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Conditions of the motorboat market using the example of Poland and an implemented R&D project

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Abstract

The purpose of this article is to determine the main conditions for the profitable production of motorboats in Poland by taking into account the implementation of an R&D project. Theoretical considerations were made for the analysis of the main considerations based on the VT Sport case study. A descriptive analysis was carried out, indicating the market conditions for the functioning of enterprises producing motorboats, including electric boats. The effects of the implementation of the R&D project for the production of electric motorboats were indicated. Results were obtained for defining changes in the business model through the use of the R&D project, and a critical discourse on the effectiveness of electric propulsion of motorboats was carried out.

Introduction

After several decades of implementing its postulates, sustainable development has become an essential element of running businesses in every field. Assessment of the state of implementation of the postulates of sustainable development in Poland is relatively difficult for several reasons. First, all research in this area is burdened with the problem of the so-called social pressure against which enterprises will always declare a more favorable state than reality. Secondly, enterprises implement low-cost or free sustainable development activities to the greatest extent. This approach seems to be widespread, especially since not all of the postulates of sustainable development (17 Sustainable Development Goals) are obligatory. Nevertheless, the environment in which enterprises operate even forces the indication of specific actions. Here, the easiest to assess are ecological activities, more specifically, the impact of activities on the natural environment and activities seeking to reduce the negative effects of these activities.

Ecological challenges faced by enterprises direct their activities towards the implementation of pro-environmental practices. Eco-practices (pro-environmental activities) include activities related to the elimination of the negative effects of the activities of enterprises. These activities include not only pro-environmental, intangible activities, but also ecological innovations, which have become a factor in the development of enterprises. It is important to

pay attention to companies in the industrial sector. Manufacturing and industry are the sectors with the greatest negative environmental impacts, whose activities are very broad with respect to greening this industry. In fact, the industrial sector should be considered the most environmentally-friendly in the economy. The social pressure placed on pro-ecological activities in this sector is also the highest. A specific industry in the industrial sector is the production of motorboats. This article discusses the ecological and economic conditions of the production of motorboats, by taking into account the special role of an R&D project. The investigations in the article were carried out using the review method with a critical analysis of the literature. On the other hand, in the area of empiricism, a descriptive analysis and a case study were used.

The main purpose of the article and its considerations was to determine the main conditions for the profitable production of motorboats in Poland, by taking into account the implementation of an R&D project.

Since the article deals with the topic of sustainable development, the issues of technological and social determinants are included as secondary elements. Of course, the considerations are not an exhaustive investigation of the topic related to the ecological and economic approach to the production of motorboats in Poland. The conducted analysis of an R&D project in the motorboat industry (as a case study) allows one to draw not only general conclusions, but also to refer to the effectiveness of conducting activities related to the production of motorboats in Poland. The area of research related to the ecology of honorable activities is still open. Therefore, the content of the article should be treated as a voice in the ongoing discussion.

Theoretical approach

In terms of sustainable development, river transport has been the subject of theoretical considerations for decades. In the Google Scholar database, you can find over 3.5 million items in this area. The same database returns 1.5 million items for the keyword "sustainable river transport" (no time limit), indicating that the subject has been investigated from many perspectives. The approach to policy recognition and implementation of sustainable development postulates (Mihic, Golusin & Mihajlovic, 2011), negative impact on the aquatic ecosystem (Mateescu, Dima & Marin, 2020), or sustainable river logistics dominates (Vilarinho, Liboni & Siegler, 2019). These are just some of the main topics covered in the river transport literature from a sustainable development perspective. The issues of river transport are even wider. Here, too, one should point to the classic approach to science and modern economy requirements. For the keyword "river transport", there are items dealing with issues such as the impact of river transport, water ecosystem and climate (Wang et al., 2020), strategic modeling of river transport (Berrio, Cantillo & Arellana, 2019), and individual freight segments transported by river transport (Boardman et al., 2019). It can therefore be concluded that the topics of river transport and sustainable river transport are widely recognized.

