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METHODS USED TO GAIN A COMPETITIVE ADVANTAGE IN THE POWER TOOL INDUSTRY

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Abstract: *Competitive advantage is frequently used in marketing and has become an essential part of strategic management. It underlies an organization's superior performance in terms of profitability relative to the average of its competitors in the medium and long term. The study aims to compare key strategic elements of Makita and Bosch to identify some specific methods of achieving a sustainable competitive advantage in an ever-expanding field of power tools. The results obtained highlight the need to implement quality methods for the development and manufacture of products that meet the ever-increasing demands of customers. It is also necessary to use forecasting methods to be able to adapt the organization's strategies and objectives at the right time.*

Keywords: *Competitive advantage, quality management, strategic management.*

1. INTRODUCTION

The study goal is to identify the specific methods used to gain a competitive advantage in the ever-growing field of power tools. The increase was achieved by adoption in various industries such as civil construction or automobile. Initially, two of the most important manufacturers were identified, such as Makita and Robert Bosch. Later, power tool portfolios, philosophy and strategies, methods used to gain the competitive advantage, risk factors, and development of the lithium-ion batteries were analyzed. Therefore, the study wants to highlight the need to implement quality and forecasting methods to succeed in developing and manufacturing products capable of meeting the demands of customers at any time.

Competitive advantage is a term often used in marketing and has become an essential part of strategic management through the contributions of Michael Porter [1]. Competitive advantage constitutes the basis of the superior performance that an organization records regarding profitability compared to the average of its competitors from the market segment in which they operate for a medium or long period. Organizations often tend to neglect the customers' needs or analyze the direct competitors' strengths. Hence, to maintain a competitive advantage, the organization needs to create new products that meet the customers' requirements as well as carry out a frequent analysis of direct competitors. Thus, it is necessary to implement several thinking models that will help the manager of an organization to be able to make the best decisions regardless of the situation. Strategic thinking is the result of the combination of intelligent and creative thinking. Strategic thinking helps the managers of an organization to develop an analytical, predictive, critical, and pragmatic vision [2].

2. THE COMPONENTS OF THE STRATEGY

Strategic management involves the managerial process that comes to the aid of leaders to determine the organization's objectives and represents the main element of long-term sustainable development and gaining a competitive advantage over direct competitors. A competitive advantage is obtained when the organization has managed to develop and acquire a set of attributes that allow it to surpass its competitors. According to Michael Porter, it can be defined as ensuring a product low cost and differentiating it through superior qualities.

Hence, the strategy that an organization establishes must have finality to gain a sustainable competitive advantage [3].

Even if the concept of quality is not a specific industrial one, the principles of quality management can be applied in any field. Therefore, the focus of organizations has moved from the quality control approach to quality circles, Total Quality Management [4], continuous improvement [5], and worker empowerment. This change came about because it was observed that only through continuous development and improvement of knowledge and system can be gained a sustainable competitive advantage. Application of the continuous improvement principle (Kaizen) leads to improvements in the methods of making products or services that are considered less efficient. Thus, it is necessary to apply the principle of Plan-Do-Check-Act (PDCA) cycle [6]. PDCA method is used to be able to achieve continuous improvements without stopping by applying the next steps:

Step 1: The PDCA cycle begins with the Plan step which involves identifying a goal, objective, or problem. Afterward, the formulation of a theory, the definition of success parameters, and the implementation of a plan must be carried out [6].

Step 2: All these activities will be included in step Do. This is the step in which the components of the plan are implemented, such as the creation of a product or a service [6].

Step 3: The third step is Check, where the results are monitored so that the organization can verify and validate the entire progress and success of the improvement plan [6].

Step 4: The last step completed is also the one that closes the cycle, the Act step. It integrates the learning generated by the whole process, which can be used to be able to achieve the goal or objective, change the methods, and, why not, even reformulate a theory altogether [6].

The competitive advantage can also be obtained by identifying in detail all the problems that an organization faces and by solving them. Such an approach can be achieved by applying the Ishikawa diagram [7]. This is also called the "Cause-Effect" or "Fish Bone" diagram because its shape is similar to a fish skeleton. The technique uses a diagram-based approach to make a detailed analysis of the issue by applying the following four steps:

Step 1: problem identification;

Step 2: main factors determination involved;

Step 3: identification of possible causes;

Step 4: analyze the chart [7].

