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Incorporating sustainable marketing in the new product development process: evidence from companies operating in Poland

Paweł Brzustewicz[1]

1 Nicolaus Copernicus University

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Abstract

The main aim of this paper is to assess the scope of the implementation of the concept of sustainable marketing in the new product development process in companies operating in Poland. A quantitative study was carried out on a randomly selected group of the most innovative companies operating in Poland, in which the method of an online survey was used. The results of the study indicate that at each stage of the new product development process, there are areas where the surveyed companies showed high activity in the use of sustainable marketing and those where these activities were undertaken by only a small percentage of companies or not at all. The study contributes to the existing literature by presenting the role of sustainable marketing in the new product development process.

Keywords: sustainable marketing, sustainable product, new product development.

JEL Classification: M31 - O31.

1. Introduction

New products increasingly determine the level and pace of sales growth, market share, and competitive advantage of companies. At the same time, the acquisition of raw materials, their processing, production of final products, their exploitation, and finally liquidation cause negative changes in the natural environment (EMF, 2012; Domenech & Bahn-Walkowiak, 2019). Increased sourcing of raw materials, generation of production and post-consumer waste, noise, and waste energy also have negative social effects, contributing, among others, to lowering the quality of life and the development of various diseases (Mancini et al., 2019). This means that an increasingly important role to reduce this negative impact is played by sustainable products that not only meet the needs of consumers but are also characterized by much better social and environmental efficiency throughout the entire product life cycle compared to traditional products (Peattie, 1995; Fuller, 1999; Martin & Schouten, 2012).

The new sustainable product development process is extremely complex (Maxwell & van der Vorst, 2003; Fiksel, 2009; Megyeri et al., 2022). This is due to the fact that this type of product must not only be competitive in relation to other products available on the market but must also meet certain environmental and social requirements throughout its entire life cycle (Fuller, 1999). Therefore, the development of a sustainable product requires the adaptation of the traditional model of the new product development process to new conditions which means that all product development processes must be sustainable. The process of developing a sustainable product, including both planning activities, materialization, and launching the product on the market, should allow for the integration of economic, environmental, and social aspects throughout the product life cycle (Brzustewicz, 2016). In such a process, product design is a special stage, because it enables the shaping of product features, taking into account their environmental and social impact throughout the product's life cycle (Fiksel, 2009; Gupta et al., 2015).

Sustainable marketing plays a key role in sustainable product development. The concept of sustainable marketing assumes that all marketing activities should not only meet the needs of customers and bring profit to the organization but should also be socially and ecologically effective and lead to an improvement in the quality of life of the entire society (Sheth & Parvatiyar, 1994; Fuller, 1999; Martin & Schouten, 2012; Quoquab et al., 2021). The success of a new sustainable product depends on the implementation of sustainable marketing in all stages of its development. Obtaining products with completely new ecological and social attributes at each stage of their development entails a number of changes not only in the organization of work, the company's strategy, and product management but also in the organizational culture and the company's relations with the environment. Implementing sustainable marketing in the new product development process requires, above all, a change in the organization and management of the entire innovation process and reformulation of all activities that make up this process in terms of meeting economic, environmental, and social criteria.

While the issues related to the new product development process have been widely described in the literature, studies on the sustainable product development process are scarce, both in the theoretical and empirical layers (Brzustewicz, 2016; Diaz et al., 2021; Ali & Gunasekera, 2023). However, even in these few publications, the issue of sustainable product development has not been presented in a comprehensive manner. It should also be noted that there is almost a complete lack of studies in the field of using sustainable marketing in the new product development process (Brzustewicz, 2016). Taking into account this research gap, the aim of this article is to assess the scope of implementing sustainable marketing in the new product development process. Thus, the following research question is posed in the article: *What activities in the field of sustainable marketing are used in the process of developing new products in companies operating in Poland?*

The structure of the paper is as follows: Section 2 presents a review of the literature. Section 3 contains the methodology, while section 4 presents the results of the study and discussion. The last section contains the conclusions.

