MODERN METHODS OF MARKET RESEARCH AND DIGITAL OPTIMIZATION OF PRODUCT QUALITY MANAGEMENT

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Abstract

The main idea of the systematic approach to analysis is to consider the market as a complex system where different elements interact with each other and influence the quality of products that meet international standards. This allows businesses to better understand market conditions and adapt their quality management strategy to ensure competitiveness and customer satisfaction.

Keywords: optimization research methods, information technology, quality, market

Humanity has always strived to ensure high quality, especially when it comes to ensuring the safety of products, preserving human health and the environment, etc. The saturation of the market with a variety of products has given consumers a choice. This has led to the fact that ensuring high quality products has become an important area of socio-economic development in most countries.

In a globalised marketplace, the issue of quality is relevant for all countries and organisations, as only high quality products can be competitive. This problem is multifaceted and has political, social, economic, scientific, technical and organisational aspects.

All of this is extremely relevant for Ukraine. Our country's desire to integrate into European and global economic structures requires us to work according to the rules of the market economy. In today's environment of sophisticated military and space technology, nuclear power plants, environmental degradation, and growing human security concerns, the topic of quality is extremely relevant.

The Centre for Innovation Development, the Business Development and Support Office, the Ministry of Economy, the Ministry of Finance, the State Regulatory Service of Ukraine, the Ukrainian Chamber of Commerce and Industry, and the United Nations Development Programme in Ukraine, with the assistance of the United Nations Recovery and Peacebuilding Programme, funded by the European Union, conducted the eleventh wave of business surveys in Ukraine. Survey period: 24.03 – 04.04.2023. A total of 999 owners and CEOs of SMEs were interviewed. The key results of the survey, which reflect the state of the business environment in Ukraine, are shown in the graph in Figure 1.

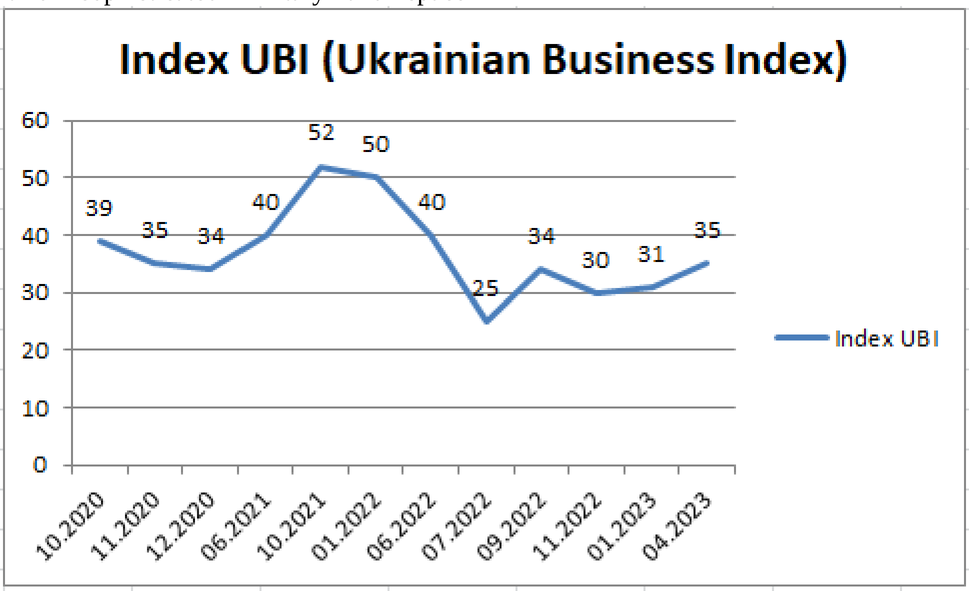

Figure 1 Business activity index – Ukrainian Business Index (UBI).

At the beginning of 2023, the Ukrainian Business Index (UBI) stood at 34.03 (out of 100). The UBI shows business activity, its ability to increase turnover and create jobs. If the index is below 50, this indicates negative business expectations of further developments. The index has increased compared to February 2023 (30.76) and the local maximum in September (33.9). This increase in the index reflects business fatigue from uncertainty and a desire to intensify rather than an improvement in the economic situation: the number of orders from customers remains unchanged, but output and inventories are growing.

The quality of products is the backbone of today's business economy. Firms from different countries and continents, producing a wide range of products, are actively working to improve their quality. Expenditures on product quality improvement have a significant and growing share. Improving quality is a labour-intensive activity for an enterprise, as it touches almost all areas of activity and ultimately results in such a macroeconomic indicator as the quality of life.