The issues of greening enterprises and, more broadly, the industry should be viewed in a similar way. The greening of enterprises is a topic that has already been widely described in the literature. Taking into account the topic of motorboats (including those powered by either an internal combustion engine or electric engine), it is necessary to refer to the subject discussed in the article to the greening area of manufacturing companies. Referring to the same database, just for the words "greening the company", there are over 1,000 results since 2017. The subject matter has been explored in many respects: the greening of the economy (Kożuch, 2015), environmental awareness (Sowa, 2018), greening the enterprise (Yakovlev & Berezhnov, 2021), and finally the greening of industry and production (Maihami, Ghalehkhondabi & Ahmadi, 2021). An important element of greening the production are issues related to specific solutions – the so-called eco-practices, or pro-environmental practices in the entire value chain (Marzantowicz, Ocicka & Pluta-Zaremba, 2021). The discussed problems are multifaceted, hence the reference to decision-making under various external and internal conditions, including the approach to risk and uncertainty (Marzantowicz, 2020; Marzantowicz & Nowicka, 2021).

The most interesting, though rarely mentioned in the literature, is the problem of the market and the production of motorboats in Europe, including Poland. The motorboat market in Europe is a small industry sector. Hence, the literature on the subject, especially the scientific one, is relatively small. In most cases, the state of the literature is determined by the motorboat market in terms of ecology, or from the perspective of electromobility (Łapko, 2019). More often, it is concerned with impacts on the natural environment, including water bodies such as lakes and rivers (Symmank, Profeta & Niens, 2021).

Nevertheless, attempts have been made to define the state of the art in the field of motorboat production from a scientific point of view. The recreational motorboats literature has mainly been written from the point of view of the development of regions in terms of tourism, while also taking into account economic aspects (Łopaciński & Żółtowski, 2018). There are also considerations on market development from a motorboat lifecycle perspective (Zhang et al., 2021). The boat production market in Europe is characterized by different levels of data accuracy and statistical aggregation methods, depending on the source of the report. Taking into account the market analyses that we developed for an R&D project described in the article and the implementation project using its results, the following three main sources were chosen:

- "Study on the competitiveness of the recreational boating sector" (ECSIP Consortium, 2015) commissioned by the Directorate for Internal Market, Industry, Entrepreneurship and SMEs;
- "Boating market monitor Market insight of the international recreational boating industry" Deloitte, commissioned by Nautica Italiana (Delloite, 2018);
- Recreational Boating Industry Statistics (International Council of Marine Industry Associations – ICOMIA) (ICOMIA, 2018).

The most accurate knowledge base about the motorboat market is the ICOMIA report, which presents the market in terms of geography, value, and segments. It is developed annually with quarterly updates. It focuses on the product market and does not provide an overview of the branch of the economy itself. A systematic source of knowledge about the functioning of the market is the relatively old "Study on the competitiveness of the recreational boating sector" (ECSIP Consortium, 2015). Already at the time of its creation, it signaled a high level of market concentration (10–20 large entities), including 6 leaders in terms of turnover and scale (in the report indicated by the name). The overwhelming majority of companies are SMEs, which account for 95% of the market (ECSIP Consortium, 2015). It can be assumed that an analogous division also occurs in Poland. The selected image of the market leads to the distinction of categories of recreational boats as follows:

- sailboats,
- motorboats with a built-in drive,
- other hull boats, including those with an external engine,
- inflatable boats.

According to the report "Study on the competitiveness of the recreational boating sector" (ECSIP Consortium, 2015), a majority of the respondents spend up to 10% of their annual turnover on R&D. At the same time, according to the report, small companies have a problem with engaging capital in R&D works. Hence, European funds play an important role.

Methodology

The following analysis method was adopted. First, a literature analysis was used to determine the state of knowledge (the quality of the literature cited was not analyzed). The literature review allowed us to determine the current state of research by analyzing the existing content, studies, and literature, which allowed us to draw conclusions about the studied problem.

