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MODELING AND RISK MANAGEMENT OF MARKETING ACTIVITIES

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ABSTRACT

Objective: The article aims to analyze the application of modeling and risk management techniques in the development and execution of marketing strategies for industrial companies, focusing on improving the reliability of management decisions by minimizing risks.

Originality/Value: This study highlights the often-overlooked importance of risk management in marketing activities. It proposes a comprehensive approach combining quantitative and qualitative models to address uncertainties in external variables and consumer behavior, providing valuable insights for enhancing marketing strategies.

Method: The research uses a combination of quantitative analysis methods, such as decision trees, stochastic programming, and statistical decision theory, to assess marketing risks. These methods are applied to real-world industrial contexts, comparing traditional and modern risk management models.

Results: The study identifies key internal and external risks in marketing activities, such as insufficient resources, low employee qualifications, and external market forces. It evaluates the effectiveness of various risk assessment methods, emphasizing the need for marketing strategies that address these risks to ensure business success.

Conclusion: The authors conclude that risk assessment and management are critical to the success of marketing strategies but are often underutilized. They recommend adopting more

robust risk management methods to mitigate uncertainties and optimize decision-making processes in marketing activities.

Keywords: Marketing. Business. Strategy, Risk management. Company.

MODELAGEM E GESTÃO DE RISCOS EM ATIVIDADES DE MARKETING

RESUMO

Objetivo: O artigo tem como objetivo analisar a aplicação de técnicas de modelagem e gestão de riscos no desenvolvimento e execução de estratégias de marketing para empresas industriais, com foco na melhoria da confiabilidade das decisões gerenciais por meio da minimização de riscos.

Originalidade/Valor: Este estudo destaca a importância muitas vezes negligenciada da gestão de riscos nas atividades de marketing. Propõe uma abordagem abrangente que combina modelos quantitativos e qualitativos para lidar com incertezas nas variáveis externas e no comportamento do consumidor, oferecendo insights valiosos para o aprimoramento das estratégias de marketing.

Método: A pesquisa utiliza uma combinação de métodos de análise quantitativa, como árvores de decisão, programação estocástica e teoria de decisão estatística, para avaliar os riscos de marketing. Esses métodos são aplicados a contextos industriais reais, comparando modelos de gestão de riscos tradicionais e modernos.

Resultados: O estudo identifica os principais riscos internos e externos nas atividades de marketing, como a falta de recursos, baixa qualificação dos funcionários e forças de mercado externas. Avalia a eficácia de vários métodos de avaliação de riscos, destacando a necessidade de estratégias de marketing que abordem esses riscos para garantir o sucesso empresarial.

Conclusão: Os autores concluem que a avaliação e gestão de riscos são cruciais para o sucesso das estratégias de marketing, mas são frequentemente subutilizadas. Eles recomendam a adoção de métodos de gestão de riscos mais robustos para mitigar incertezas e otimizar os processos de tomada de decisão nas atividades de marketing.

Palavras-chave: Marketing. Estratégia empresarial. Gestão de riscos. Empresa. Modelagem.

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INTRODUCTION

In the modern world, large companies cannot operate and develop without the use of marketing technologies (Granina, 2014; Kameneva & Polyakov, 2016; Kostromina et al., 2022). Due to the constant emergence of new companies, competition is also growing, which makes such companies improve their products and services to maintain their sales and gain as much income as possible (Agasyeva et al., 2023; Baimuratova et al., 2023; Nikolenko & Semina, 2022). This is why marketing is required in the scientific, technical, and production activities of a company (Kotler, 2008; Kotler et al., 2015; McDonald, 2017).

Methods for quantitative analysis of management decisions are used by industrial companies to achieve accuracy and reliability in assessing the effectiveness of their marketing strategies and the degree of risk impact (Engel et al., 2001; Lyshchikova et al., 2023). Marketing strategies can be developed using calculation and analytical methods, expert assessments, and a statistical method (Petrina et al., 2023; Zaitseva et al., 2020). These methods for analyzing the implementation of marketing strategies by industrial companies, as a rule, meet the requirements for ensuring the necessary accuracy and reliability of assessing their effectiveness and degree of risk impact (Ilkevich et al., 2022; Khoruzhy et al., 2023).

