Methodology for effectiveness evaluating of foundry activity organization

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Abstract. An integrated approach to the methodology of assessing the activities of an industrial enterprise is considered. The emphasis is on the business activity of the industry, which is a reflective factor of the external impact on the industry. N.K. Moiseeva approach, which consists of setting a level of business activity, explaining its changes and predicting its future state as an oscillating system, is used for detailed and completed consideration of business activity. The classical triad is used for determining the main aspects of marketing activity: quality, quantity and time. The marketing is used as a number indicator to determine a state of the industry. In order to calculate marketing activity, many estimates are used, which in the future, together with the selected development function, allow getting the final activity indicator taking into account the current period. The regulation of the marketing activity of the enterprise according to the marketing functions, used in various techniques and methods, is also taken into account.

1. Introduction
Marketing is the most difficult managed sphere of industry activity. Due to different contacts with the market, a large number of junction points have appeared, and as a result, there are many control needs [1]. At the same time, what is objectively needed is not reducibility of marketing management only to solving strategic and current issues. However, proactive analysis of market information. Therefore, the system of managing the marketing has to be characterized by flexibility and versatility.

The marketing of industry is a creative activity, the meaning of which is developing the market for goods and services as well as labour in the way of assessing the needs of customers. It also makes sense of activities for satisfying these needs [2].

The insufficient degree of problem development, a small number of multi-purpose economic works of the theme is determined to choose a topic of the research, justified its goal and tasks.

The object of the study is the industry that implements marketing. The object of the research is a process of managing industry marketing. The goal of studying is developing the assessment of industry marketing.

The following main tasks were set and solved in order to achieve this goal:
• Development of a methodology for the formation of a balanced system of indicators for the marketing activities of an industrial enterprise.
• Development of a methodology for determining key indicators of achieving the results of an enterprise’s marketing service.

The practical significance of the work lies in the created scientific and methodological base of establishing a system of assessing industry marketing, the introduction of which improve the quality of marketing decisions.

2. Features and abilities to assess business activity
Traditionally assessing the business activity of industry is conducted in two directions: a temp of growth of main indicators and a level of effective use of industry resources. However, these indicators are generally estimated internal factors that influence the dynamics of economic development of the industry. At the same time, there are poorly formalizing qualitative components of business activity such as the sale market breadth, the availability of products, which are exported, the reputation of the industry. Without renowned economic indicators of the first type, it is considered features and possibilities of assessing the second type of components of the business activity that appears as a reflection of the impact of external factors and are indicators of marketing activity.

According to N.K. Moiseeva, to establish the level of business activity, explain the course of its change and predict the further state is possible only when the situation is considered as an oscillatory system with regular (seasonal, cyclical) and irregular fluctuations. Oscillating processes are generally invertible. Along with it, in the dynamic process of the economic sphere of the life, there are irreversible trends, which might be introduced into a model of managing the business activity just as random components [3].

![Diagram of Strategical activity](image)

**Figure 1.** Aspects of foundry marketing.

N.K. Moiseeva proposes to use the classical triad to determine the main aspects of marketing activity, which provides the enterprise with a forward movement: quality (level of potential marketing mobilization; methods and culture of applying the marketing mix; quality of the competition strategy), quantity (rationality of a given scale of marketing activity) and time (speed of marketing changes;
correspondence of the reaction to the nature of the competitive situation). The level of attracted investments can be considered as a providing component of marketing activity (Fig 1).

According to figure 1, the marketing is determined as a “...comprehensive description of the effectiveness of industry actions in the competitive area, reflecting the quality of the strategy and the speed of reaction for changes in the external environment with the corresponding intensity of use and development of marketing potential. The marketing and its indicators might be base reference points in the system of ensuring production efficiency with the cyclical development because complex of different cycles impact the behaviour of consumers, their tastes, purchasing opportunities, price range, options for moving goods from producer to consumer and product change [4, 5].

Marketing activity, as a real numerical indicator, has a complex multifactorial nature. It is a reflection of decisions made in the field of marketing, resulting from various factors that determine the state of marketing activities of an enterprise [6, 7]. Therefore, “marketing activity can be represented as a dependent (effective) variable, respectively, a formalized description and evaluation of the indicator of marketing activity are possible. Thus, the concept of “marketing activity”, taking into account its qualitative aspect, can be defined as follows: the index (indicator) of a firm’s marketing activity is a multifactor indicator that reflects the volume of marketing investments, the level of marketing potential, the quality of the applied competitive strategy and marketing mix, calculated per unit time” [3].