For analytical purposes, the case study method was used. This part of the analysis used a broad approach to the research subject – in the case of the article, one of the companies in the West Pomeranian Voivodeship that produces motorboats was adopted. This analysis was applied to the motorboat manufacturing market in Europe. This method is a qualitative research method allowing for a much deeper examination of the problem undertaken (Malewski, 2017). The scope of the case study includes the activities of VT-Sport, the production of selected recreational boats produced by VT-Sport, the economics of boat production, ecological aspects against the background of the market for the production of boats powered by an internal combustion engine and electric motor, and the production activities of the company through the implementation of an R&D project.

The main research question adopted for the considerations in the article is the need to change the business model towards ecological business activities in the motorboat market. The authors seek answers to this question by setting the main goal of the analysis:

***Main goal**: To determine the main conditions for the profitable production of motorboats in Poland, by taking into account the implementation of an R&D project*.

The main goal of the considerations is supported by two auxiliary goals:

- Auxiliary objective 1: ecological conditions for the production of motorboats in Poland.
- Auxiliary objective 2: economic conditions for the production of motorboats in Poland.

Analysis – A case study was carried out according to 4 premises:

1. The starting point for the presentation of the results of the implemented research and development project is its size, geographical division, and structure at the time of project preparation (2015–2017) and in 2020 (project completion date).
   - The main markets were identified based on the report "Study on the competitiveness of the recreational boating sector" (ECSIP Consortium, 2015) and the overview based on the ICOMIA report (ICOMIA, 2018)
2. Due to the availability of materials related to the industry, business models were based on the "Study on the competitiveness of the recreational boating sector" (ECSIP Consortium, 2015). Here, the indicated division into business models was used according to the following criteria:
   - In the area of small and medium-sized enterprises (SMEs) – a traditional model focused on specific (regional) niches and not outsourcing activities.
   - Serial and highly individualized (tailor-made) – divisions made according to the size of units. Customized production starts from 20 m.
   - Integration process level (implementation of in-house production). The model is present mainly in France. For comparison, the British, Germans, and Italians use subcontracting. The Italians use domestic contractors, while the British and Germans use Polish.
3. The analysis of the market environment was presented in the Research Agenda of the project during preparation, in which the authors took part. It was developed by analyzing the offer of enterprises (4 companies) offering boats with characteristics similar to those of the 4 companies: the competitive offer, the company's market position, and factors distinguishing its offer from the VT-Sport offer were analyzed. Subsequently, a separate analysis of products competing for the planned boat was carried out.
4. According to the classification of business models presented as part of the methodology, VT-Sport Sp. z o.o. is a medium-sized company (with the motorboat department itself corresponding to a small company). It is reliable for the implementation of an R&D project in an industry dominated by many companies of similar sizes.

Research and development project as an integral element of the business model against the background of external conditions

The starting point for presenting the results of the completed research and development project as an element of the business model of VT-Sport Sp. z o.o. is its location in the competitive environment and its business model. The combination of both of the above-mentioned factors with the overview of the motorboat market in Europe allows for a proper interpretation of the obtained parameters of the developed boat models and an assessment of the implementation carried out in terms of its impact on the manufacturer's competitive position.

Table 1 summarizes the competitive analyses that were performed at the Research Agenda stage of the project. First, they included the identification of competitors of VT-Sport Sp. z o.o. necessary to define the range and production scale targets.

This was complemented by identifying the products constituting a direct market reference point for the new product to be developed as part of the R&D project. Two such products and ten boat models were identified, which constituted potential competition for the product resulting from R&D work. A summary of the analysis of competing products is presented in Table 2.

