Marketing Tools to Ensure the Economic Security of the Enterprise: Assessment and Modelling

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Abstract **– The article examines specific features of the use of marketing tools and their impact on the economic security of enterprises. It has been determined that an effective pricing policy can not fully compensate for the impact of such negative factors as force majeure circumstances, deficit of resource, a fall in solvent demand, and negative institutional influence. At the same time, a reliable assessment of the levels of these factors, combined with flexible regulation of pricing policy, can determine the strategic directions for ensuring the economic security of the enterprise in terms of four key indicators: Profitability increase, ensuring competitiveness, increasing market share, and forming a positive reputational capital. A model for assessing the impact of negative factors and pricing policy on the economic security of the enterprise has been developed using fuzzy Sugeno inference. To model the impact on the key indicators of economic security, four rules of the fuzzy knowledge base have been suggested, which allows adjusting the marketing strategy in accordance with the current state of the external environment. The model has been tested at light industry enterprises. The obtained results were used to form an optimal set of marketing tools aimed at increasing the market share and forming a positive reputational capital for the enterprise. To determine the proportional distribution of marketing tools, a method of dynamic planning based on the ratio of values of economic security indicators has been developed.**

Keywords **– Marketing, economic security, marketing tools, impact factors, Internet marketing.**

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1. Introduction

Under modern business conditions, the issue of ensuring economic security is becoming particularly relevant and requires the introduction of a number of multi-vector measures to identify and minimize the negative impact of external and internal threats caused by the transformation of the business environment [4], [6], [7], [10], [12].

According to the authors, economic security is achieved through the effective use of resources available to the enterprise, as well as taking into account the main trends characterizing the state of the external environment [1], [3], [5], [13], [14]. From the point of view of the enterprise, these aspects are largely represented by the marketing activities of the enterprise, which makes it possible to assess the efficiency, and completeness of the use of available resources and the position and prospects of the functioning of the business entity in the market [2], [3], [8], [9], [11].

It is marketing, through its system of tools, that creates the prerequisites for ensuring the proper level of economic security and adapting the enterprise to the realities of functioning in a particular target market. It should be emphasized that ensuring the economic security of an enterprise implies its sustainable functioning in unpredictable conditions of a highly competitive market. For this purpose, the enterprise must have a sufficient share of the target market and make a profit from its operating activities.

The purpose of most marketing tools [16], [17] meets the aforementioned requirements and allows enterprise management to effectively form a marketing policy in accordance with current business conditions and ensures growth in revenue by increasing the number of company clients and order volumes.

It should be noted that an increase in net revenue is possible due to an increase in the number of customers and orders (purchase of goods), or due to an increase in product prices with unchanged volumes of product sales. At the same time, the price level for a highly competitive market is set on the basis of the supply and demand ratio, however, there are exceptions for unique products and certain brands with strong marketing support.

In other words, for light industry goods, the price range can fluctuate significantly depending on the strategy of product promotion and brand awareness. There is a certain range of price fluctuations from the minimum to the maximum level, which depends on the market segment in which the products are sold: premium segment – maximum prices; mass consumption goods – minimum prices; popular brands - average prices.

Prices also depend on the cost of production, which includes variable and fixed costs that must be reimbursed through the sale of the respective products. That is, taking into account the specifics of setting product prices and using the optimal number of marketing tools allows the enterprise to increase the volume of product sales and profits without a drastic increase in costs and a corresponding increase in the total cost of production, which is the basis for developing a model for ensuring the economic security of the enterprise.

Thus, the pricing policy of a light industry enterprise is closely related to ensuring the economic security of this enterprise. The influence of pricing policy on the choice of marketing tools is very significant because light industry products are sold relatively quickly, so price fluctuations immediately affect economic security and marketing [18], [19]. At the same time, it is necessary to take into account the influence of those factors that periodically arise and hinder the activities of light industry enterprises, namely:

1) presence of force majeure circumstances;
2) deficit of resources (material, labor, energy, and others);
3) fall in solvent demand;
4) presence of «gray import»;
5) negative institutional influence (aggressive fiscal policy, imperfect licensing system, bureaucratic obstacles).