2. Theoretical background

2.1. Sustainable marketing

In the literature on the subject, there is no single universally accepted definition of sustainable marketing. Sheth and Parvatiyar (1994), who first coined the term ‘sustainable marketing’, point out that this concept includes all marketing initiatives that not only increase the company’s competitiveness but are also ecologically sustainable. Sustainable marketing should not only bring profit and build the company’s competitiveness but also be ecologically effective because only in this way can lead to an improvement in the quality of life of the entire society. Fuller (1999, p. 4) defines sustainable marketing as ‘the process of planning, implementing and controlling the development, pricing, promotion, and distribution of products in a manner that satisfies the following three criteria: (1) customer needs are met, (2) organizational goals are attained, and (3) the process is compatible with ecosystems’. In this approach, sustainable marketing is a concept of product management at all stages of its development (from raw material extraction to final disposal). Martin and Schouten (2012, p. 10) propose a broad approach to sustainable marketing, referring to the value creation for the customer. They state that sustainable marketing is ‘the process of creating, communicating, and delivering value to customers in a way that both natural and human capital are preserved or enhanced throughout’. Environmental capital means all resources provided by nature, while social capital means all resources provided by people, including their work, talents, and creativity. In a narrower sense, presented by de Draaijer et al. (2009), sustainable marketing is ‘a way of creating value by promoting a company, products or services that fit into the environmental or social dimension’. However, it seems that reducing sustainable marketing to promotion, which is supposed to help increase the level of interest in the offer and gain customer trust in the brand, will not bring the intended result if the company’s activities and products are not really innovative in the environmental and social aspects.

The analysis of sustainable marketing definitions presented in the literature leads to the conclusion that it is not a concept detached from the main purpose of marketing, which is to find, attract, keep, and grow the targeted customers by creating and delivering superior customer value (Kotler et al., 2018). Sustainable marketing, similarly to traditional marketing, refers to the process of exchange, value creation, or stakeholder theory. The structure of sustainable marketing also does not differ from the structure of classical marketing. However, sustainable marketing, which combines economic with social and ecological aspects, assumes a different goal and way of implementing the company’s activities.

2.2. Sustainable product development

According to Seuring and Müller (2008), the term ‘sustainable product’ refers to all kinds of goods that aim to improve environmental and social quality. Environmental quality of a sustainable product concerns product attributes (e.g. being free of contaminants) and minimizing its impact on the natural environment, while social quality relates to, among others, the conditions in which the product is developed. The fact is that more and more often, consumers pay attention not only to product attributes but also to the conditions in which employees work (e.g. decent remuneration, participation in decision-making, breaks at work, work safety, and ergonomics). Luchs et al. (2010) claim that the category of sustainable products includes all goods that have positive social, environmental, and ethical attributes. A more comprehensive definition of sustainable products was proposed by Peattie (1995, p. 181), who argues that they are goods that ‘meet the needs of customers and are characterized by much better social and environmental efficiency throughout the life cycle compared to conventional products’. In turn, Martin and Schouten (2012) define a sustainable product as a good that

meets the following criteria throughout its life cycle:

- it does not pollute the natural environment because it does not contain substances such as: petroleum derivatives, mercury, carbon dioxide, chromium, plastic, pesticides, flame retardants, or solvents that cannot be absorbed or neutralized during the lifetime of one generation;
- it does not contribute to the degradation of the existing ecosystem, i.e. it does not deplete natural resources, such as freshwater resources;
- it does not reduce human abilities to meet their needs but contributes to building social capital.

From a company's point of view, every new product must go through a series of product development stages. The existing literature contains a wide range of new product development models that differ in terms of the number and the name of stages and other activities accompanying this process (Cooper, 1994; Cooper, 2008). The number of stages in the new product development process largely depends on the industry in which the company operates and its strategic orientation. Although many researchers (Cooper & Kleinschmidt, 1986; Urban & Hauser, 1993; Crawford & Di Benedetto, 2003) have tried to develop the ideal framework for the new product development process that covers all relevant steps and activities, the most widely known model was proposed by Booz, Allen & Hamilton (1982). According to Booz, Allen & Hamilton (1982), the new product development process consists of seven sequential stages: new product strategy development, idea generation, screening & evaluation, business analysis, development, testing, and commercialization. Whereas sustainable products must go through subsequent steps and stages to enter the market, the majority of the existing methods, techniques, and tools which are used in the new product development process must be adapted to new requirements. Decisions related to the new product development process that do not consider rules of sustainable marketing result in unsustainable processes and products.