A parallel issue is the incorporation of the project into the business model of the company. The case study of VT-Sport Sp. z o.o. showed that the production organization method is similar to the German model, in which elements of the production process are entrusted to specialized subcontractors. In this case, the manufacturer is responsible for the assembly of the product and its finishing. Subcontractors are responsible for specialized processes such as the lamination of plating, varnishing of plating,

Table 1. Summary of the competitive position against identified main competitors

	VENA P.U.	Mazury Sp. z o.o.	Rivers and Tides Boatbuilding	Hellwig
Number of competing models	2	2	1	1
Product range	8	>10	7	>10
Market seniority in relation to VT-Sport	Bigger	Bigger	Bigger	Bigger
Production volume compared to VT-Sport	Bigger	Bigger, mass	Bigger	Bigger

Table 2. Summary of the competitive position against the identified main competitors

	Compact dimensions	Spaciousness	Number of versions	Number of seats	Drive	Drive type	Design	Still available
Boote Marian GmbH, Eclipse 580	+	+	1	6	E	W	+	Y
Rivers and Tides Boatbuilding, BootOX	+	–	1	5	S/E	W	+	Y
Boesh, B620	–	+	1	6	S/E	W	+	Y
Chris Craft, Capri 21	–	+	1	6	S	W	+	N
Frauscher, 610 San Remo	–	+	1	5	E	W	+	Y
Lex Boote, E-lex 610	–	+	1	5	S/E	W	+	Y
Rapp Werft, BlueSky 600	–	+	1	6	S/E	W	+	Y
Invictus, 190FX	–	+	1	8	S	W	–	Y
Flipper, 610ST	–	+	1	6	S	Z	–	Y
Bayliner, Element E6	–	+	1	8	S	Z	–	N
Bayliner, 180 Bowrider	–	+	1	7	S	Z	–	N
Mastercraft, XT20	–	+	1	11	S	W	–	Y
Janneau, Cap Camarat 5.5	–	+	1	6	S	Z	–	Y

E – electric drive, S – combustion engine, W – built-in drive, Z – outboard drive, Y – still in production at the time of the article, N – not produced at the time the article was developed, + criterion met, – criterion not met.

Table 3. The business model of VT-Sport Sp. z o.o. in the motorboat segment (based on company materials)

Business model area	Company size	Model type	Production volume	Process integration scheme
Implemented model by VT-Sport Sp. z o.o.	SME	Focused on the market niche	Serial	Outsourcing

preparation of upholstery, execution of propulsion, accessories, and equipment elements mounted in the boat.

The implementation of the above model (Table 3) by the project has the following boundary requirements:

- focus on a selected market segment and a limited range of products;
- material solutions for serial production – no solutions requiring craftsmanship;
- limitation of elements necessary to design from scratch for the planned products – the use of equipment and fittings "from the regiment" of suppliers;
- unification of the design of individual versions, enabling the wide use of uniform components of accessories in different versions – the possibility of maintaining lower stock levels.

The completed research and development project results

The description of the R&D project results can be divided into four areas: construction and material solutions, drive, design, and performance. Below, an overview of each is presented, along with a brief justification of the adopted solution. They were assessed against the background of competitive products and in the context of guidelines resulting from the business model.

Design and key material solutions

The adopted construction and material assumptions of the VTS31 family of boats follow the solutions used in competitive products. The hull plating is made of polyester-glass laminates, and wooden finishing elements are mounted as cladding. In this way, a thin-walled product is obtained, with a lower weight and costs and shorter production time than in the case of an analogous boat with wooden sheathing.

An element worth emphasizing is the modular construction of the boat. The identified competing products are overwhelmingly offered with one version of the deck, without the possibility of choosing its configuration. One of the assumptions of the project was to treat the issue differently and offer boats that are better suited to the buyer's expectations by choosing one of three deck configurations (classic, bowrider, or with a sun deck). Therefore, VT-Sport Sp. z o.o. gave the design team the task of designing the hull plating in a manner analogous to that of floor platforms in the automotive industry. The remaining plating elements were integrated into the hull depending on the version at the stage of assembly of a given copy of the boat. This streamlines the

production process of components, maintains lower stock levels of individual sheathing elements, and allows for flexible production planning.