An important aspect of maintaining a competitive advantage is represented by the timely decision-making by the organization's leaders. Therefore, many organizations use the Pareto chart, which is a statistical technique that highlights the causes of great importance concerning others that lead to quality reduction by presenting the analysis results in a form of a graph [8]. The Pareto chart is also referred to as the "80-20 Rule" since 80% of the effects are determined by only 20% of the causes. The necessary steps to apply the technique are:

Step 1: collecting data about the problems that arose during the realization of the projects;

Step 2: determining the interval at which the identified problems are repeated;

Step 3: determining the percentage share of each problem;

Step 4: determining the cumulative percentage of each problem;

Step 5: forming the Pareto chart;

Step 6: analyze the charts and propose corrective measures [8].

The decisions taken by the leaders of the organizations must be following the objectives that have been established. Hence, the objectives established and implemented by any organization must be according to SMART approach (Specific, Measurable, Achievable, Relevant, and Time-Bound) [9]. This will help managers to make statements about events whose real results have not yet happened, thus allowing them to change their vision and take measures at the right moment to obtain the best results and benefits.

3. STRATEGIC FORECAST AND MANAGEMENT DECISION

The forecast accuracy can be influenced by how appropriate the model used is, by the change in time of the causal relationships within the respective model, and by the human

interventions factor. One of the most used forecasting methods is Delphi [10]. This consists of a group communication exercise between an expert team that is geographically spread. The technique allows experts to systematically approach a complex task, being created around desired performances by establishing some basic rules and principles. The steps for applying the Delphi technique are as follows:

Step 1: formation of a team for the development and monitoring of the project;
Step 2: selection of the choosing criteria for experts who will participate in the exercise;
Step 3: Delphi questionnaire development;
Step 4: questionnaire testing for the correct formulation of the problem;
Step 5: sending the first version of the questionnaires to experts;
Step 6: answers analysis following the first questionnaires;
Step 7: questionnaires development for the second round;
Step 8: sending the questionnaires from the second round to the experts;
Step 9: analyzing the answers from the second round;
Step 10: present the conclusions following the exercise [10].

The organization's objectives are established after analyzing the external environment because it is characterized by an extreme dynamism degree, complexity, and uncertainty. It is also necessary to carry out an internal environment analysis for a better vision and understanding of the organization's capabilities. Often, SWOT analysis is used to analyze both the internal and the external environment [11]. Though combining the conclusions, it is possible to adopt and implement the strategy that the organization will want to develop in the following period to ensure the strategic competitiveness that confers the achievement of a sustainable competitive advantage.

4. POWER TOOLS INDUSTRY

Power tools present a complex portfolio of products designed to satisfy the need to find alternatives for different activities such as construction or production. They are used both by professionals and amateurs for various house renovation activities. Power tools have been adopted on a large scale because they provide ease of operation and reduce operating time. The increase in construction activities has boosted the demand for such tools as they have been able to successfully replace conventional drilling or cutting methods. Though adoption in the automotive industry, the power tool segment is expected to double.

4.1 Power Tools by application and regions

Based on the type of tools, it is estimated that the power tools segment for drilling and fixing will register a growth rate of approximately 6.3% in the period 2021-2027 as seen in figure 4.1.

Also, the growth of this segment is because such tools have been adopted in developed regions such as Europe, Asia Pacific, and North America with a significant increase in the number of DIY activities. For example, according to [12], Asia Pacific held over 40% of the power tools market share in 2020 (figure 4.2). It is estimated that the automobile industry, which is continuously growing in countries such as China, Japan, and India, will stimulate the expansion of the regional market. Europe will have a considerable compound annual growth rate of over 6.2% until 2027.

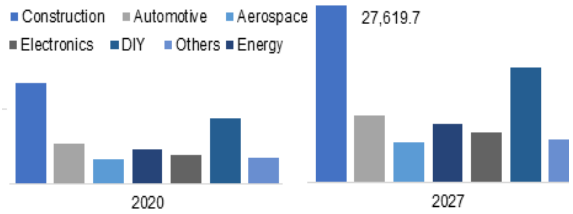

Fig. 4.1. Power Tools Market Size, By Application, 2020 – 2027 [12].

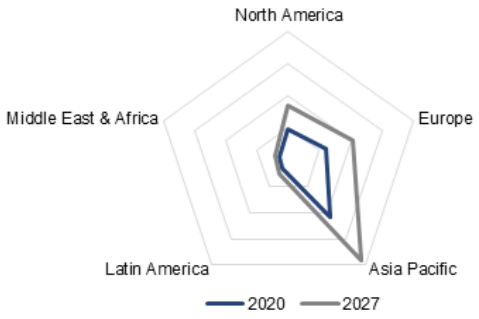

Fig. 4.2. Global Power Tools Market by Region [12].