3. Materials and methods

The conducted research covered the most innovative companies operating in Poland in various industries and having a diverse form of ownership and a number of employees. The companies were listed in the 'Report on the largest investors in research and development in Poland in 2012' (Baczko et al., 2013). One part of the report is the ranking based on a unique methodology developed by the Institute of Economic Sciences of the Polish Academy of Sciences which contains 795 companies. The first report in this series was published in 2005, while the last one was issued in 2013, ending a cycle of long-term research on the innovativeness of Polish companies conducted by the Polish Academy of Sciences. One of the main reasons for choosing this list was the fact that the organizational, process, product, and marketing innovations that these companies stand out are absolutely necessary in the process of developing sustainable products (and other types of sustainable innovations), where it is necessary to use the latest methods and tools for sustainable design and assessment of environmental and social impact throughout their life cycle. In addition, since one of the key factors influencing the success of new products on the market is regular research of consumers' needs (Cooper, 1979; Cooper & Kleinschmidt, 1986; Cooper & Kleinschmidt, 1995; Cooper, 1999), it can be assumed that especially today – in the era of growing environmental awareness – the ability to adapt products to environmental and social expectations of consumers

is also important, although it involves certain competencies. Innovative companies are usually characterized by a high degree of market orientation, without which, the commercialization of innovations would be almost impossible. Hence it can be assumed that innovative companies also are more advanced in terms of using sustainable marketing in the new product development process.

Given the fact that the aim of this study is to evaluate the implementation of sustainable marketing in the new product development process, only manufacturing companies were included in the final list. After excluding non-manufacturing companies, 476 companies were left on the list. To get the right sample size, the sample size calculator was used. After estimating all parameters, the minimum sample size was 124 companies. The sample selection was carried out using the method of simple random sampling. Respondents for the survey were selected from employees responsible for marketing activities and holding the highest possible position in the company. They were mainly managers in the field of marketing or specialists holding various positions related to the new product development process.

The data was collected using an online survey. The LimeSurvey 2.0 software was used to design and present the questionnaire to the respondents. All answers provided by the respondents were automatically recorded by the system and placed in the central database of the program. The questionnaire included 35 questions. The respondents were asked to answer by selecting a specific category on the scale. Nominal, ordinal, and positional scales were used in the questionnaire. In order to eliminate errors at the stage of designing the questionnaire, it was subjected to preliminary verification through scientific consultations and then tested in a pilot study. Personal interviews in two companies from the list were carried out to test the questionnaire.

The data was collected in the period from June to September 2017. The invitation to participate in the study was sent to 124 companies. The invitation letters were sent to the e-mail addresses of the employees of the surveyed companies who met the previously defined selection criteria. The questionnaire was available to the respondents after clicking on the link sent
in the invitation letter. Finally, the responses were received from 33 companies participating in the study. The data were analyzed in IBM SPSS Statistics 24 program.

4. Results

4.1. Characteristics of respondents and their companies

The respondents in the study were employees from various departments of the surveyed companies. Employees from the marketing department accounted for 24.2% of the survey participants, while the remaining respondents (75.8%) represented other organizational units. They were employed in various positions, mostly managerial (54.5%). This group was represented by managers (27.3%), directors (15.2%), and owners or presidents of the management board (12.1%). Out of all respondents, 6.1% did not answer the question about their job position.

The companies participating in the study were characterized on the basis of the following five criteria: the type of

manufactured products, the number of employees, location, number of years on the market, and connections with foreign capital.

The obtained results indicate that the largest group of surveyed companies were those manufacturing only intermediate goods (60.6%). The second largest category included entities producing both intermediate and consumer goods (33.3%). The least numerous category were companies producing only consumer goods (6.1%). However, if we take into account the fact that among the companies covered by the study, there were units that manufactured both categories of products at the same time, it can be noticed that intermediate goods were manufactured by as much as 93.9% of them, while consumer goods – 39.4%.