Drive

In the drive area, the key elements to be discussed include the type (built-in or outboard) and drive (combustion or electric). The decisions taken in this respect affected the design of the boat, the ergonomics of its use, as well as the cost for the potential recipient.

According to the 2018 ICOMIA report cited in the methodology, motorboats of up to 7.5 m in length are some of the most popular in Europe (based on import and export data for individual EU countries). Manufacturers offer models with both built-in and outboard drives. Due to the difficulty of integrating them into the line of classic-style boats, built-in engines dominate this segment, and models with a more contemporary design are equipped with outboard motors. In this context, the design assumptions adopted for the new boat, presented later in the article, turned out to be the right step. They avoided the limitations resulting from too-classic styles, which prevented the creation of a coherent boat design with an outboard drive.

Both drive types generate different conditions on the design and operational sides, including weight distribution, maximum drive power, ease of service work, and cockpit space available for arrangement. The advantages of an enclosed drive include a better weight distribution and the possibility of installing a drive with a much higher power (and thus also weight). In turn, outboard drives are characterized by the freedom to choose the manufacturer and model, a lower purchase price, greater freedom of cockpit arrangement, easier service access, and lower costs.

After analyzing the propulsion sources available on the market, the concept with an outboard engine was chosen. The initial assumption was to adapt the boat to internal combustion and electric drives due to restrictions on the use of conventionally-powered boats in selected EU export markets. However, this required optimizing the shape of the hull and minimizing hydrodynamic drag, which, in the case of an electric drive, are much more important than for an internal combustion drive. In addition, due to the outboard drive, it is possible to reconfigure the drive later in the life of the product.

According to the developed documentation, the following propulsion power range was adopted for the designed boat:

- combustion engines: up to 90 HP (approx. 66 kW);
- electric drives: up to 50 kW.

In the course of the R&D project, three propulsion sources were tested: those with conventional motors of 44.2 kW and 66.2 kW, respectively, and a 10 kW electric motor. The performance of boats with the above-mentioned power sources is presented in a separate section.

Design

As part of the project, three versions of the boat were developed. All boats were based on the same hull plating and differed in the arrangement of the cockpit and deck:

- Flying Shark (basic) version: It has a classic, full bow deck and a cockpit with two rows of seats that can be folded out into a 1.4×2.0 m bunk. It is equipped with a cassette for a sun canopy located at the stern.
- Bowrider version: It has an open bow deck with two comfortable V-shaped seats. The cockpit has an L-shaped arrangement of seats, with reversible helmsman and navigator seats, allowing for free arrangement of space. It is also equipped with a stern cassette for a sun canopy.
- Capri version: It has one row of seats in the cockpit and a multifunctional aft platform measuring 1.9×1.7 m. The aft platform can also be used as a couch and fishing platform.

The design of the boat was developed in two stages. In the first one, the design of the base version (Flying Shark) was developed. It was the starting point for the concept and design work on the Bowrider and Capri versions, which were developed in the next stage – co-financed under the Regional Operational Program of the West Pomeranian Voivodeship 2014–2020. In all three cases, in terms of design, it was decided to combine the proportions of runabouts and classic Italian motorboats (Riva). With a relatively small width (2.05 m), an effect was obtained that successfully combined modernity and dynamics, with the classic and elegant appearance of premium class products. The proposed style enables easy identification of the boat against the offerings of other manufacturers.