That is, the indicator of marketing activity of an industrial enterprise for an estimated period of time in a generalized form can be represented as a function of four variables:

$$I_{mat} = f_t(MZ, MP, CK, KMM),$$

(1)

where: $I_{mat}$ is an indicator of the marketing activity of the company; $MZ$ is the marketing costs of the company; $MP$ is the marketing potential; $CK$ is the quality of the company's competitive strategy; $KMM$ is the quality of marketing mix of the company; $f_t$ is a function that determines the type of model used for determining the marketing activity of a firm ($I_{mat}$).

The principles of constructing a generalized indicator are taken into account in the process of detailing each of the indicators based on an analysis of the main factors. Detailed algorithms have been developed to concretize the calculation of the individual components.

3. Composition and sequence of work to assess the marketing activity of the enterprise

First, evaluating the target market of the enterprise as a whole is necessary. This circumstance is because marketing activity, as the most crucial function in the field of entrepreneurship, should ensure a stable, competitive position of the enterprise in the market of goods and services, taking into account the state of the internal and external environment. In this regard, the evaluation of marketing activity involves conducting market research and developing a program of marketing activities that are used for increasing the productivity of the company and the effectiveness of meeting the needs of the end-user. An analysis of development trends and changes in market conditions will allow identifying the phase of the cycle of this industry based on forecasts of market development, demand volumes in various segments. Figure 2 presents the sequence of evaluating the target market of the enterprise.

The obtained information about market prices, financial conditions and the structure of expenses will allow determining priority marketing areas and establish the significance of marketing functions depending on market conditions and the phase of the development cycle [8].

Based on the research and analysis of the target market of the enterprise, marketing activity is assessed by its main elements (Formula 1). The assessment is carried out as follows.

For the estimation of marketing cost of the enterprise, the relevant information is collected, which includes the following data: administrative cost ($Z_{adm}$); informational cost ($Z_{inf}$); trade cost ($Z_{tr}$); storage cost ($Z_{sklad}$); transport cost ($Z_{trans}$); the cost for marketing researches ($Z_{iss}$); advertisement cost ($Z_{rek}$); the cost of sales promotion ($Z_{stim.sbg}$); PRcost($Z_{svyaz.sobzh}$).

Total actual marketing costs are determined according to the formula:
\[ MZ_f = Z_{adm} + Z_{inf} + Z_{tor} + Z_{skl} + Z_{tran} + Z_{iss} + Z_{rek} + Z_{stim} + Z_{sbyaz} + Z_{svoz} \]  \hspace{1cm} (2)

Figure 2. The assessment of the target market of the foundry.

Total actual marketing costs \((MZ_f)\) used in the future to assess the level of attracted investments in marketing \((MZ)\):

\[ MZ = \frac{MZ_f - MZ_k}{MZ_{opt} - MZ_k} \]  \hspace{1cm} (3)

where: \(MZ_k\) is the critical point in the number of marketing costs, located on the border of profit and loss and showing that the number of marketing costs below this point does not lead to revenue; \(MZ_{opt}\) is the point of the optimal number of marketing costs, after which an increase in marketing costs leads to a decrease in revenue.

4. Assessment of the level of mobilization of marketing potential

When assessing the level of mobilization of marketing potential, it is necessary to proceed from the fact that marketing potential is understood as “... the totality of the enterprise’s capabilities that allow determining, shape and satisfy the needs of users in goods and services in the process of optimal interaction with the environment and resources, including use of all the best practices in the field of marketing”.

Quantitative assessment of the level of marketing potential should be based on the following principles: differentiation according to different periods of the company; accounting for the structure of marketing potential by its elements, types and degree of compliance of resources with the Pareto efficiency principle; analysis of the influence of both individual sides of the internal marketing environment (private indicators), and the cumulative effect of these conditions on the creation of prerequisites for achieving the appropriate level of marketing potential (general indicator). The assessment is carried out in the following sequence.

At the first stage, in order to establish the marketing potential of the enterprise for each element, the resources that can ensure the achievement of the marketing goals of the enterprise in one or another period of its activity must be determined. Marketing resources have substantial and structural features. The content of the complex of marketing resources can be represented by the following four components:

- Marketing material resources: material marketing resources; financial resources allocated for the implementation and development of marketing activities.
- Resources of the marketing personnel (human resources): staff qualifications; staff experience; management structure.
• Marketing informational resources of the enterprise: system support; application programs; databases; external informational communication.

• Resources of marketing tools (methodological).