SWOT analysis provides a fairly accurate assessment of the effectiveness of marketing strategies and their risk level.

The article aims to analyze risk management methods to formulate a strategy for the company's activities.

METHODS

We studied a wide range of modeling and risk management methods and emphasized their use in the formulation of industrial strategies in the corporate sector. We conducted a critical analysis of these methods and assessed their efficiency, limitations, and adaptability across various business contexts. The discourse compares conventional and modern models with due regard to pragmatic industrial challenges. It dwells on quantitative models known for their analytical precision and methodological robustness, including qualitative frameworks that provide context and adaptability. We also considered the synergistic potential of these diverse modeling paradigms to form a unified and effective strategic approach.

RESULTS AND DISCUSSION

In general, risk is understood as a possible unfavorable event that can happen in the future. An event that hinders the achievement of a goal set and/or entails a loss of resources is considered unfavorable. Risk characterizes the possibility and achievability of some result depending on the action taken or the management decision made, i.e., a combination of the probability of an event and its consequences (Chagina, 2011; Domashchenko & Finogenova, 2010; Dubrov et al., 2003).

An example is the risk of losing income. In relation to marketing in general and marketing strategy in particular, risk is interpreted differently.

Marketing risk is a risk inherent in the marketing sphere of a company’s business activities, i.e., it is characterized by the probability of certain events and their consequences, which makes it difficult or even impossible to achieve goals at certain stages of marketing activities or leads to a complete marketing failure (Kiseleva & Simonovich, 2014; Kleiner, 2014; Pesikov, 2003).

Marketing risk is defined as the risk of profit loss as a result of a decrease in sale volume or selling price; the likelihood of commercial failure in the market or failure to achieve the planned strategic goals, as a result of which the company will suffer financial or economic damage; a set of risks characterized by the probability of events and their consequences that make it difficult or impossible to achieve goals at certain stages of marketing activities (Cross et al., 2009; Kotler et al., 2015).

Thus, the risk of a marketing strategy can be defined as the probability of not achieving goals and losing potential income and benefits. As practice shows, not enough attention is paid to the comprehensive study and analysis of risks in the field of marketing.

The concept of marketing can be characterized as a process of profitable exchange between two parties (seller and buyer), through which the value of a company and its product increases (Teichert et al., 2015; Thompson, 2009). However, authors (both historical and contemporary figures) suggest their definitions of marketing (Table 1).

Table 1. Authors and their definitions of marketing

Author	Definition
Ph. Kotler, G. Armstrong	Social process by which people and organizations exchange values (goods/services in exchange for money) to satisfy their needs
V. Tyushin	Any activity that promotes sales
B. Gudrich	The process of creating consumer needs by identifying and forecasting them, and organizing a company's resources to satisfy them and generate the greatest profit
R. Buchanan	Behavior stimulation that is economically beneficial for the stimulating party
P. Drucker	Business from the viewpoint of consumer needs
American Marketing Association	Activities aimed at creating, exchanging, and distributing offerings between businesses that will provide value to consumers
Chartered Institute of Marketing	The process of managing and satisfying consumer needs to make a profit

Since marketing analyzes a large amount of information, a marketing strategy should consider numerous features (about the product, its promotion, demand, customers, etc.). Marketing activities are also subject to risks that should be considered by risk management specialists.

Risk management aims at resolving dangerous situations in the activities of companies to minimize their losses and maximize profits.

The risk itself is a threat, a danger of unforeseen expenses and losses. However, companies develop and solidify their presence in the market thanks to risks.

The formation of a marketing strategy is impossible without risk since uncertainties cannot be avoided in the market. Therefore, marketing and risk management can be considered as two inseparable spheres. We need to consider this relationship that can be represented as a diagram (Figure 1).

