the main goal is to take into consideration environmental as well as social consequences, together with economic business interest. This is often referred to as the 'Triple Bottom Line' (TBL), a concept introduced by Elkington (cit. in McDonough and Braungart 2002). The seeds of this integrated, triple bottom line based business perspective appear in recent studies (e.g. Seebacher et al. 2005).

While there is no generally accepted concept referring to the TBL sustainability of business, the European Union uses the wide understanding of 'corporate social responsibility' (CSR) for this purpose, and the local social responsibility of business is usually discussed under the denomination of CSR of SMEs[1] (see e.g. Munkelien and Vilsted 2002, Spence et al. 2004).

Moreover, the International Organisation for Standardization launched the development of a new standard, providing guidelines for social responsibility. This guidance standard will be published in 2008 as ISO26000, and it is supposed to offer a framework of social responsibility for organizations of all sizes and types and at any degree of development. As a set of aspects to be handled, ISO26000 could serve as a base for companies. They should not have to deal with answering the question '*What to manage?*; their task could be to reveal the ways of '*how to perform*' (manage) achieving sustainability goals.

From this TBL point of view, we can state that product development predominantly deals only with environmental criteria: while there are tools for measuring and managing the environmental performance of products, social requirements are not systemized at all, moreover, they are slightly understood (James 2001). The Integrated Product Policy (IPP) of the European Union for example deals only with environmental issues; the scope will be widened *later* to include the social requirements (IPP 2003).

Forces Enhancing Change

Consumer demand pulls out new solutions to the market. Thus, the development of consumer consciousness and the emergence of new consumer segments, together with the formation and establishment of NGOs are relevant from this aspect.

The roots of conscious consumerism can be traced back to Elkington and Hailes's book titled *Green consumer guide*, published in 1988. Following the publication of the book, the formation of consumer groups started: initially for concrete events, and later thematically – but mainly on environmental issues. However, the segmentation of consumers based on environmental (e.g. Roper 1992 cit. in Hassan and Vandermerwe 1994, RoperASW 2002) as well as on ethical concerns (Corrado and Hines 1997) has been performed.

On the other side of the market, business realized the benefits of environmental arrangements. The low hanging fruits are environmental arrangements resulting in better financial performance. The reduction of resource-use is a typical example for this. As the

[1] small and medium sized enterprises

use of the raw material is a key issue in realizing long-term environmental sustainability, several studies and concepts have been surged on the topic of resource efficiency. Targeting the reduction of resource use in Western societies, 'factor X' concepts (aiming X-fold improvement) were introduced, where the value of X is between 4 and 50 (REIJNDERS 1998). 'Factor 10' (introduced in 1995) aims at the tenfold reduction of material flow per unit of service. 'Factor 4' (WEIZSÄCKER et al. 1997) moderates the former, setting down the first step by achieving 'doubling wealth and halving resource use'. Basically, the higher the value of X is, the longer time-period is referred. Also, a higher X value mainly expresses the higher perceived severity of (usually environmental) problems.

Forces Against Change

Achieving sustainability seems to need a radical technological innovation. The barrier can be – beyond the risk/benefit rate, time period, etc. – the stage in which actual technologies are in their life cycle. Nevertheless, actual sustainability measures are mainly characterized by step-by-step improvements (JAMES 2001), rather than radical innovations. In this context, we distinguish radical (discontinuous) innovation that supposes new structures, and continuous innovation that is based on traditional structures (based on REKETTYE 2004). Whereas, some examples exist that result in radical improvement within the boundaries of traditional structures.

The prolonged time-horizon that sustainable approach needs – as compared to the traditional economic or environmental view – is often emphasized. This is conceived as a barrier, since business is used to, and usually interested in shorter periods than a sustainable situation would require. Short-term economic interest is (or should be) balanced with medium-term environmental issues that business started to deal with. At the same time, the implementation of social issues makes the system more complex and requires a long-term horizon. Thus, the higher the 'sustainability' degree of innovation, the longer the time-horizon needed. According to estimations (CHARTER 1998, SCHMIDT-BLEEK 1999), approximately 2 years need to be considered for arrangements that yield smaller environmental improvements, and for achieving the green limits this time-horizon is about 5 years. Alternative products can be born when a 10–20-year time period is taken into consideration, while the time-horizon required by (TBL) sustainability is appraised to be about 20–30 years.

The Bottom Needs

Several studies refer to current consumption as an aesthetic one. This means that motivations for purchasing products and services are emotional rather than functional. In the USA, for example, new houses built in 2002 were 38% bigger than in 1975, which is even more imperative considering that the average household size is decreasing (DOBERS and STRANNEGARD 2005). Another example can be clothing: consumers mainly purchase new fashion, new style or new image, rather than the function of clothes and shoes (the replaced clothes usually could fulfil their function).