2. Research Method

It should be emphasized that an exceptionally successful and effective pricing policy can not be contrasted with the above list of negative factors affecting domestic enterprises. However, reliable assessments of the levels of the listed negative impact factors, together with a successful short-term pricing policy, can point out the direction of ensuring economic security in terms of four key indicators (profitability growth, ensuring competitiveness, increasing market share, and building a positive reputational capital of the enterprise). Similar estimates can be obtained through expert surveys and the processing of expert judgments.

The aforementioned determinants of adverse impact may be denoted as follows:

$$x_{ForceMajor}, x_{Deficit}, x_{PopytFall}, x_{GrayImport}, x_{NegatInstit} \quad (1)$$

where $x_{\text{ForceMajor}}$ – presence of force majeure circumstances;

x_{Deficit} – deficit of resources;

$x_{\text{PopytFall}}$ – afall in solvent demand;

$x_{\text{GrayImport}}$ – presence of «gray import»;

$x_{\text{NegatInstit}}$ – negative institutional influence

It is separately distinguished the factor that determines the average price level – $x_{\text{PricePolicy}}$.

Assuming that all of them take values in the range from 0 to 1. A value of 0 or close to 0 for factors (1) will mean that the corresponding negative impact is minimal; a value of 1 or close to 1 will mean that the corresponding negative impact is maximal. A value of $x_{\text{PricePolicy}} \approx 0$ means that the pricing policy is lenient: value added is not high and average prices are low. A value of $x_{\text{PricePolicy}} \approx 1$ corresponds to the most stringent pricing policy: value added is high, and average prices are high.

The principal indicators of economic security can be identified as follows:

1. Profitability increase – through $y_{\text{ProfitIncrease}}$.
2. Ensuring competitiveness – through $y_{\text{Competitiveness}}$.
3. Increasing market share – through $y_{\text{MarketPartInc}}$.
4. Forming a positive reputational capital of the enterprise – through y_{ReputCap}.

All these indicators take values in the range from 0 to 1. A value of 0 or close to 0 for the indicator of ensuring economic security will mean the absence of focus or weak focus of the relevant marketing tools on ensuring economic security. A value of 1 or close to 1 will mean that the relevant marketing tools are used with the maximum possible (or close to maximum) focus.

The task is to reflect factors (1) as accurately as possible and $x_{\text{PricePolicy}}$ to have the following levels of performance:

$$y_{\text{ProfitIncrease}}, y_{\text{Competitiveness}}, y_{\text{MarketPartInc}}, y_{\text{ReputCap}} \quad (2)$$

at which the corresponding set of marketing tools will effectively strengthen the economic security of the enterprise. In other words, it is necessary to identify an operator mapping f such that:

$$\left(y_{\text{ProfitIncrease}}, y_{\text{Competitiveness}}, y_{\text{MarketPartInc}}, y_{\text{ReputCap}}\right) = f\left(\begin{matrix} x_{\text{ForceMajor}}, x_{\text{Deficit}}, x_{\text{PopytFall}}, x_{\text{GrayImport}}, \\ x_{\text{NegatInstit}}, x_{\text{PricePolicy}} \end{matrix}\right) \quad (3)$$

At the same time, the requirement of connectivity of indicators (2) can be imposed:

$$y_{\text{ProfitIncrease}} + y_{\text{Competitiveness}} + y_{\text{MarketPartInc}} + y_{\text{ReputCap}} = 1 \quad (4)$$

where indicators (2) are non-negative.