The research sample was dominated by large (42.4%) and medium-sized companies (39.4%). The companies represented 13 regions of Poland and differed in terms of the number of years on the market. The majority of them had been operating on the market for more than 35 years (42.4%). It is worth noting that in the group of surveyed companies, there were no units operating on the market for less than 5 years. Finally, the vast majority of companies participating in the survey had no connections with foreign capital (72.7%). The existence of such links was indicated by 27.3% of them.

4.2. Characteristics of products offered by the surveyed companies

The obtained results indicate the diversification of the types of new products manufactured in the surveyed companies. More than half of them (60.6%) manufactured modified products, i.e. products that were created as a result of modification of the functional characteristics of the products previously manufactured in these companies. For comparison, absolutely new products (both for the companies and the market) were produced in 30.3%
of them. A greater percentage (39.4%) of the surveyed companies declared the manufacture of the products that were new for the company, and technologically modified products, i.e. those that were previously manufactured in the company but were improved with the use of new technologies, but without any changes in the existing functional characteristics. The lowest percentage of the surveyed companies (15.2%) were those that did not manufacture any of the above categories of new products.

The differences between the products offered by the surveyed companies resulted not only from the degree of their products' novelty but also from the attributes possessed by these products. The results of the study indicate that as many as 78.8% of the surveyed companies offered new products that met customer expectations. Almost the same number of companies (75.8%) offered products that were price-competitive. Products that stood out for their safety for the consumer were offered by (69.7%) of the companies. The representatives of the surveyed companies also pointed to the high durability of the manufactured products (66.7%), low costs in the use phase (48.5%), and the lack of harmful substances in the products (42.4%). In turn, a much smaller percentage of the companies offered products that were manufactured in cooperation with local suppliers (36.4%); products that resulted from clean production processes (36.4%), and those that had a fair price, i.e. a price that took into account all costs, including environmental and social costs (30.3%). The smallest percentage of the companies offered products that were characterized by recyclability (24.2%), compliance with ethical standards (21.2%), and easy repair (15.2%).

Among all the surveyed companies, the largest percentage (81.8%) were those that had environmentally friendly products in their portfolio. In 42.4% of them, the share of environmentally friendly products was less than 50% of their total production volume, and in 39.4% of them, the share of such products in the total production exceeded 50%. A definitely smaller percentage of the surveyed companies had sustainable products in their offer (57.6%). Such products accounted for more than 50% of the total production volume in 36.4% of the companies. Ethical products were manufactured by more than half of the surveyed companies (54.5%). In 30.3% of them, they accounted for over 50% of the production volume, while in 24.2% of them – less than half of the total production.

4.3. New product planning

The results of the study confirm that at the stage of planning new products, the surveyed companies implemented various activities in the field of sustainable marketing. For example, 69.7% of the companies estimated the possibility of developing new products in partnership, 39.4% of them estimated the possibility of using new environmentally friendly technologies, and 24.2% of them assessed the competitive offers in the field of environmentally friendly products. While estimating the possibility of cooperation at this stage was carried out in most of the surveyed companies, the assessment of the competitive offers in the field of environmentally friendly products and the assessment of the possibility of using new environmentally friendly technologies were undertaken in a much smaller group of companies. Noteworthy is the low percentage of the companies in which the activities were carried out in the field of researching customer needs regarding the ecological and social characteristics of products (respectively 18.2% and 3% of the surveyed companies) and a complete lack of activities in the area of investigating the level of consumer environmental awareness.

4.4. Collecting and selecting ideas for a new product

The results of the study indicate that the sources of information that were used ‘very often’ to obtain ideas for new products were employees (46.4% of responses) and consumers (39.3% of responses). The sources of ideas for new products that were used ‘often’ were primarily competitors and/or their products (64% of responses). Sources used only ‘sometimes’ included suppliers (89.3% of responses), intermediaries (57.1% of responses), and other stakeholders (75% of responses). It is worth noting that 64.3% of the surveyed companies, in order to obtain ideas for new products, ‘never’ used the help of non-governmental organizations, and 32.1% of them did it only ‘sometimes’.