The reasons behind the transformation of consumer behaviour are connected to the transformation of modern societies into post-modern ones. Among the main features of post-industrial societies, the pluralization of values (as opposed to acting upon norms) and a growing emphasis on self-realization and communication (as opposed to the materialist values of mass culture) should be mentioned (HRADIL 1992). Consequently, the role of innovation and the freedom of individual judgement are relevant. This growing emphasis on innovation, communication, and self-expression lead to aestheticized consumption, which is increasingly differentiated and trend conscious. Consumers are looking continuously for new challenges, new experiences, new sensations, new styles and new fashions. Thus, the bottom needs (real motivators of consumption) are beyond products and services: they are rooted in identity and self-realization, character and personality, authenticity and competence and confidence (TÖRŐCSIK 2003).

For fulfilling these bottom needs, only traditional consumption patterns are available. From another point of view, we could say that the answers for explicit consumer demands are limited by the products (or better: types of products) available. Concerning car-share and city-bike systems, values, needs and aims by consumption, as well as the standardised feature of these solutions can be barriers to success – beyond the cultural background.

ANSWERING BOTTOM NEEDS

As mentioned above, the field of answering consumer needs, namely NPD, is poorly developed with respect to integrated sustainability: predominantly environmental issues are handled. Also, in this context the expression 'sustainable design' is often misused as excluding social issues (e.g.: FULLER and OTTMAN 2002, CERIN and KARLSON 2002). Actual methods are criticized as they stimulate gradual (environmental) improvements. The need for radical changes is reasonable, e.g. by considering that the improvement of eco-efficiency is outweighed by the continuously increasing consumption (MICHAELIS 2003).

Based on the dematerialization requirement of environmentalism, the need for the substitution of products by services started to spread. At the same time, eliminating products in fulfilling consumer demands seems to be impossible in many cases. Thus, the main goal is to answer consumers' bottom-needs with innovative solutions. This requires a need-oriented approach instead of a product- or service-oriented one from the early product development phase (see *Table 1*).

Table 1. Some examples for product- and need-orientation

Product oriented view	**Need oriented view**
Refrigerators	Cool, temperated room
Washing machine	Clean, fragrant clothes
Car	Mobility (flexible, weather-independent, fast)
Copy machine	Documents

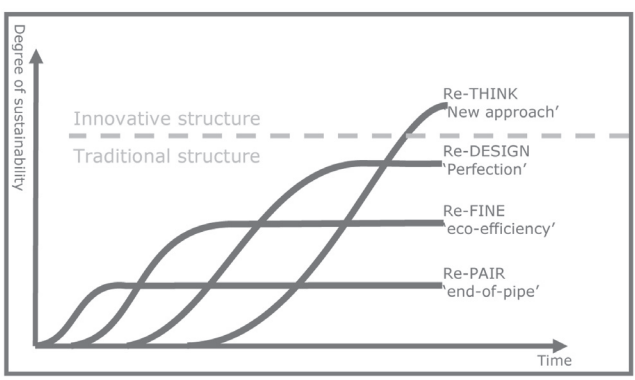
All environmental NPD theories refer to mainly technological and engineering tasks, which contradicts to the literature that reveals the significant role of marketing management in the development of a successful new product (VÁGÁSI 2000). The involvement of marketing management staff in NPD processes and an integrated approach on sustainability of the product development team can result in a more effective response to altered consumer demands – with an emphasis on bottom-needs. The potential of a new, TBL-based approach in enhancing corporate competitiveness is shown by pioneer solutions (see section 'Examples' later).

LEVELS OF SUSTAINABLE DESIGN

When considering product development issues, beyond the basic economic interests of business, altered (post-modern) consumer demands should be considered. At the same time, as the basic role of business is to fulfil consumer demands, the base of business should be altered. Whereas, several examples show the sustainability potential of rearranged demand-supply interests within the framework of traditional technology and with traditional products. These innovations are results of re-thinking the deepest motivators of consumption, and of revealing the bottom-needs. In some cases, offering existing products in a new way can result in a more sustainable situation. This requires a sustainability approach not only on the strategic level, but on the operative levels, too. This is even imperative, as several studies report significant resistance of the middle management levels in sustainability questions (see e.g. BIEKER 2005).

Based on the degree of integration of the approach of innovations, different levels of sustainable design were defined (*Figure 1*).

Figure 1. Levels of sustainable design



Source: Based on CHARTER and CHICK 1997:5 (Figure 1)

Within traditional structures, incremental improvement can be achieved by improving the environmental performance of existing products. This requires a life-cycle thinking as early as possible in the product design phase, with mostly engineers/designers involved. 'Re-Pair' (level 1) is characterized by 'end-of-pipe' solutions: usually the once 'created'

pollution is handled and decreased by an added technology. The aim by 'Re-Fine' (level 2) is an enhanced eco-efficiency, with special focus on energy and raw material use during the production process as well as during the product use. While 'Re-Design' (level 3) is still within the frameworks of traditional technology, improvements are performed along the whole lifecycle.