Many years of experience of leading companies in the developed world show that market success can be achieved by improving the quality management system. That is why today, when we talk about quality, we mean not so much the quality of the product itself as the quality of the functioning of enterprises and organisations, the perfection of their quality management systems aimed at continuous self-improvement and, most importantly, meeting the existing market demand.

It is generally accepted that if a company has received a certificate of compliance of its quality management system with international standards ISO 9000, it is able to consistently produce quality products that can be competitive. Most companies in the world use ISO 9000 international standards for this purpose [4].

Compliance with ISO 9001 demonstrates an organisation's ability to provide products and services that meet customer requirements and relevant regulatory requirements. It also demonstrates an organisation's ability to continuously improve its processes and quality management system.

ISO 9001 is one of the best known and most widely used international standards in the field of quality management. It sets out the requirements for a quality management system in organisations, regardless of their size, type of activity or industry.

Thus, the level of effectiveness of the quality management system is directly proportional to the level of competitiveness of the product and the enterprise.

The concept of market relations in the automated product quality management system focuses on understanding and meeting customer needs through effective interaction with the market environment. The main idea is to consider the market as a complex system where various elements interact with each other and influence the quality of products that meet international standards.

This approach involves researching various aspects of the market environment, such as customer needs and requirements, the competitive situation, market trends, economic and technological factors, etc. Based on the data obtained, an understanding is developed of which aspects of the market can affect product quality and which quality management strategies can be used to achieve the desired result.

A systematic approach allows us to consider market conditions and factors in conjunction with each other and to analyse their impact on product quality in a comprehensive manner. This allows businesses to better understand market conditions and adapt their quality management strategy to ensure competitiveness and customer satisfaction [1].

The main aspects of this concept include:

1. Satisfaction of consumer needs. A central element of the marketplace concept is the recognition and understanding of customer needs and expectations. An automated quality management system should be designed in such a way as to ensure that products are manufactured that meet these needs and requirements.

2. Analysis of the market environment. The automated quality management system should include mechanisms for continuous monitoring and analysis of market trends, competitive situation, changes in customer requirements, etc. This allows the company to adapt to changes in the market and respond to them in a timely manner.

3. Increasing competitiveness. By continuously improving product quality and responding to market demands, the company seeks to increase its competitiveness. An automated quality management system helps to identify and resolve problems that may arise in the production process, which helps to improve quality and reduce costs.

4. Collaboration with partners and suppliers. An automated quality management system may include modules for monitoring and controlling the quality of incoming materials and components supplied by partners and suppliers. This allows you to ensure quality at every stage of the production process.

Market analysis is the process of collecting, evaluating and interpreting information about a market in order to understand its potential, dynamics and characteristics in order to make informed business decisions. Market analysis is an iterative process that may require constant updating and adjustments based on new information or changes in market conditions.

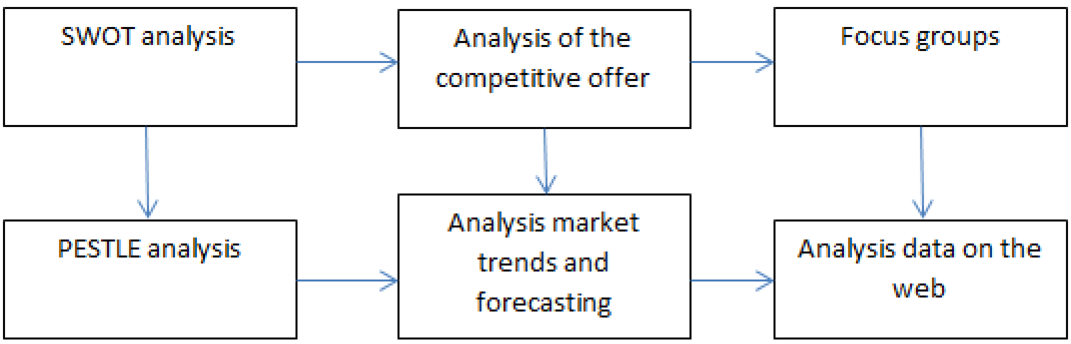

Figure 2 Market research methodology.

The first stage of market analysis involves gathering various information about the sector, products or services, competitors, potential customers, etc. This may include statistical data, market research, interviews with experts, consumer surveys, trend analysis.

An important step is to analyse competitors in the market. This includes studying their products or services, pricing strategies, marketing techniques, strengths, weaknesses, opportunities and threats.