At the second stage, the coefficients of the significance of the criteria for assessing marketing potential based on the goals of the company are determined. Significance is assessed in three ways:

• Adequacy of response to changes in the external environment.
• Supporting and increasing the competitiveness of the enterprise.
• Expanding the capabilities of the marketing system.

These weights should be normalized, i.e., their sum should be 1 (or 100%), and the approach to determining weight coefficients can be based on the direct comparison method.

At the third stage, comparing the values of the actual and required parameters of the resources, experts establish indicators of compliance of the actual parameters with the required for each element of the strategic potential in the form of coefficients of the actual compliance of marketing resources with the specified criteria $k_{ij}^{com}$. These indicators are combined into a generalized assessment taking into account the significance of each element.

At the final stage, the coefficient of use of each of the marketing resources for a given period of time and the coefficient of the marketing potential of the enterprise as a whole are determined:

$$MR_1 = \sum_{j=1}^{m} \beta_j \cdot k_{ij}^{com},$$

$$MP = \frac{1}{4} \sum_{j=1}^{m} \beta_j \sum_{i=1}^{n} k_{ij}^{com}.$$  

Considered assessment can be ranked to determine the competitive position of the company:

• $0 < MP < 0.4$ – a weak position.
• $0.5 < MP < 0.7$ – a middle position.
• $0.8 < MP < 1.0$ – a strong position.

The optimal value of the level of marketing potential depends on a number of factors, the main of which is the market and intra-company situation. Therefore it is recommended to determine $MP_{opt}$ based on these conditions and taking into account that $MP_{opt}=1$.

The composition and sequence of work related to assessing the quality of a competition strategy are presented in Figure 3. The quality of the competition strategy can be assessed by the degree of achievement of the goals set by the company.

Marketing objectives must be consistent with corporate objectives and have an accurate quantitative description. Typically, goals are set by income and profit in monetary terms. It is necessary to collect data on the actual values of profit received for the period from the start of planning to the present to build a time series that reflects the dynamics of changes in profit.

5. Quality assessment of a marketing mix

A group of indicators reflecting the effectiveness of methods and the culture of applying marketing tools is used for assessing the quality of the marketing mix. (table 1). This index reflects the tactical marketing component, that is, the key to determining the current marketing activity since it directly characterizes the effectiveness of marketing activities [9].

A marketing mix or marketing complex includes a set of controllable variable marketing factors that the firm uses to elicit the desired response from the target market. Since the elements of the marketing mix (marketing tools) are closely related to the four priority marketing functions, assessing the quality of these functions, you can accordingly evaluate the quality of the marketing mix.
The following are taken as a basis in order to create a set of indicators characterizing the quality of the marketing mix: traditional indicators of the effectiveness of marketing activities; financial indicators; specific indicators for assessing the quality of individual instruments.

Figure 3. The algorithm for assessing the quality of a competitive strategy.

Since the quality of the marketing mix is a multifactorial indicator, it can be represented as a model:

$$KMM = f(F1, F2, F3, F4),$$

where: $F1$ - a group of analytical indicators; $F2$ - a group of indicators of quality of the range; $F3$ - a group of sales and distribution indicators; $F4$ - a group of communication indicators.
Table 1. Grouping of indicators reflected the quality of methods and culture of applying marketing mix.

| Components of quality of the marketing mix | Contents |
|------------------------------------------|----------|
| Quality of the analytical function       | The share of the cost for marketing studies at the common volume of marketing costs.  
The share of rejections from orders in common turnover. |
| Quality of the assortment function       | The competitiveness index of commodity nomenclature.  
The shape of production in the growth way and maturity at the whole nomenclature. |
| Quality of the distribution function     | The share of gross proceeds accounted to the one sale agent.  
The relation of production volume in the stock to turnover.  
The relation of profit of product distribution for summarizing costs of distribution. |
| Quality of the communicative function    | The share of orders in the common volume of obtained orders.  
The exhibition activity.  
The advertising activity. |

The following scale is used for identifying ranges of values: 0<KMM<0.4 - poor quality of the marketing mix; 0.5<KMM<0.7 - the middle quality of the marketing mix; 0.8<KMM<1.0 - high quality of the marketing mix.

After that, an assessment is made of the level of marketing activity of the enterprise as a whole, taking into account the cyclical development. The composition and sequence of work carried out by the enterprise in this regard are presented in Figure 4.

![Diagram](image)

Figure 4. Assessing a level of the marketing of an industry taking into account cyclical development.