Nevertheless, innovative structures enhance a more systematic and integrated approach. 'Re-Think' (level 4) means the reconsideration and understanding of the key motivators of actual consumption by understanding consumer 'bottom-needs', which have the potential to reorganize actual production and consumption systems.

PSSs As Answers

The combination of products and services (called product-service system, PSS) can better fit sustainability requirements than single products or services. PSSs are not inherently more sustainable than products, but they have the potential to alter the pattern of motivators of market actors - resulting in a shift towards sustainability.

Three types of PSSs can be distinguished that have different sustainability potential (Tukker and Tischner 2006). The main aim of *product oriented services* (product orientation) is to complement existing products with additional services (maintenance, reverse logistics, etc.). Consequently, the result can be (mainly small-scale) environmental improvement. The term *use-oriented services* (service orientation) refers to the substitution of products by services – the focus is put on the use of the product. Typical examples are product sharing, renting and pooling. These intermediate results can be achieved within the framework of traditional structure. *Result-oriented services* (need orientation), however, focus on the bottom-need of consumers. These can be formed by understanding the deep motivators of consumer demands for actual products and services, and by enhancing the degree of freedom of decisions by searching for new solutions rather than improved products or services.

While several successful PSSs are known, a careful assessment of the created situation is needed before a PSS is introduced. As Tukker and Tischner (2006) draw up, some cases are known in which the introduction of a PSS *decreases* corporate competitiveness. Higher costs (and price), lower consumer acceptance, and weakened position of the company in the value chain should be mentioned.

Pioneer Examples

Some examples show a high degree of improvement within the framework of traditional technology. The FRIA, for example, is a hybrid of the larder and refrigerator, answering the demand for 'conservation by cooling' in a kitchen in a more sophisticated way. It is easy to adapt to consumer needs altering over time (e.g. variable cooling intensity in sectors), and enhances eco-efficiency in several other ways (alternative isolation, using cold outside air during winter, etc.). Due to its 'in-built' feature the chest's lifetime is equal to that of the building where it has been placed, and only the cooling system should and can be replaced, by any alternative solution, at any time.

A more sophisticated example is the one of Xerox, where the different PSS levels and the re-arranged motivators of market actors also can be demonstrated. Xerox introduced a successful reverse logistic system, by realising the re-use of parts and units of end-use products for the maintenance of other machines, and for the production of new ones. Reducing the resource use resulted in decreasing the costs of the company. In this situation, the company got interested in offering a (competitively priced) maintenance service together with its products (product oriented PSS). However, due to the required initial investment (purchasing copy machine), the company can lose potential consumers, and the capacity of the (bought) product is fixed for consumers. The motivation of the company still remains the number of products sold, and also, the economic results of the service department – which can interfere with the environmental goal of optimum lifetime and thus, the quality of machines.

This 'net of motivators' can be altered resulting in a more sustainable situation by a use-oriented PSS, when consumers pay per copy made. In this case, the interest of the company is to reduce costs considering the whole life-cycle, to optimise product lifetime, and to replace machines according to the capacity needed. This situation enhances corporate interest in reverse logistics, because at the end of the life-cycle the machine should mean resource, rather than costly waste.

Xerox defines itself as 'The document company' widening its focus and referring to consumers' bottom-needs. In several cases, consumers do not need the copy itself, just want to archive a document, which can be performed electronically through a network. Digital copy machines have a scanner function as well as an interface for computer networks, enabling electronic data storing. Obviously, technological development made possible the formation of this result-oriented PSS, which can be considered as technology push. Nevertheless, the identification of bottom-needs could stimulate market-pull technology development.

Conclusion

Sustainability and its requirements are often discussed topics in the scientific world. The translation of global issues into local actions has started. Consequently, several studies deal with the responsibilities of business, too. In recent years, the sustainability approach in business strategies is beyond pure environmentalism. Nevertheless, triple bottom line based corporate operation requires the involvement of all functions and all decision makers in a company. However, research on the field of new product development has revealed the lack of handling social issues.

At the same time, a few attempts have been made towards widening the environmental focus of sustainable design (mainly Charter, Tukker and Tischner). In these, consumer needs are conceived in an altered way, and as a result, new product development is not only an engineering task. On one hand, this is because the basic advantages of product use are targeted, and on the other hand, the real motivators of consumption are also taken into consideration.

In this altered view, the results of the product development processes are solutions rather than products or services, which also have been presented in this work through some examples. While sustainability requires radical technological innovation in the long run, these initiatives can be conceived as the low hanging fruits of sustainability design, and can be recognised by results in restructuring the actual 'product oriented' supply.

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