The significant number of automobile and electronic factories in countries such as Germany or Great Britain has made them regional market leaders [12].

4.2 Type of power tools according to the mode of operation

According to [13], the global market for such instruments was estimated at 32.3 billion dollars in 2019. It is predicted that in the period 2020-2027, the compound annual growth rate (CAGR) will increase by 4.2% compared to the current moment. Technological progress is another factor that influences the market growth. I.e., DeWalt has developed a battery, Flexvolt, that can identify the type of electric tool attached, and it will automatically switch the voltage [13,14]. Another example is the X-Lock angle grinder locking interface developed and implemented by Bosch. It helps the easy release of the wheels of the grinders by turning the lever [13,15]. Stanley Black & Decker has observed that there is a growing demand for cordless power tools and changed its portfolio so that it can satisfy the current demand of the clients and remain competitive [13]. In figure 4.3. the situation of the global market of such instruments is presented depending on the type of application.

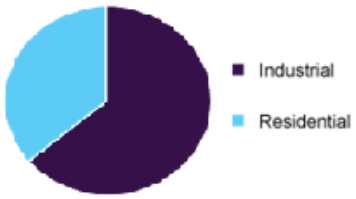

Fig. 4.3. Global Power Tools Market Status by Applications [13].

4.3 Research and development trends

Since the growth of this segment of the global market, several interesting trends and innovations can be observed, with new models of completely new power tools. Identified trends driving the power tool industry today [16]:

Trend 1: Cordless power tools – the idea of such tools was born because of the mobility need. Although corded electric tools currently have greater diversity, they impose mobility restrictions, being powered by a fixed energy source. Today's cordless power tools can work longer periods than they did in recent years. I.e., in Makita's portfolio, there are over 200 power tools that are powered by an 18 V battery [16].

Trend 2: Li-Ion batteries – with the significant increase in the models of cordless power tools, a new need was born, of developing batteries that allow their use over a long time. The solution found is represented by the lithium-ion battery, which is smaller and lighter than the conventional version, batteries with nickel-cadmium or nickel-metal hydride. The superior efficiency of lithium-ion batteries is because of their high energy density [16].

Trend 3: Product development - due to the significant increase in the sales of power tools, several companies have established specialized laboratories for research and development to find appropriate solutions to the new trends [16].

5. NUMERICAL SIMULATION OF LITHIUM-ION BATTERY FUNCTIONING

One of the current trends in the field of power tools is to develop compact and lightweight lithium-ion batteries capable of providing as much autonomy as possible. Therefore, several organizations have expanded their research laboratories to develop batteries to meet today's needs. Through developing and implementing superior batteries in terms of autonomy compared to direct competitors, a competitive advantage can be gained because customers do not want to be dependent on cabled power tools or must charge them in the middle of work.

Considering the trend, it has become of utmost importance to predict by numerical simulation the behavior of this source of energy during the life cycle of the product actuated by it. The characteristics that differentiate lithium-ion batteries from classic ones are their long life and high efficiency, which have made them the right power source for smartphones, laptops, power tools, or electrical vehicles. Millner [17] approaches a new battery aging model by using theoretical crack propagation models. The new model shows the exponential dependence of aging on stress, i.e, discharge depth. This can only be achieved after a voltage measure is derived from arbitrary charging and discharging history to be able to include mixed-use in vehicles or vehicle-to-grid operations. The model proposed by Millner is combined with an

empirical equivalent circuit model. Thus, time and state-of-charge-dependent charging and discharging characteristics will be provided at any rate and temperature. The proposed model application will result in a prediction of the cycle life as can be seen in figure 5.1. The described model will be applied in Matlab and to an A123 ANR26650M1A cell. This cell is part of a bank for a plug-in hybrid electric vehicle with 56 series cells in a bank and 11 parallel cells in a bank.

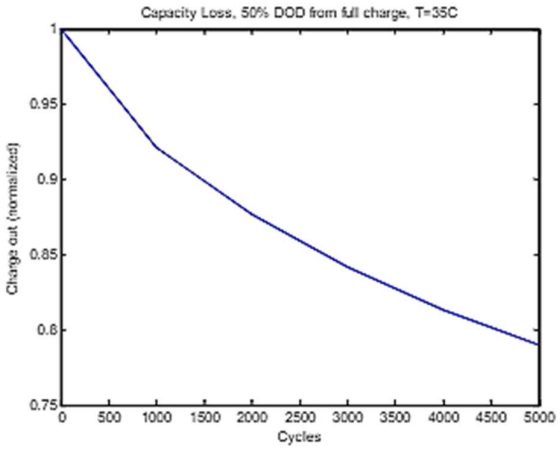

Fig. 5.1. Loss of capacity in the cell simulated by applying the exponential model. The average state of charge is 75%. The swinging in the state of charge is 50%. Temperature 35C, tested at C rate [17].