The negative impact factors (1) and the factor of the company's pricing policy will be assessed using expert surveys (Table 1). The model of such a survey is as follows. A total of M experts (respondents), where $M \geq 24$ (a standard requirement for ensuring the reliability and stability of sociological surveys in small groups). The i-th expert provides his/her judgement as a list of values:

$$x^{(i)}_{\text{ForceMajor}}, x^{(i)}_{\text{Deficit}}, x^{(i)}_{\text{PopytFall}}, x^{(i)}_{\text{GrayImport}}, x^{(i)}_{\text{NegatInstit}}, x^{(i)}_{\text{PricePolicy}} \quad (5)$$

Which can only be equal to 0, 0.5 or 1. That is, the expert's answer to factor (1) is his/her judgement on the state of their negative impact (at the moment), and the expert's answer to $x_{\text{PricePolicy}}$ means his/her proposal for setting the average price level (for the nearest short term).

Table 1. Expert questionnaire for submitting assessments of negative impact factors and pricing policy proposals

Negative impact factors					Price policy $x_{\text{PricePolicy}}$
Presence of force majeure circumstances $x_{\text{ForceMajor}}$	Deficit of resources x_{Deficit}	Fall in solvent demand $x_{\text{PopytFall}}$	Presence of «gray import» $x_{\text{GrayImport}}$	Negative institutional influence $x_{\text{NegatInstit}}$	

Expert judgments and suggestions are processed by averaging and analyzing compatibility (consistency). Since there is no reason to distinguish between experts by experience and tendencies to make systematic errors (especially since the questionnaire survey will most likely be anonymous), the averaging will be without weighting.

Thus, the average score for each factor is equal to:

$$\begin{aligned} x_{\text{ForceMajor}} &= \frac{1}{M} \cdot \sum_{i=1}^{M} x^{(i)}_{\text{ForceMajor}} \\ x_{\text{Deficit}} &= \frac{1}{M} \cdot \sum_{i=1}^{M} x^{(i)}_{\text{Deficit}} \\ x_{\text{PopytFall}} &= \frac{1}{M} \cdot \sum_{i=1}^{M} x^{(i)}_{\text{PopytFall}} \\ x_{\text{GrayImport}} &= \frac{1}{M} \cdot \sum_{i=1}^{M} x^{(i)}_{\text{GrayImport}} \\ x_{\text{NegatInstit}} &= \frac{1}{M} \cdot \sum_{i=1}^{M} x^{(i)}_{\text{NegatInstit}} \\ x_{\text{PricePolicy}} &= \frac{1}{M} \cdot \sum_{i=1}^{M} x^{(i)}_{\text{PricePolicy}} \end{aligned} \quad (6)$$

The divergence of expert judgments can be assessed using the root mean square deviation (RMSD) [20]:

$$\sigma_{\text{Factor}} = \sqrt{\frac{1}{M} \cdot \sum_{i=1}^{M} \left[x_{\text{Factor}} - x^{(i)}_{\text{Factor}}\right]^2} \quad (7)$$

x_{Factor} is one of the factors (6), (7). In the most unfavorable case, when the deviation is the largest, approximately half of all experts will evaluate some factor as 0, while the remaining experts will evaluate it as 1.

Then the average score of such a factor will be approximately equal to 0.5 (with an even number of experts this will be the exact average value).

Accordingly, the maximum RMSD (8) will be equal to:

$$\sigma_{\text{Factor}}^{(max)} = \sqrt{\frac{1}{M}\cdot\sum_{i=1}^{M}\left[x_{\text{Factor}} - x_{\text{Factor}}^{(i)}\right]^2} = \sqrt{\frac{1}{M}\cdot\sum_{i=1}^{M}\left[0{,}5 - x_{\text{Factor}}^{(i)}\right]^2} = \sqrt{\frac{1}{M}\cdot\left(\sum_{i=1}^{\frac{M}{2}}[0{,}5-0]^2 + \sum_{i=1}^{\frac{M}{2}}[0{,}5-1]^2\right)} = \sqrt{\frac{1}{M}\cdot\left(\sum_{i=1}^{\frac{M}{2}}0{,}25 + \sum_{i=1}^{\frac{M}{2}}0{,}25\right)} = \sqrt{\frac{1}{M}\cdot\sum_{i=1}^{M}0{,}25} = \sqrt{\frac{1}{M}\cdot 0{,}25M} = 0{,}5 \quad (8)$$

Therefore, it will be set a requirement that RMSD (7) does not exceed 40% of the maximum RMSD (8):

$$\sigma_{\text{Factor}} \le 0{,}2 \quad (9)$$

Therefore, if condition (9) is met for each of the five negative impact factors and the price policy suggestion, the expert judgments will be considered to be consistent and send the average estimates (6) to the operator mapping (3).