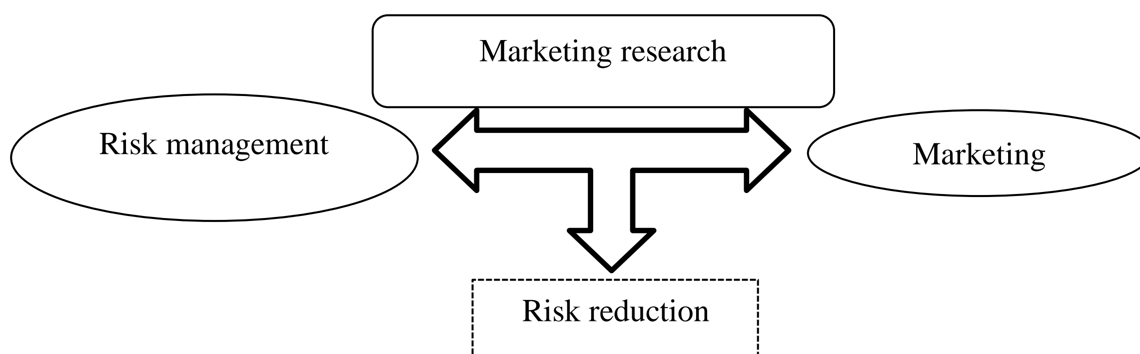

Figure 1. Relationship between marketing and risk management

This diagram explains the impact of risk management on marketing, and vice versa.

Marketing is used to promote a company and its services or products to make a profit. To attain this end, it is necessary to conduct various studies aimed at determining customer satisfaction and their expectations. A company that is more aware of customer needs and can anticipate their expectations will be more successful and in demand in the market.

Risk management that studies risks within a company also represents the risks entailed by marketing research. Marketing risks are any risks directly related to the marketing activities of a company. Any marketing operations (marketing activities in general) can cause difficulties and negative consequences. These are risks. The more research is done, the more risks are found. However, this process also helps a company better understand itself and its customers, which ultimately reduces risks.

During marketing research, risks can arise for different reasons and under different conditions. Thus, they can be divided into several types according to the source of impact, i.e., internal or external risks (Figure 2).

In practice, marketing risks comprise all the risks connected with a company's marketing activities in general and the implementation of its marketing strategy in particular. All of them are characterized by the probability of certain events and their consequences, which can create difficulties in achieving business goals at various stages of a company's marketing activities (Bogoviz et al., 2019; Kosov et al., 2016; Mescon et al., 2020).