The obtained results show that the most popular technique for collecting ideas for new products was ‘brainstorming’ – 57.1% of the companies declared that it was used ‘very often’, while 28.6% of them – ‘often’. ‘Focus group interviews’ were used to a moderate extent in the surveyed companies (in 25% of them it was done ‘often’, and in 32.1% – ‘sometimes’) and the ‘contest of ideas’ (in 17.9% of the companies this technique was used ‘often’, and in 39.2% – only ‘sometimes’). Techniques for collecting ideas for new products, such as: ‘eco-compass’, ‘sustainability wheel’, and ‘backcasting’, were of very little importance in the surveyed companies. For instance, the first of these techniques was ‘never’ used in over 85% of the companies, the second one – in 75% of them, and the third one – in over 57% of them.

In the process of selecting ideas for new products, the largest percentage of the surveyed companies (63.6%) took into account the criterion of compliance of planned products with the law. A slightly smaller percentage of the companies considered the value of the planned products for the consumers (60.6%) and the consumer's safety during the use of the planned products (57.6%). In more than half of the companies (51.5%), at the stage of selecting ideas, the following criteria were taken into account: the possibility of cooperation with stakeholders in the new product development process, the uniqueness of the ideas, and the estimated product lifetime. In a much smaller percentage of the companies, social and environmental criteria were included when selecting ideas. In 48.5% of them, the impact of the production of planned products on the health of the employees was taken into account, while in 42.4% of them – the degree of environmental pollution related to the products. Other social and environmental criteria used in the selection of ideas for new products, such as the compliance of planned products with ethical standards and the use of renewable raw materials in the production processes of planned products, were considered only in a small number of the companies – respectively in 21.2% and 6.1% of them.

4.5. Economic and financial analysis of a new product

Less than half of the surveyed companies (45.5%) took into account the costs of environmental pollution, and only 36.6% of them included the social costs and the costs associated with the use of natural resources needed for manufacturing the product in the product life cycle. In a smaller number of companies, the costs of potential fines for environmental pollution (24.2%) and the costs of preventing environmental pollution (21.2%) were taken into account. The fact that only 9.1% of the surveyed companies did not include any of the above-mentioned costs is optimistic.

4.6. Designing a new product

At the stage of designing new products, a significant percentage of the companies, to a 'very high' and 'high' degree, considered such parameters as: the level of product safety (57.2% and 25% of responses), product durability (46.4% and 32, 1% of responses), the number of raw materials needed to manufacture the product (32.1% and 42.9% of responses) and the number of hazardous materials needed to manufacture the product (42.9% and 17.9% of responses). The parameters that a significant number of companies took into account at a 'very low'
and 'low' levels included: the amount of energy consumption in the product use phase (32.2% and 28.6% of responses), the degree of product recyclability (3.6% and 50.0% of responses), the possibility of product repair (25.0% and 25.0% of responses) and product disassembly (25.0% and 25.0% of responses).

In the majority of the surveyed companies, no actions were taken to improve the environmental and social efficiency of the products. Only in 33.3% of the companies, at the stage of designing the new products, the opinion of stakeholders regarding the ecological attributes of the products was taken into account. In an even smaller percentage of the companies (24.2%), the opinion of stakeholders regarding the social features of the products was considered. The same percentage of the companies (24.2%) assessed the ecological efficiency of the products, while the assessment of the social efficiency of the products was undertaken only by 12.1% of them. The analysis of the ecological and social impact

of the products was carried out in 21.2% of the companies.

4.7. Prototyping a new product

Currently, due to the high costs (including environmental costs) of making physical models of the new products, it is necessary to prototype and test them using computers equipped with specialized software. The above approach to prototyping was confirmed by the results of the study, indicating that as many as 92.6% of the surveyed companies used digital prototyping.