This mapping will return the indicators (2) in a certain ratio.

This ratio will be used in the appropriate combination of marketing tools in order to ensure the economic security of the enterprise for a short period of time (a week, two or three weeks, or a month). To identify the mapping (3), a soft computing approach based on fuzzy Sugeno inference system is used [15]. In this context, the three levels of each of the five factors of negative impact and supply of price policy will be set as linguistic variables with the values of the terms «low» («low»), «middle» («mid») and «high» («high»). Each of the corresponding three membership functions in this case is best to set as a symmetric Gaussian function with centers at points 0, 0.5, 1 and a dispersion of 0.0625:

$$\begin{aligned}\mu_{\text{Factor}}^{(\text{low})} &= e^{\frac{-x_{\text{Factor}}^2}{0.125}}\\ \mu_{\text{Factor}}^{(\text{mid})} &= e^{\frac{-(x_{\text{Factor}}-0{,}5)^2}{0{,}125}}\\ \mu_{\text{Factor}}^{(\text{high})} &= e^{\frac{-(x_{\text{Factor}}-1)^2}{0{,}125}}\end{aligned} \quad (10)$$

Figure 1 shows an example of entering the parameters of symmetric Gaussian membership functions (3.10) for the terms «low level of force majeure», «middle level of force majeure», «high (threatening) level of force majeure» in the Matlab Fuzzy Logic Toolbox dialogue box.

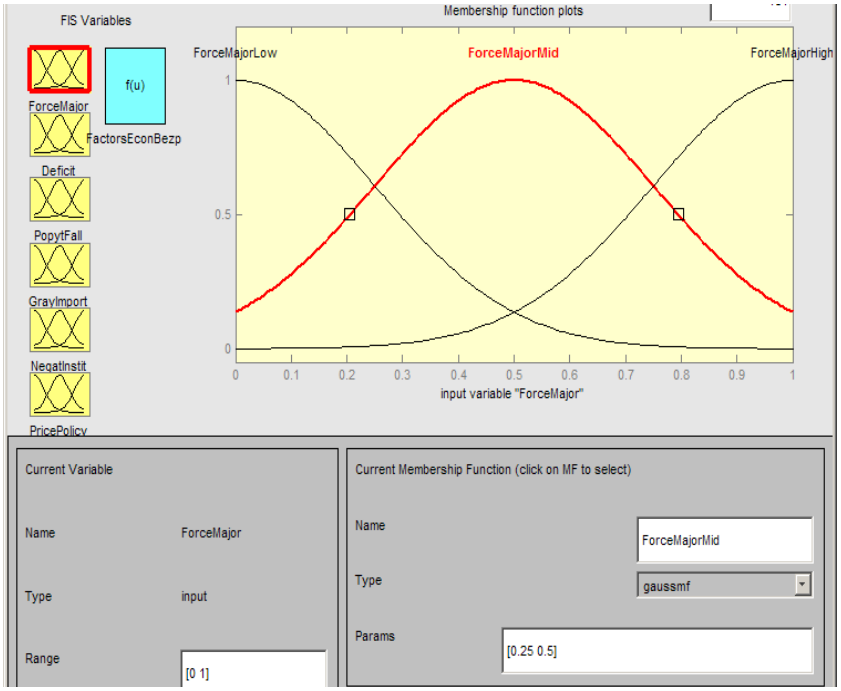

Figure 1. Introduction of parameters of symmetric Gaussian membership functions (10) for the terms «low level of force majeure», «medium level of force majeure», «high (threatening) level of force majeure»