Formula (3) in general terms when using the additive model and with the number of indicators (P) can be represented as:

\[ K_{MM} = \sum_{i=1}^{n} A_i \times (I_i^{m1} + I_i^{m2} + I_i^{m3} + \ldots + I_i^{mn}) \]

where: A1, A2, A3, ..., Ann - adequately weights of indicators, but \( \sum_{i=1}^{n} A = 1 \); m1, m2, m3, ..., mn - adequate degree of index of i-th indicator, where i=[1,n].
A comprehensive assessment of the actually achieved level of marketing activity of the enterprise at a time point \( (t) \) is carried out according to the additive model, in accordance with the following formula:

\[
I_{ma}t_n = \frac{1}{4} \times (MZt_n + MPt_n + CKt_n + KMMt_n),
\]

where: \( I_{ma} \) is an indicator of industry marketing.

Indicators of marketing activity are associated with the functions of marketing: analytical, assortment, marketing, communication and the function of accounting and control. Table 2 presents some of them.

**Table 2.** Grouping of indicators reflected the quality of methods and culture of applying marketing mix.

| Group of marketing indicators | Example of indicators | Sources of information on indicators |
|------------------------------|-----------------------|-------------------------------------|
| Indicators of investigating the market | The share of marketing researches in common volume of cost for the marketing | According to the work balance and financial reporting |
| Indicators of activity of the assortment policy | The correlation of production with demand flexibility. The share of “growing” and “mature” products in total volume of production. The riskiness of subject-specific specialization | A calculated indicator according to analytical accounting. Calculated indicator (based on the BCG matrix) |
| Indicators of activity of sales | Efficiency of sales agent works. The distribution profitability | Data of visit number to intermediaries and consumers, number of sold products, sales per consumer. The relation between profitability and costs (analytical accounting). |
| Indicators of activity strategy | The increase of the share of sale in new markets at the common volume of sales | Special calculations (from analytical and current accounting data), matrix analysis |
| Indicators of communicative activity | The share of product growth for advertising cost. The number of new consumers to common number. The increase of the return for promotion costs. Rating of exhibition activity | Special calculations (from analytical and current accounting data), |
| Profit indicators | Quality indicators of profit; Indicators of income stability; Profitability of production and the market | Special calculations (from analytical and current accounting data), |
| Strategy activity indicators | The increase in the share of sale in new markets to common sale volume | Special calculations (from analytical and current accounting data), matrix analysis |
6. Regulation of marketing activity

Different approaches and techniques are used for regulation. As part of the analytical function, in order to recognize an unstable market, marketing employees need to analyze the relationship of profit from short-term projects to total and net profit from all types of activities (high values of these indicators reduce the quality of income). It is necessary to analyze the assortment portfolio of the enterprise and identify groups of goods with relatively stable demand in order to fulfilling the assortment function, taking into account the marketing risk, which will allow the company minimizing the impact of economic cycles on its activities. It is necessary to include in the product range products that are in demand in various phases of the cycle to stabilize the income of the company.

For analyzing the degree of fulfillment of the sales function, it is necessary to assess the change in the actual sales volumes of different products in various sales markets, depending on the goals set in this area.

It is required to identify the relationship between the cost of promotion and sales in value terms according to the following parameters: the cost of maintaining sales agents related to sales; advertising costs and RL-shares related to sales volume; sales promotion costs, administrative costs of sales services, also referred to sales volume to assess the activity of communicative function execution. Cost-to-sales ratios should be analyzed in terms of overall financial goals. This is necessary in order to determine where the organization has the most revenue.

7. Conclusion

Thus, N.K. Moiseeva and M.V. Konysheva provide indicators of marketing activity for various functions, such as market research, assortment policy, sales activities and communication activities. Moreover, they use general indicators, namely: profitability and activity of the strategy. This makes it possible to use the considered methodology for assessing the marketing activity of an industrial enterprise in the process of developing a strategy for an enterprise. In this case, indicators of marketing activity will be used in the form of complementary variables that evaluate such characteristics as the relative competitive advantage of the enterprise (the GA/McKinsey matrix), the business competitiveness (the Sell/DPM matrix) and the company’s competitive position (The Hofers matrix).

It is important to note that the authors did not complete the methodology for practical application. Namely, scales for a qualitative assessment of marketing, as well as a model for calculating a composite performance indicator, have not been developed.

The study analyzed the positive and negative aspects of the various functions included in the composition of indicators of marketing activity. All aspects and nuances of each of the evaluative qualities are examined in detail to compile a final assessment of the quality of marketing activity. All estimated indicators were considered in dynamic conditions and taking into account time. The parameters of the regulation of marketing activity were taken into account.

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