Simulation results show that the battery capacity will be reduced to 80% after 1700 cycles (~ 4.6 years). However, researchers are trying to improve lithium-ion batteries because of their superior characteristics compared to classical ones, i.e., nickel-cadmium.

6. COMPARATIVE STUDY BETWEEN MAKITA CO. AND ROBERT BOSCH GMBH

The comparative study aimed to compare product and service portfolios, philosophy and strategy, sustainable competitive advantage, and risk factors of Makita and Robert Bosch.

It was observed that both organizations have a diversified product portfolio to obtain a considerable profit and satisfy the needs of customers. Regarding the warranty and the service they offer, the two have different approaches. Makita offers a warranty for its products for a longer period, but it does not offer such a complex service as Bosch. Bosch offers its customers a service plan that covers free of charge the replacement of worn parts under normal conditions of use.

In table 6.1, the advantages and disadvantages of Makita and Bosch are presented [18].

Table 6.1

Advantages and disadvantages of Makita and Bosch.

	Makita
Advantages	➢ complex portfolio of products and services; ➢ lithium-ion batteries have a greater capacity and autonomy; ➢ the quality of the products is superior - the life span is longer.
Disadvantages	➢ high prices for their products; ➢ few options for certain types of products.
	Bosch
Advantages	➢ complex portfolio of products and services; ➢ trust since it is one of the oldest manufacturers of electric tools in the world; ➢ lower prices compared to the competition; ➢ good quality services for customers.
Disadvantages	➢ only one year warranty for their products; ➢ low autonomy for cordless products.

Makita's philosophy is to keep the same managerial approach in all subsidiaries and emphasizes empowering and engaging employees in the organization's objectives. The objective is to develop the rechargeable battery segment to take the lead in expanding this cordless product segment.

Bosch wants to increase the added value for users by developing innovative products such as "NanoBlade" technology and emphasizing capitalizing on the high potential of future emerging markets. Bosch leaders consider that an important factor in achieving success in emerging markets is represented by the low price of the products and the consideration of the feedback received from the users. In table 6.2 the strategic objectives set by Makita and Bosch are presented [19,20].

Table 6.2

Strategic objectives of Makita and Bosch.

Makita	Bosch
➢ philosophy in symbiosis with the subsidiary; ➢ solid proactive management; ➢ capitalizing on the capabilities of each employee; ➢ empowering employees.	➢ creating added value for users; ➢ harnessing the high potential of emerging markets; ➢ affordable price and creation of local service centers; ➢ feedback request; ➢ sustainability.

Makita believes that its products enjoy a sustainable competitive advantage through its reputation for quality, reliability, and after-sales services. Also, competitive advantage is maintained by research and development of innovative products, human resources, and superior quality. Makita has a total of 440 employees in its research and development centers to be able to produce products at the highest level. Human resources are the principal resource available to Makita because they want to hire staff for life.

Bosch gained a sustainable competitive advantage through the innovation of services oriented to the users' needs, the digitalization of sales and marketing processes, and sustainability. The organization has successfully launched more than 100 innovative products in recent years. They have also continuously invested in the digitalization of sales and marketing processes to be prepared for the increase in the number of purchases in the online environment. They continued the parallel development of the two product categories: DIY power tools (the green world) and power tools for professional users (the blue world). Another aspect developed by Bosch is sustainability.

They have created a special team whose objective is to continuously examine and implement appropriate measures worldwide regarding the recycling of packaging and power tools. The approaches and visions of Makita and Bosch are summarized in table 6.3 [19,21].

Table 6.3

Makita's and Bosch's approches and visions.

Makita	Bosch
➢ research and development, patents and licenses; ➢ human resource; ➢ superior quality.	➢ innovation products and services oriented to the needs of users; ➢ digitalization of sales and marketing processes.

COVID-19 affected the civil construction field, but also home renovations. Therefore, the demand for power tools has decreased, and sales activities decreased as a result. This led to a rethinking of production and the suspension of certain operations to comply with the regulations in force.