The indicators (2) in the output variable «FactorsEconBezp» are applied with the following levels (constants) of the output membership functions (Figure 2):

$$\begin{aligned} \bar{y}_{\text{ProfitIncrease}} &= 0{,}2 \\ \bar{y}_{\text{Competitiveness}} &= 0{,}4 \\ \bar{y}_{\text{MarketPartInc}} &= 0{,}6 \\ \bar{y}_{\text{ReputCap}} &= 0{,}8 \end{aligned} \quad (11)$$

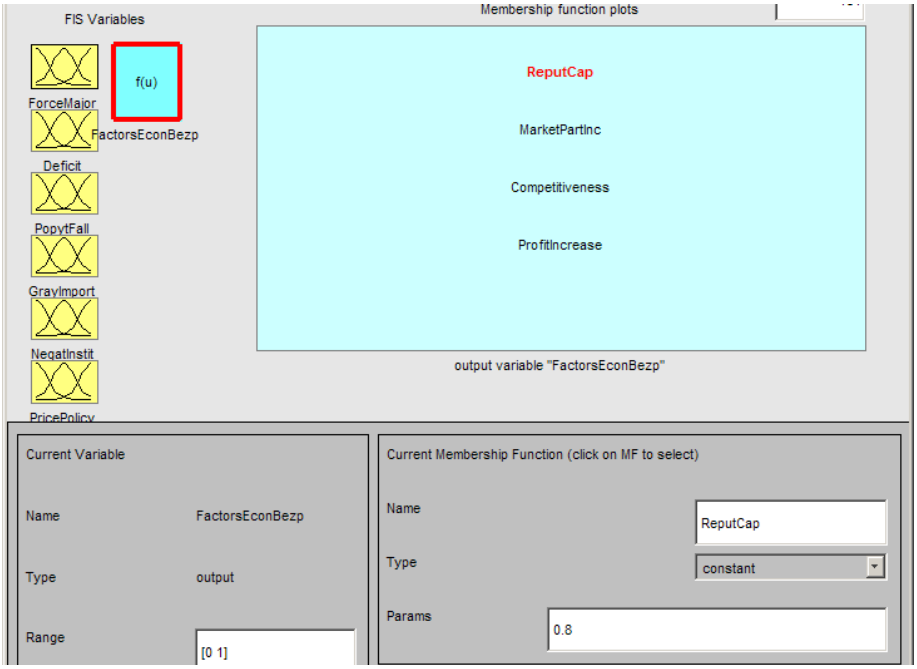

Figure 2. Entering the constants of the output membership functions to obtain the result of the operator mapping (formula 3)

For a fuzzy conclusion, it is enough to use several rules in a fuzzy knowledge base:

- Rule No. 1. If all negative impact factors are low, and the average prices offered are also low, then the result is $y_{\text{ProfitIncrease}}$ (i.e., it is necessary to apply marketing tools to increase profitability);
- Rule No. 2. If the levels of force majeure circumstances, the deficit of resources, and negative institutional influence are low, the level of «gray imports» is middle, and the fall in solvent demand is not low at the proposed moderate average prices, then the result is $y_{\text{Competitiveness}}$ (i.e., first of all, it is necessary to apply marketing tools to increase competitiveness);
- Rule No. 3. If the levels of force majeure and the deficit of resources are low, while the levels of falling solvent demand, «gray import», negative institutional influence, and average prices offered are not high, then the result is $y_{\text{MarketPartInc}}$ (i.e., it is necessary to apply marketing tools to increase market share);
- Rule No. 4. If the levels of force majeure circumstances, the deficit of resources, the fall in solvent demand, and «gray import» are not high, the level of negative institutional influence is low, and average prices are offered moderate, then the result is y_{ReputCap} (i.e., it is necessary to apply marketing tools to form a positive reputational capital of the enterprise).