The system of collecting external current marketing information is a set of sources and methodological measures that help the company's management to obtain regular information about events taking place in the commercial environment. The organisation of the information gathering and processing by the management team can be different.

First, it is the use of data on the state of the macro environment, which newspapers, specialised magazines, and newsletters; secondly, a lot of information about the product can be provided by sellers who are in daily contact with customers; thirdly, specialised firms that provide external current information have the necessary information; fourthly, any employee of the marketing service can be entrusted with collecting and presenting information in the appropriate form for the manager.

Sources of external information about competitors may include: purchased goods; visits to open days and specialised exhibitions; reading company reports; attending shareholder meetings; talking to company employees who are sales agents; collecting and analysing advertising; reading documents of professional associations; data from specialised firms and other sources.

From a marketing perspective, the market is not homogeneous but consists of parts and segments. The market can be divided into different segments based on various criteria, such as age, geographic location, income, interests, etc. Segmentation helps to better understand the diversity of the audience and identify strategies to engage each segment.

The main segmentation criteria are as follows:

1. Quantitative parameters of the segment: segment capacity, i.e. how many products and for what total amount can be sold; number of potential consumers. Based on these parameters, an enterprise should determine which production capacities should be targeted at a particular segment and what the selling price should be.

2. Accessibility of the segment for the enterprise. The company must determine whether it has sufficient sales channels for its products, what is the capacity of these channels, and whether the system of bringing products to consumers is reliable.

3. Materiality of the segment. It is necessary to determine whether this market segment is stable, growing or declining.

4. Profitability, i.e. how profitable is the work in the selected market segment.

5. Comparability of the segment with the market of the main competitor. It is necessary to determine to what extent the main competitors are ready to give up the chosen market segment, to what extent their interests will be affected.

6. Protection of the selected segment from competitors, the enterprise needs to determine its capabilities in the competition in the selected market segment.

The main actor in the consumer market is a specific personality with a unique set of specific traits and qualities that are constantly influenced by external factors. Studying the target audience helps to understand their needs, requirements, wishes, consumer habits, as well as their willingness to buy and other aspects that influence their purchase decision.

Several groups of factors influence the consumer's way of thinking: cultural, social, personal, and psychological factors. Getting into the ‘black box’ of the buyer's mind, these factors, taking into account his or her characteristic features, adjust the decision-making process regarding the choice of product, brand, dealer, time and volume of purchase accordingly.

Customer behaviour research is an important part of market analysis, as it helps to understand how consumers make decisions about buying products or services. Here are some of the aspects that can be included in customer behaviour research in market analysis:

1. Motivation to buy. The study of what motivates customers to purchase a particular product or service. These can be functional needs, emotional motives, social factors.

2. The decision-making process. Understanding the stages that a customer goes through from realising a need to making a purchase. This includes searching for information, comparing options, evaluating alternatives, and making a decision.

3. Influencing factors. Determining what factors influence buyers' decisions. These can be personal characteristics of the buyer (age, gender, income), marketing influences (advertising, promotions), social environment (friends' opinions, family influence).

4. Market segmentation. The division of the market into different segments depending on certain characteristics of customers. This allows you to better understand the diversity of the consumer base and develop convenient strategies for attracting each segment.

5. The impact of information technology. Study of how the use of information technology affects customer behaviour, including visiting online stores, reading reviews, using mobile applications.

These aspects of research help businesses to better understand their target audience, their needs and preferences, which in turn allows them to tailor products and marketing strategies more effectively to meet market needs [4].

Continuous systematic updating of the product range and high quality of products enable the company to ensure: stability and expansion of the sales market, increase in profits, reduction of dependence on the sales of a particular type or product group, efficient use of the existing goods movement system, and creation or maintenance of the company's reputation.

The new product planning process includes the following key stages: idea generation, idea selection, concept development, concept validation, economic analysis, product development, trial marketing, and commercialisation.

The main characteristics of a new product are: attractiveness to consumer markets; potential attractiveness of the product life cycle; resistance to seasonal factors; ability to produce at specific prices; general characteristics; potential profit; existing competition; level of investment; possibility of patenting; degree of risk; marketing characteristics; production characteristics; ease of production; time to commercialisation; availability of labour and material resources.

Let's take a closer look at how consumer reaction to new products is studied in the process of planning new products.