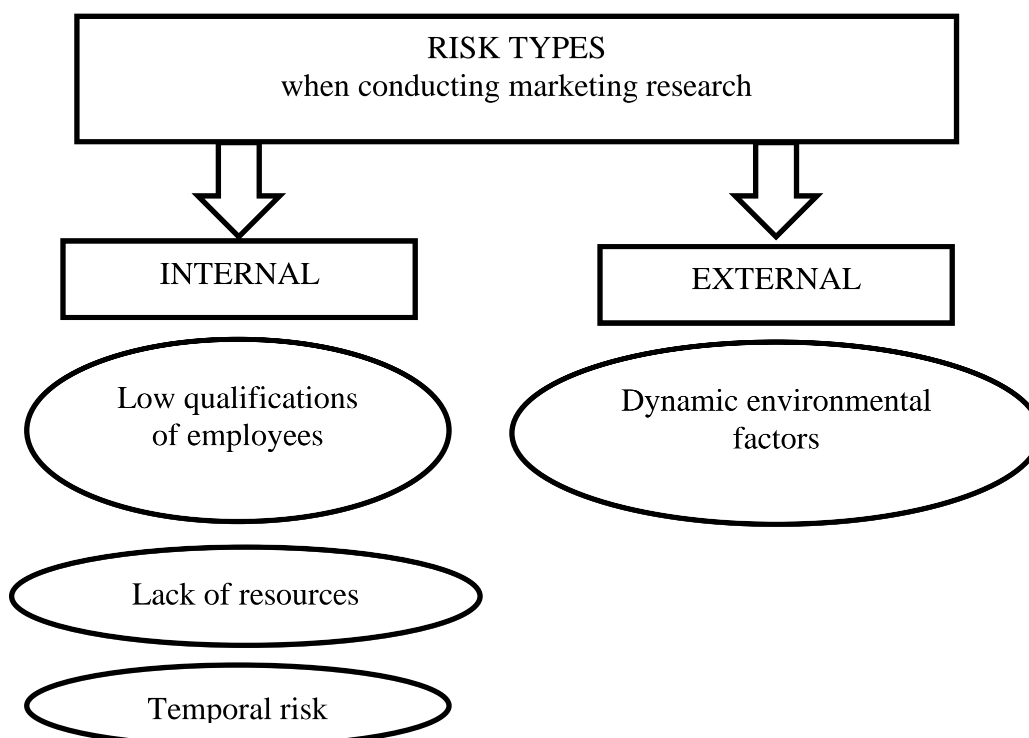

Figure 2. Types of marketing strategy risks (Kameneva & Polyakov, 2016)

The internal risks of a marketing strategy are determined by its content and the company's activities. These risks are considered specific. These may include the lack of resources, low qualifications of personnel, leakage of confidential information, etc.

On the contrary, external risks are determined by dynamic environmental factors, are formed outside a company, and do not depend on it. They are also called systematic or market risk, for example, inflation, anti-Russian sanctions, etc.

M. MacDonald provides a classification according to which all risks arising in the field of strategic marketing can be divided into three groups (McDonald, 2017): market risks, equity risks, and profit risks.

Market risks are associated with the fact that the actual market capacity may not correspond to its predicted value. As a result, real sales volume, market share, and profit will be less than the planned ones. This group includes price and forecast risks, sales volume risks, product category risks, etc.

Equity risks arise when a marketing strategy may not be ready to provide the competitive advantage or customer preference necessary to gain a new market share. This includes supply risks, target market assessments, uniqueness risks, etc.

Profit risks depend on the likelihood that the marketing strategy being implemented will not be able to achieve the planned level of margin. In this case, the main risks include the risk of a source of profit, the risk of a profit pool, and the risk of additional costs.

A separate group includes tactical risks of a marketing strategy that are directly related to decision-making on the marketing mix. In accordance with the 4Ps marketing mix, they include risks associated with product policy, pricing and sales risks, and promotion risks.

By studying marketing research with due regard to risk management, a company can function more effectively. To make marketing activities more useful, it is necessary to examine each stage of a marketing strategy and assess all possible risks. To identify and assess the risks of marketing strategies, traditional risk management techniques are used. A special role is assigned to statistical methods and methods of stochastic programming (Lambin, 1996; Weatherford & Kimes, 2003).

The most popular method is the decision tree. It is used in cases where it is necessary to ensure the consistent adoption of several management decisions (Foss, 2007; Morrow et al., 2007).

We present methods for assessing the risk of marketing activities in Table 2.

Table 2. Risk assessment methods

Method	**Essence**
Decision tree	Graphical method of quantitative analysis. When constructing decision points and connecting them, it becomes easier to consider several strategies and their consequences under external circumstances. This method is used in situations where a consistent construction of possible solutions is needed.
Statistical decision theory	This is a method of quantitative analysis. The tools are standard deviation, variation coefficient, and dispersion. It is the theory of conducting, processing data, and using statistical observations. Any information is quantitative characteristics of certain objects. If these data are economic, then such objects are also economic. These economic data and objects emerge under the influence of various conditions and factors. Some of them may be uncontrollable and can create random data since they can take on random values. With this type of data, it is necessary to use special methods that can analyze and process all the information. Therefore, the methods of mathematical statistics are often used.
Stochastic programming	This method is used to study mathematical programming problems in which data is randomly assigned. There are three main ways to solve this kind of problem: 1) To obtain solutions at the level of mathematical expectations, random parameters are replaced by their average value. 2) Random data in linear programming problems are studied in two stages. The first stage involves solving a problem with the verification of random demand specified through mathematical expectation. The second stage includes finding the most suitable vector for managing the production of something with due regard to the fixed demand for the goods produced. 3) Probabilistic constrained programming.
Monte Carlo method	The above-mentioned methods cannot meet all requirements to ensure reliability and accuracy in the marketing environment. These requirements are important and necessary when assessing the effectiveness and degree of risk for internal processes. The resulting data will be most accurate and effective for risk assessment if random numbers are specified in advance and distributed considering the probability of random parameters of external and internal factors (Porter, 2015). Data are distributed in advance considering information on the past period with statistical dynamics. However, not all companies have data that can satisfy the request and have all the information to do so. If this is the case but it is still necessary to make an assessment, the Monte Carlo method is used. With this method, all the data are recalculated immediately when new random numbers are introduced, and the values of random variables are selected based on random generation (Kotler et al., 2015). Then the results are combined into several groups and analyzed using statistical methods to calculate risk indicators for certain studies (i.e., marketing) (Kotler, 2008).