4.8. Manufacturing a new product

According to the results of the conducted survey, the percentage of the companies in which specific activities in the field of sustainable production were implemented was quite high. In the largest number of the surveyed companies (75.8%), the energy consumption of production processes was reduced, and in a slightly smaller number of them (69.7%) the reduction concerned post-production waste. Satisfaction of production workers was increased in 66.7% of the surveyed companies. In turn, in 60.6% of them, the harmfulness of production processes to the natural environment was reduced, and in 54.5% of them, environmentally friendly machines and devices were used. In addition, in more than half of the companies (51.5%), the harmfulness of production processes to the workers' health and life was reduced, and in more than 40% of them (42.4%), the harmfulness of technological processes for the local community was reduced. Only 3% of the surveyed companies used renewable energy for production processes. On the other hand, in a slightly larger number of surveyed companies (6.1%), the use of recycled materials and the number of components from socially responsible suppliers increased.

4.9. Testing a new product

As many as 97% of the surveyed companies tested the new products (or their elements) before launching them on the market. In the largest percentage of the companies (69.7%), the reason for testing the new products (or their elements) was to check their reliability. In a slightly smaller percentage of the companies (66.7%), the reason for conducting the tests was to check the product safety and the durability of the product components. Less than 40% of the companies (36.4%) tested the new products in order to assess them by buyers in comparison with competing products, and in 6.1% of them, the new products (or their elements) were tested in order to verify their ecological attributes.

4.10. The main elements of a new product differentiation

– Positioning

In the positioning of the new products the surveyed companies emphasized such attributes as: quality (81.8%), advantages over competing products (66.7%), and price (57.6%). Only 12.1% of the companies highlighted the ecological and social attributes of the new products. The same percentage of the companies (12.1%) highlighted the environmental

benefits provided by the new products. In an even smaller number of companies (9.1%), the social benefits provided by the new products and ethical conditions for the development of the new products were emphasized. On the other hand, only 3% of the surveyed companies informed customers about the possibility of buying back used products from them when buying new ones. A relatively low percentage of the companies in which the ecological and social features of new products were exposed proves that a significant part of the surveyed companies did not fully use the opportunities resulting from sustainable positioning.

– Pricing policy

The key parameters that were taken into account to a ‘high’ or ‘very high’ degree in the procedure of calculating the prices of the new products in the surveyed companies included: the price of the competing products (in 75% and 14% of the companies), the price accepted by the market (in 53.5% and 25% of the companies), and the production costs of the products (in 60.7% and 17.9% of the companies). The obtained results also indicate that in the procedure of calculating the prices of the new products, environmental and social parameters were taken into account in most of the surveyed companies, to a ‘low’ or ‘very low’ degree.

– Distribution

At the stage of distribution of the new products, the surveyed companies carried out mainly activities aimed at increasing the level of adjustment of distribution to individual customer needs (72.7%). A significant percentage of the companies (57.6%) minimized the total purchase cost for the customers at the stage of distribution of the new products. In turn, a very low percentage of the companies used ‘just-in-time’ delivery (18.2%) and logistics centers (6.1%). Similarly, only a few of the surveyed companies took measures to reduce the impact of the distribution of the new products on the natural environment and society, e.g. by cooperating with organizations that collect used products for recycling (21.2%), using ecological means of transport (12.1%) or conducting an environmental and social assessment of suppliers (9.1%).

– Marketing communication

The most frequently mentioned feature of marketing communication carried out by the surveyed companies was the use of electronic media (75.8% of responses). For comparison, traditional media were used in marketing communication in 51.5% of the surveyed companies. On the other hand, in 69.7% of them, marketing communication was of two-way (dialogue)
and long-term nature, and in 54.5% of them, it was integrated. In a much smaller percentage of the companies (36.4%), marketing communication took the form of dialogue with all stakeholders (partners). Similarly, in a relatively low percentage of them (30.3%), the communication regarding the new products was adapted to the requirements of the market segments.

– Packaging

Among the attributes that characterized the packaging of the new products manufactured in most of the surveyed

companies, there were two features: safety for health (75% of responses) and a competitive price in relation to packaging available on the market (53.6% of responses). In turn, less than half of the companies (42.9%) used recyclable packaging, and 39.3% of them – packaging that reduced the transportation cost of the products. Noteworthy is the low percentage of companies that used reusable packaging (25%) and packaging made of recycled materials (21.4%). In addition, none of the surveyed companies used packaging that was produced using 'clean' technologies or renewable energy.