The first stage is the generation of ideas. This is a kind of search for opportunities to create a product with market novelty. Ideas for creating new products arise in research laboratories and design bureaus, and are based on reports and suggestions from sales agents, research into the advantages and disadvantages of their products, analysis of trends in the development of new products by competitors.

The second stage is the selection of ideas. Whereas the aim of the previous stage was to generate as many ideas as possible, the second stage reduces the number of ideas by using comprehensive characteristics (general product analysis, potential profit, competition, market size, investment level, patentability.). Each of the characteristics is assigned a score (from 1 to 10), and, if necessary, a weighting factor is also set.

The third stage is the development of the marketing concept. The development of this concept for entering the market with a new product can consist of three parts.

The first part describes the size, structure and behaviour of the target market, the intended product positioning, sales, market share and profit figures for the next few years. The second part provides general information about the estimated price of the product, the general approach to its distribution and the estimated marketing costs for the first year. The third part defines long-term goals in terms of sales and profits, and creates a marketing mix.

The fourth stage is concept validation. It is about presenting the intended product to the consumer and thereby changing their attitude to the product, making them want to buy it at this early stage of development.

The fifth stage is the economic analysis of the accepted ideas. The analysis is based on the study of forecasts of demand, costs, competition, required investments, and profits.

The sixth stage is the product development process. The process involves making decisions on the design of the product, its packaging, trade mark, determining the condition of the product, checking the attitude to the product and its use by the consumer. Functional cost analysis and other methods are widely used in the process of developing new products.

The seventh stage is trial marketing. It is carried out in order to evaluate products and test marketing activities in real conditions in advance before the start of full-scale sales.

The eighth stage is commercialisation. This stage corresponds to the product life cycle stage, includes the implementation of a marketing plan and full-scale production, requires significant costs, and quick management decision-making.

For a product to be easily sold on the market, it must meet two requirements: it must have consumer properties and it must be competitive. The competitiveness of a product is a set of quality and cost characteristics that ensure that specific needs are met. It can be determined by the ratio of the beneficial effect to the total costs, including the costs associated with both the acquisition and operation of goods. Competitiveness is the compliance of a product with market requirements. The level of competitiveness of a product can be assessed using a system of individual, group (aggregate) and integral indicators.

Today, it is important not only to develop and manufacture products that meet international quality standards, but also to sell them. In order for a manufactured product to meet consumer requirements, it must be delivered from the manufacturer to the consumer with certain properties, in a certain quantity and to a certain place.

Sales of goods guarantee coverage of all costs of production, delivery, and customer satisfaction. It is in the area of sales that the effectiveness of all the company's activities is determined. That is why a well-thought-out action plan for the company's sales team is important.

By accurately forecasting sales, a firm is able to: identify growth areas, study competitors, develop a marketing budget, allocate marketing resources, analyse sales performance, monitor the external environment, modify marketing plans, and measure success [3].

The company's sales manager is advised to develop a forecasting plan that includes a number of elements:

1. Define the tasks of forecasting (examination of company materials, analysis of potential sources of information, collection of information directly in the sales territory).
2. Evaluation, analysis and extrapolation of data, measurement of changes, objective and subjective forecasting methods; combined method.
3. Applying the forecast to sales centres, sales territories, markets for production goods, markets for consumer goods, sales channels.
4. Control of forecasts and the forecasting process, audit of the forecast, audit of the ‘mechanics’ of forecasting.

After analysing the desires and characteristics of consumers, the company is ready to select a target market, which it will focus on and develop an appropriate strategy for.

There are three alternative methods that companies can use to reach their target market:

1. Mass marketing. Targets the consumer market using a single basic plan. The company believes that consumers have similar desires for the characteristics of goods or services. The main goal is to maximise sales.
2. Market segmentation. Aimed at a narrow group of consumers - a market segment. This method is used by small or specialised businesses. A company

can succeed with limited resources and capabilities by specialising.

3. Multiple segmentation. The enterprise focuses on two or more market segments with different plans for each of them. This strategy requires a detailed analysis, as the resources and capabilities of the enterprise must be sufficient to produce and market goods of two or more brands.

The methodology for studying the market as a component of an automated product quality management system, which is presented in the article, allows to: determine the needs for products, market demand for them and areas of their sale, identify specific customer requirements or analyse general ones, and coordinate all relevant functions of the organisation related to meeting customer requirements.

The enterprise quality management system can become a tool for winning the competition, given that the competitiveness of an enterprise is the level of its competence relative to other competitors in the accumulation and use of production potential of a certain orientation, which is reflected in such indicators as product quality, production volumes, profits.

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