	The Monte Carlo method helps evaluate different risk indicators in combination. These include standard deviation, mathematical expectation, etc. (Kameneva & Polyakov, 2016). This method is among the most effective in marketing research since it helps select the most appropriate strategy at a given limit value. In addition, the Monte Carlo method is widely used in the risk management of marketing research.

The next step is to consider existing **risk management models**. As we discussed above, marketing strategy and market research can have different consequences and increase risks. To minimize these risks, it is necessary to implement certain measures. This entails additional costs in terms of money and resources. However, they can have a negative impact on a marketing strategy and undermine its effectiveness. Consequently, when setting goals, models are used that can minimize costs and optimize measures to reduce the level of risks (Marennyi & Egorova, 2004).

Figure 3 demonstrates a system of marketing factors that influence tariff formation. All these factors somehow affect the cost of services provided by marketing specialists under the guidance of their management.

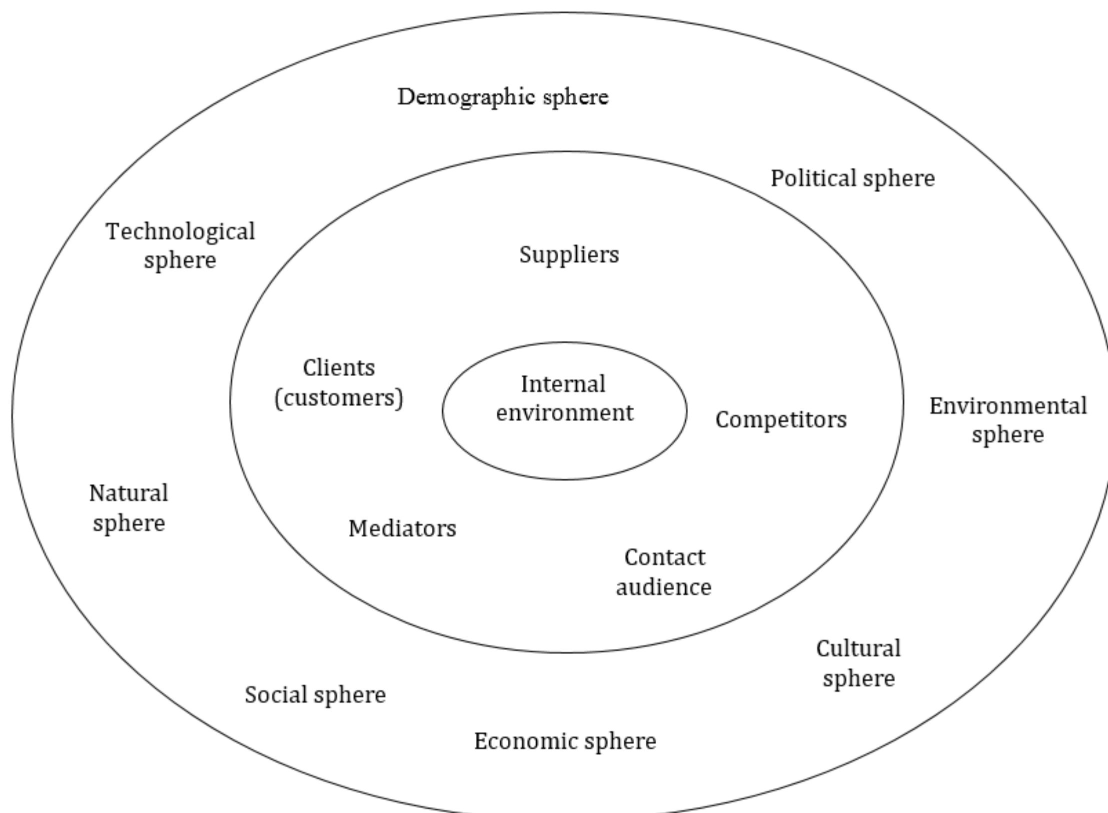

Figure 3. Factors influencing tariff formation

All company's costs and expenses associated with collecting data and information, their processing and analysis should be considered in combination with the factors connected with marketing activities aimed at the development and implementation of a marketing strategy. These factors directly or indirectly influence pricing and tariff costs in the internal marketing environment. They are significant so the success of the pricing process also depends on the control over the factors.

Pricing is influenced by many factors and different forms of business. For example, seasonality and its influence on demand affect the cost of goods and services. This could be the sale of ice cream in winter and summer or the tourism business. Thus, the formation of tariffs is also at risk.

When analyzing the specifics of risk management (in particular, marketing), it is necessary to pay attention to the risks borne not only by a company and its personnel but also by its consumers or buyers. These risks are also called perceived risks. This concept was first put forward by the US marketer Bauer in the 1960s.

The fundamental thesis of this concept is that it is concerned with subjective risks rather than general ones. This means that experts consider the expectations of consumers who cannot present the necessary amount of information about a particular product to marketers. Thus, marketing specialists cannot form their own professional opinion but have to be guided by the viewpoint of consumers and their attitude toward a company's products. Consequently, it becomes almost impossible to conduct the most accurate and predictable marketing research (McDonald, 2017). However, the concept of perceived risks helps to correctly allocate the budget, guide a company's development strategy in the right direction, and minimize risks (Granina, 2014).