– Labeling

The results of the survey indicate that the new products that had any eco-label were manufactured in only 7.1% of the companies. The percentage of the companies in which neither line of the new products had any eco-label, amounted to 92.9%, which confirms the very low importance attributed to eco-labeling in the surveyed companies.

Conclusions

The results of the study indicate that the areas in which the surveyed companies showed the highest activity included:

- at the stage of planning new products: estimating the possibility of developing new products in partnership;
- at the stage of collecting and selecting ideas for new products: obtaining ideas for new products mainly from employees and consumers; using heuristic methods to collect ideas for new products (the most popular technique in this area was 'brainstorming'); taking into account, in the process of selecting ideas, the criteria regarding the compliance of the planned products with the law, the value of the planned products for the consumer, and the consumer's safety when using the planned products;
- at the stage of differentiating new products: highlighting quality, advantages over competing products, and price of new products in the marketing communication; taking into account the price of competitive products and the cost of manufacturing the products in the pricing policy; increasing the degree of adaptation of distribution to customer needs; using electronic media in marketing communication; using marketing communication that is two-way (dialogue), long-term and integrated; using packaging that is safe for health and competitive in terms of price compared to packaging available on the market;
- at the stage of economic and financial analysis of new products: taking into account the costs of environmental pollution;
- at the stage of designing new products: taking into account parameters regarding product safety, durability, and the number of raw materials;
- at the stage of prototyping a new product: using digital prototyping;
- at the stage of manufacturing new products: reducing energy consumption; reducing the amount of post-production waste;
- at the stage of testing new products: testing the reliability, safety, and durability of products and their components; no animal testing.

The study contributes to the marketing literature by presenting the role of sustainable marketing in the new product development process. Specifically, it contributes to a better understanding of which elements of sustainable marketing are of importance to companies in the process of new product development. This study also has practical implications, as it can be a source of knowledge for managers and marketers in the use of specific activities of sustainable marketing in the process of developing new products. The results of the conducted research may also be a starting point for decision-makers responsible for public policy regarding the selection of appropriate support instruments to accelerate the introduction of more sustainable products to the market.

The study has some limitations. In the theoretical layer, they are primarily related to the multidisciplinary and complex nature of the study. The need to synthesize different fields of knowledge meant that the paper focused only on the most important aspects of them. In the empirical layer, these limitations were primarily related to the selection of appropriate companies for research on the domestic market which would be sufficiently advanced in the use of sustainable marketing in the development of new products. Moreover, the empirical study was based on a small and unrepresentative sample, hence the results obtained cannot be generalized. Despite the aforementioned limitations, the results of this study may be helpful in formulating research questions and hypotheses for future qualitative and quantitative research.

References

- Ali, A., & Gunasekera, J. S. (2023). *Sustainable product development process*. In: Ganesh Narayanan, R., Gunasekera, J. S. (eds), Sustainable Manufacturing Processes, Academic Press, 195-211.
- Baczko, T., Puchała-Krzywina, E., Szyl, M., Paczkowski, T. (2013). *Raport o największych inwestorach w badania i rozwój w Polsce w 2012 roku*. Warszawa: Instytut Nauk Ekonomicznych Polskiej Akademii Nauk.
- Booz, Allen & Hamilton. (1982). *New Products Management for the 1980s*. New York.
- Brzustewicz, P. (2016). The Application of Eco-Compass Method in Sustainable Product Development. *Acta Scientiarum Polonorum. Oeconomia*, 15(1), 5–14.
- Crawford, C. M., Di Benedetto, C. A. (2003). *New Products Management*. New York: McGraw-Hill.
- Cooper, R. G. (1979). The Dimensions of Industrial New Product Success and Failure. *Journal of Marketing*, 43, 93–103.
- Cooper, R. G. (1994). Perspective Third-Generation New Product Processes. *Journal of Product Innovation Management*, 11, 3–14.
- Cooper, R. G. (2008). The Stage-Gate Idea-to-Launch Process–Update, What's New and NexGen Systems. *Journal of Product Innovation Management*, 25(3), 213–232.
- Cooper, R. G., Kleinschmidt, E. J. (1986). An Investigation into the New Product Process: Steps, Deficiencies, and Impact. *Journal of Product Innovation Management*, 3(2), 71–85.
- Cooper, R. G., Kleinschmidt, E. J. (1995). Benchmarking the Firm's Critical Success Factors in New Product Development. *Journal of Product Innovation Management*, 12, 374–391.
- Cooper, R. G. (1999). From Experience. The Invisible Factors in Product Innovations. *Journal of Product Innovation*

Management, 16(2), 115–133.