Performance

The last stage of the research and development project was to test the prototypes under real conditions. They confirmed the correctness of the adopted design solutions and the refinement of the units

Table 4. The business model of VT-Sport Sp. z o.o. in the motorboat segment (based on company materials)

Boat version	Flying Shark	Capri	Bowrider
Drive make and model	Suzuki 60ATL	Torqeedo Cruise 10.0 RL	Suzuki 90ATL
Drive type	Combustion	Electric	Combustion
Screw type	11.25×15	v15/p10000	13.75×19
Battery Pack / Fuel tank	60 l	10.0 kWh	90 l
Weight	680 kg	735 kg	820 kg
Crew	1 (75 kg)	1 (75 kg)	1 (75 kg)
Measured maximum speed	53.7 km/h	15.6 km/h	67.8 km/h
Stability category CE with permissible number of persons on board	C – coastal (bays, lagoons, rivers, and lakes), 6 people	C – coastal (bays, lagoons, rivers, and lakes), 7 people	C – coastal (bays, lagoons, rivers, and lakes), 6 people

Table 5. Performance of the tested boats (based on company materials)

Model	Variable	Measurements												
Flying Shark	Velocity	4.7	6.5	7.6	9.0	11.9	14.7	19.7	27.5	34	39.8	44.7	50.1	53.7
	Consumption l/h	0.9	1.1	1.5	1.9	2.2	4.5	6.4	8.8	11.8	14.9	17.2	20.8	23.1
	Swimming range (time)	313.3 (66:40)	354.5 (54:33)	304.0 (40:00)	284.2 (31:35)	324.5 (27:16)	196.0 (13:20)	184.7 (9:23)	187.5 (6:49)	172.9 (5:05)	160.3 (4:02)	155.9 (3:29)	144.5 (2:53)	139.5 (2:36)
Capri	Velocity	4.9	6.9	7.5	8.7	9.8	10.3	11.2	12.2	13.0	14.1	14.8	15.2	15.6
	Consumption kWh	0.25	0.5	0.75	1.25	2.00	2.50	3.50	5.00	6.50	8.00	9.00	9.50	10.00
	Swimming range (time)	196.0 (40:00)	138.0 (20:00)	100.0 (13:20)	69.6 (8:00)	49.0 (5:00)	41.2 (4:00)	32.0 (2:52)	24.4 (2:00)	20.0 (1:32)	17.6 (1:15)	16.4 (1:07)	16.0 (1:03)	15.6 (1:00)
Bowrider	Velocity	5.2	7.4	9.7	11.2	15.4	23.2	33.6	37.3	48.2	51.0	56.0	61.5	67.8
	Consumption l/h	0.9	1.2	2.1	3.1	5.7	7.2	10.1	11.0	14.0	19.3	25.7	29.3	32.9
	Swimming range (time)	508.7 (97:50)	579.1 (78:16)	415.7 (42:51)	325.2 (29:02)	243.2 (15:47)	290.0 (12:30)	299.4 (8:55)	305.2 (8:11)	309.9 (6:25)	237.8 (4:40)	196.1 (3:30)	188.9 (3:04)	185.5 (2:44)

in terms of stability, hydrodynamic resistance, and mass distribution. The performed tests proved the correctness of the designed shape of the hull, which has a bottom with a sharp V-section on the bow, with flattening towards the stern. This solution ensures smooth wave dispersion and cutting of the water surface, while minimizing drag at low speeds. On the other hand, the large V-opening angle in the stern section ensures the stability of the boat at speeds below 7 km/h and when performing port maneuvers. During the tests under real conditions, the mouse effect was observed. The boat pulls the wave from a speed of about 11 km/h and enters the slide at a speed of about 28 km/h. Redans, splash strips, and an additional upper deflector ensure that the water in each speed range is correctly reflected. Tables 4 and 5 provide a summary of the parameters of the tested boats, as well as the performance measured during the tests.