Marketing risk management aims at reducing the degree of their implementation and possible negative consequences. All this is accompanied by additional resource and monetary costs, reducing the overall effectiveness of a marketing strategy.

In this regard, it is a common practice to use optimization methods that minimize costs at a given level of risk or at a given maximum permissible cost that can also minimize the level of risk.

The main methods to manage and minimize marketing risks are to reduce uncertainty, calculate the probability of risks, and limit liability. The latter is ensured through risk diversification or sharing. As practice shows, risk assessment should not be neglected when developing a marketing strategy.

CONCLUSIONS

The marketing strategies of companies should be assessed in terms of their effectiveness and degree of risk impact.

Based on the results of such an assessment, proposals are developed on the risk structure of marketing strategies and measures to prevent and minimize them, including political, legal, industrial, technical, organizational, and internal socio-psychological, marketing, and financial risks.

To assess the effectiveness and risk exposure of marketing strategies, calculation and analytical methods (for example, SWOT analysis) can be used.

Detailing goals and plans is possible with a formal assessment of results, i.e., their measurement (through expert method or SWOT analysis).

Under economic and other conditions, companies need to adjust to the market requirements and respond to a changing external environment. In addition to staying up to date, their main goal (making a profit) requires other processes to minimize possible risks and predict and manage them.

Possible risks that arise during marketing research or implementing a marketing strategy are quite specific and require a special approach to minimize them.

This article describes four methods to assess risk. Three of them are quantitative: the decision tree method, the method of stochastic (mathematical) programming, and the theory of statistical decision. We also covered the Monte Carlo method, which is the most effective in relation to risks associated with marketing.

Then we considered perceptibility risks, i.e., consumer risks. Their assessment is crucial within marketing processes. However, it is not objective as it represents subjective judgments of buyers about goods, who do not have the necessary amount of information and the number of tests (purchases).

Summing up the study results, it is worth mentioning that assessing the risks of a marketing strategy is an important practice. However, it is rarely used since it is not effective and cannot guarantee the objective results necessary for the work of marketers. When reviewing the approaches and methods currently used in marketing research, we should pay more attention to the implementation of the methods mentioned above to minimize risks and take control of some uncertain aspects of the external environment and consumers.

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