- de Draaijer, A., Pfann, M., Davis, M. (2009). How to Avoid Greenwash.*Sustainable Insight*, January. Available online: http://www.kpmg.com/GR/en/IssuesAndInsights/ArticlesPublications/Sustainability/Documents/Sustainable-insight-January-2009.pdf (accessed on 20 December 2022).
- Diaz, A., Schöggl, J.-P., Reyes, T., Baumgartner, R. J. (2021). Sustainable product development in a circular economy: Implications for products, actors, decision-making support and lifecycle information management. *Sustainable Production and Consumption*, 26, 1031–1045.
- Domenech, T. & Bahn-Walkowiak, B. (2019). Transition Towards a Resource Efficient Circular Economy in Europe: Policy Lessons From the EU and the Member States. *Ecological Economics*, 155, 7–19.
- EMF (Ellen Macarthur Foundation). (2012). *Towards the Circular Economy. An Economic and Business Rationale for an Accelerated Transition*. Available online: https://www.ellenmacarthurfoundation.org/assets/downloads/ (accessed on 20 December 2022).
- Fiksel, J. (2009). *Design for Environment. A Guide to Sustainable Product Development* New York-Toronto: McGraw Hill.
- Fuller, D. A. (1999). *Sustainable Marketing: Managerial-Ecological Issues. Markets and Market Development*. Thousand Oaks: Sage Publications.
- Gupta, S., Dangayach, G. S., Singh, A. K. (2015). Key determinants of sustainable product design and manufacturing. *Procedia CIRP*, 26, 99–102.
- Kotler, P., Armstrong, G., Opresnik, M. O. (2018). *Principles of marketing* (17th ed.). Harlow: Pearson.
- Luchs, M. G., Walker Naylor, R., Irwin, J. R., Raghunathan, R. (2010).*The Sustainability Liability: Potential Negative Effects of Ethicality on Product Preference*. *Journal of Marketing*, 74(5), 18–31.
- Mancini, L., Vidal Legaz, B., Vizzarri, M., Wittmer, D., Grassi, G. Pennington, D. (2019).*Mapping the Role of Raw Materials in Sustainable Development Goals. A preliminary analysis of links, monitoring indicators, and related policy initiatives*. EUR 29595 EN, Luxembourg: Publications Office of the European Union.
- Martin, D., & Schouten, J. (2012). *Sustainable Marketing*. Boston: Prentice Hall.
- Maxwell, D., & van der Vorst, R. (2003). Developing sustainable products and services.*Journal of Cleaner Production*, 11(8), 883–895.
- Megyeri, G., Boros, K., Fekete, B. A. (2022). Theoretical Concept of an Innovative and Sustainable Product Based on an Unconventional Approach to Design Development. *Sustainability*, 14, 3022.
- Peattie, K. (1995). *Environmental Marketing Management: Meeting the Green Challenge* London: Pitman Publishing.
- Quoquab, F., Mohamed Sadom, N. Z., Mohammad, J. (2021). *Sustainable Marketing*. In: Crowther, D., Seifi, S. (eds), The Palgrave Handbook of Corporate Social Responsibility, Cham: Palgrave Macmillan.
- Sheth, J. N., & Parvatiyar, A. (1995). *Ecological Imperatives and the Role of Marketing*. In: Polonsky, M. J., Mintu-Wumsall, A. T. (eds), Environmental Marketing: Strategies, Practice, Theory, and Research, New York: Haworth Press.
- Seuring, S., & Müller, M. (2008). From a literature review to a conceptual framework for sustainable supply chain management, *Journal of Cleaner Production*, 16(15), 1699–1710.
- Urban, G. L., Hauser, J. R. (1993). *Design and Marketing of New Products*. New Jersey: Prentice Hall.