Four rules are used – each rule will correspond to a particular indicator (Table 2).

Table 2. Rules of the fuzzy knowledge base

Rule	$x_{\text{ForceMajor}}$	x_{Deficit}	$x_{\text{PopytFall}}$	$x_{\text{GrayImport}}$	$x_{\text{NegatInstit}}$	$x_{\text{PricePolicy}}$	Fuzzy Sugeno inference
1	Low	Low	Low	Low	Low	Low	$y_{\text{ProfitIncrease}}$
2	Low	Low	Not low (middle, or high)	Middle	Low	Middle	$y_{\text{Competitiveness}}$
3	Low	Low	Not high (low or middle)	Not high (low or middle)	Not high (low or middle)	Not high (low or middle)	$y_{\text{MarketPartInc}}$
4	Not high (low or middle)	Not high (low or middle)	Not high (low or middle)	Not high (low or middle)	Low	Middle	y_{ReputCap}

Considering the example with 24 experts. After the first round, it turned out that four out of six RMSDs did not meet the requirement (9).

The experts' judgments diverged too much regarding all negative impact factors, except for force majeure circumstances (Table 3).

Table 3. Results of two rounds of surveys

Expert number	First round (inconsistency of experts' judgments was detected – marked in bold)						Second round					
	$x^{(i)}_{\text{ForceMajor}}$	$x^{(i)}_{\text{Deficit}}$	$x^{(i)}_{\text{PopytFall}}$	$x^{(i)}_{\text{GrayImport}}$	$x^{(i)}_{\text{NegatInstit}}$	$x^{(i)}_{\text{PricePolicy}}$	$x^{(i)}_{\text{ForceMajor}}$	$x^{(i)}_{\text{Deficit}}$	$x^{(i)}_{\text{PopytFall}}$	$x^{(i)}_{\text{GrayImport}}$	$x^{(i)}_{\text{NegatInstit}}$	$x^{(i)}_{\text{PricePolicy}}$
1	2	3	4	5	6	7	8	9	10	11	12	13
1	1	0,5	0,5	0,5	0,5	0,5	1	1	0	0,5	0	1
2	1	1	0	0,5	1	0	1	1	0	0,5	0,5	0,5
3	1	1	0	0,5	0,5	0,5	1	1	0	0,5	0,5	0,5
4	1	1	0	0,5	0,5	0,5	1	0,5	0	0,5	0,5	0,5
5	1	1	0	0	0	0,5	1	1	0	0,5	0,5	0,5
6	1	0,5	0	0,5	0	0,5	1	1	0	0,5	0,5	1
7	1	1	0	0,5	0,5	0,5	1	1	0	0	0,5	0,5
8	0,5	1	0	0,5	0,5	0,5	1	1	0	0,5	0,5	0,5
9	1	1	0	0,5	0,5	0,5	1	1	0	0,5	0,5	0,5
10	1	1	0	0,5	0,5	0,5	1	1	0	0,5	0,5	0,5
11	1	1	0	0,5	0,5	0,5	1	1	0	0,5	0,5	0,5
12	1	1	0	0,5	0,5	0,5	1	0,5	0	0,5	0,5	0,5
13	1	1	0	1	1	0,5	0,5	1	0	0	0,5	0,5
14	1	1	0,5	0,5	0,5	0,5	1	1	0	0,5	0,5	0,5
15	1	1	0	0,5	0,5	0,5	0,5	1	0	0,5	0,5	0,5
16	1	0,5	0	0,5	0,5	0,5	1	1	0	0,5	0,5	0,5
17	1	1	0	0,5	0,5	0,5	0,5	1	0,5	1	0,5	0,5
18	1	1	0	0,5	0,5	0,5	1	1	0,5	0,5	0,5	0,5
19	1	1	0	0,5	0,5	0,5	1	1	0	0,5	0,5	0,5
20	1	1	0,5	0,5	0,5	0,5	1	1	0	0,5	0,5	0,5
21	1	1	0,5	0	0,5	0,5	1	1	0	0,5	0,5	0,5
22	1	0,5	0	0,5	0,5	0,5	1	1	0,5	0,5	0,5	0,5
23	1	1	0,5	1	0,5	0,5	1	1	0	0,5	0,5	0,5
24	1	0,5	0	0	0,5	0,5	1	1	0,5	0,5	0,5	0,5
Average	0,9792	0,8958	0,1042	0,4792	0,5	0,4792	0,9375	0,9583	0,0833	0,4792	0,4792	0,5417
RMSD	0,1021	**0,2074**	**0,2074**	**0,2322**	**0,2085**	0,1021	0,1689	0,1412	0,1903	0,1793	0,1021	0,1412