Discussion

From the point of view of enterprise economics, in particular production and trade, any financial support has a positive impact on the market share of such enterprises. The question arises whether Polish small and medium-sized enterprises from the recreational boat production sector would achieve a market share that is competitive with other European enterprises. Support for R&D projects is a determinant of the level of competitiveness. It is also a response to market demands in the era of the implementation of sustainable development postulates. The case study showed the use of an R&D project for the production of electric boats and further allowed us to compare such boats with conventional drives, but also to define the level of competitiveness. It may be puzzling that one of the smaller companies was used for the analysis. Taking into account the comparison with other competitive and similar enterprises, it should be assumed that VT Sport's share is lower. All four competing companies ranked higher in terms of width, production volume, and seniority. Nevertheless, the use of a decisive niche in the area of electric drives with the participation of the R&D project will increase the level of competitiveness with similar parameters of the boat itself.

The implementation of an R&D project forces companies to change their business model. While these changes are somewhat voluntary, the boundary constraints indicate the need for these changes and, consequently, their cost-effectiveness. We can talk about two aspects here – economic and ecological.

The economic aspect is obvious. Expanding the range thanks to an R&D project leads to an increase in market share and eventually to an increase in profits. Here, however, it is worth noting that by increasing the product range, the company's market share can be greatly increased; however, these are *ex-ante* assumptions. When looking at the analyzed case, it can be presumed that the implementation of an R&D project enabling the production of an electric motorboat ranks the company high in the group of enterprises greening their production. The analysis also showed that the technical efficiency of the electric drive of these boats is radically lower. Therefore, it is difficult to talk about a spectacular ecological success. However, from the perspective of the implementation of ecological postulates of sustainable development, there is a high degree of contribution to reducing the negative effects of the production and operation of motorboats on the natural environment. Another issue is, of course, the sale of these products, more specifically the volume. These issues are not the main theme of the article, but by highlighting their importance (after all, economic factors are the basic category of market share assessment), it is indicated that with today's degree of environmental awareness of customers and consumers, the motorboats with electric propulsion will be one of the main criteria for the decision to buy such a boat.

Can it be unequivocally stated that changing the business model to one that effectively uses R&D projects and includes in its product range products (boats) that meet modern environmental requirements (electrification) is sufficient to ensure a company's competitive advantage? Taking into account the market analysis, the combination of comparative assessment criteria, technical comparisons, and, finally, the variables shaping the business model, it is impossible to propose a clear thesis that such a change brings only benefits. There are financial barriers (the amount of their own contribution), technical and technological barriers (design, know-how, production), and allocation barriers – how often during the year a recreational boat can be used at a particular latitude. Nevertheless, taking into account the lifetime of the product and the company itself, it can be assumed that the benefits of changing the business model to a greener one are long-term, and there are more benefits than barriers.

Conclusions

The considerations and analysis (a case study) carried out in the article allow the following conclusions to be drawn:

1. In terms of market conditions and implementation of R&D projects.
   - R&D projects play a significant role in changing the business model. This is important in the ecological and economic dimensions, especially for the market environment in which the company operates.
   - The implementation of an R&D project strengthens the company's position in the market, particularly when it comes to a niche product.
   - The value of the company increases thanks to the financial support of R&D projects.
   - The implementation of an R&D project is complicated, and it should be assumed that advanced knowledge in the field of such a project is needed.
2. On the ecological dimension.
   - Supplementing the range of products with an electric drive reflects the implementation of ecological postulates of sustainable development.
   - The electric drive, although much less efficient than the standard one, generates less noise and pollution.
   - Electrification of the product is an element of greening the company – it can be considered the so-called best practice.
   - The ecological dimension meets the expectations of customers and consumers.
   - Environmentalized production as a link in the value chain translates into the greening of downstream links.
   - Although the production of electric drives may be more expensive, the positive effects offset the higher costs.
3. On the economic dimension.
   - Expanding the assortment with ecological products has a positive effect on the company's image and profit level (increases sales).
   - Informing about the use of R&D support improves the company's image.
   - Changing the business model based on the implementation of ecological postulates increases revenue and market share.

- Solutions for customer expectations and external conditions of doing business always have a positive dimension reflected in increased turnover.
- Implementation of an R&D project reduces the production costs of electric motorboats.

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