Thus, construction-level activities combined with capital investments in this market segment harmed Makita's sales. Another risk factor identified is represented by exchange rate fluctuations because they can affect the financial results obtained. Since 80% of the production and general sales of the Makita group are made outside of Japan, the main currency is the euro. This aspect sometimes harms the organization's capital because, at the end of the Japanese fiscal year, all receipts are converted into Japanese yen. The competitive advantage obtained and sustained by Makita over time is largely because of maintaining good relations with its main customers. If they significantly reduce purchases of power tools, sales can be significantly affected. The expansion of the Makita group at the global level has led to a problem regarding the acquisition of usage rights for patents, models, and trademarks. Therefore, it is sometimes difficult for the organization to proactively protect intellectual property rights. Bosch sales were also affected by the level of construction activities and capital investments in this market segment. Hence, Bosch has started steps aimed at delivering to emerging countries as well, but there is a possibility that this action will have a significant negative impact on the financial situation and the results of the organization. The risk factors in emerging countries can be the political and economic situation, changes in legislation and regulations in force, the flow of technical knowledge, or even the interruption of operations due to workplace disputes. Bosch gained a competitive advantage by developing innovative products and by offering services to be able to satisfy the demands of customers. If Bosch cannot maintain its level of innovation, sales may be negatively affected, and customers will turn to another manufacturer. Another risk factor that could

negatively affect Bosch's activity is the network of IT operations. This risk is because the main sales and production centers are in Germany, and its purchasing, production, sales, and development sites are located all over the world. If the network and information systems malfunction, it is possible that the organization will have to delay production or deliveries, which would lead to a negative impact on Bosch's finances [19,20]. Makita and Bosch have similar risk factors that could adversely affect their financial and operational condition. They are presented in table 6.4.

Table 6.4

Risk factors for Makita and Bosch.

Makita	Bosch
➢ construction-level activities and capital investments; ➢ exchange rate fluctuations; ➢ geographical concentration of offices and production plants; ➢ maintaining relations with the main clients; ➢ protecting intellectual property rights; ➢ loss of essential personnel.	➢ the level of construction activities and capital investments; ➢ entry and development of power tools distribution activities in emerging countries; ➢ the development of innovative products; ➢ disputes regarding liability for products or services; ➢ IT operations network.

7. CONCLUSIONS AND FUTURE RESEARCH DIRECTIONS

In order to maintain a competitive advantage, organizations must create new products that can successfully satisfy the demands of customers. It is also necessary for periodic strengths analysis of the competitors, as well as an internal analysis to notice if the current methods implemented, are still relevant or require changes. The field of power tools is dynamic and has experienced considerable growth with the adoption in civil construction and automobile because of the increased efficiency and reduced completion time for certain tasks. Therefore, a comparison of essential strategy elements of Makita and Bosch was elaborated to identify some specific methods to gain a sustainable competitive advantage. The results demonstrate that manufacturers must be orientated toward user needs and new trends. The research trend is to develop cordless tools with high autonomy capable of completing the tasks they are used for. Hence, most manufacturers have changed their portfolio by expanding the cordless instrument offers to remain competitive. Also, even if civil construction-level activities and home renovation were affected by COVID-19, and the demand for devices has decreased, organizations have restructured their production so they can cope with this period. Thus, managers must be able to make the best decisions at the right time. The future research directions are the quantitative and qualitative study of the specialized literature articles about innovation methods and technological transfer used in strategic management, the synergy between innovation and forecasting methods to achieve sustainable competitive advantage, and new methods of technology transfer to reduce the response time from idea to saleable product.

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METODE UTILIZATE PENTRU OBȚINEREA AVANTAJULUI COMPETITIV ÎN INDUSTRIA SCULELOR ELECTRICE

Avantajul competitiv este folosit frecvent în marketing și a devenit parte esențială a managementului strategic. El stă la baza performanței superioare pe care o organizație o înregistrează în ceea ce privește profitabilitatea față de media concurenților săi pe termen mediu și lung. Studiul își propune să compare elemente strategice esențiale ale Makita și Bosch pentru a identifica unele metode specifice de obținere al avantajui competitiv durabil într-un domeniu în continuă expansiune ca cel al sculelor electrice. Rezultatele obținute evidențiază necesitatea implementării unor metode de calitate pentru dezvoltarea și fabricarea produselor care să satisfacă cerințele în continuă creștere ale clienților. De asemenea, este necesară utilizarea unor metode de prognoză pentru a putea adapta la momentul potrivit strategiile și obiectivele organizației..

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