Therefore, a second round of surveys was conducted, which resulted in all the RMSDs meeting the requirement (9).

Then, the obtained average values (6) were submitted to the input of the fuzzy inference system (Figure 3) and the corresponding levels of indicators (2) were obtained.

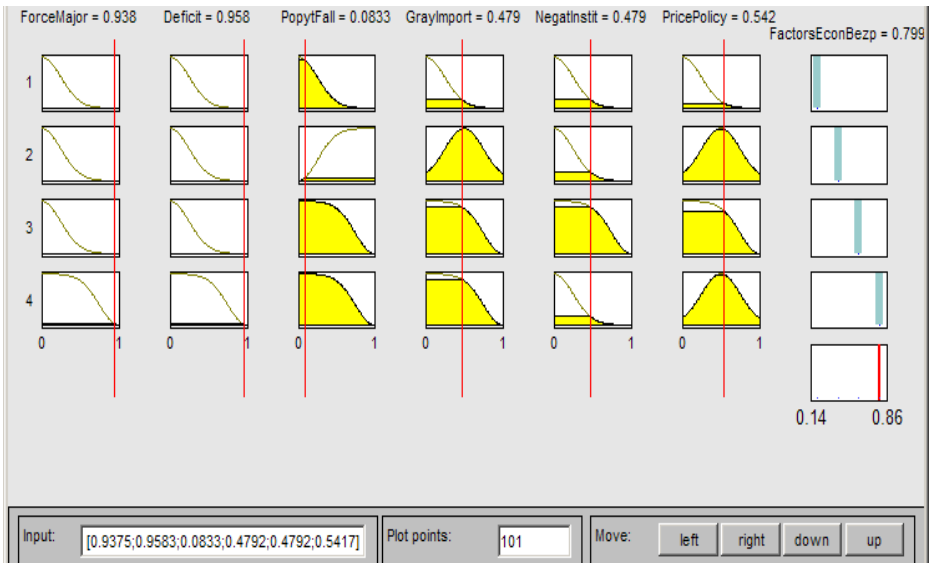

Figure 3. The result of fuzzy inference and defuzzification based on the averages from Table 2

As seen, the indicators in (2) have acquired very small values, but after fulfilling the condition (4) they are as follows:

$$\begin{aligned} y_{\text{ProfitIncrease}} &= 0 \\ y_{\text{Competitiveness}} &= 0{,}0001 \\ y_{\text{MarketPartInc}} &= 0{,}0061 \\ y_{\text{ReputCap}} &= 0{,}9938 \end{aligned} \quad (12)$$

Thus, the optimal set of marketing tools, taking into account the company's pricing policy and current factors of negative impact on the activities of light industry enterprises, should consist only of the following: search engine optimization (SEO), social media marketing (SMM), banner and teaser advertising, viral advertising, content marketing, video marketing, storytelling, crowd marketing, native information, crazy marketing.

Such a set of marketing tools is effective in the immediate calculated situation, since, based on the results of the actual assessment, the conditions of the enterprise's functioning are clearly identified and specific means of influencing target audiences are determined to achieve maximum effect.

3. Results

The proposed model was tested at PrJSC «Khmilnyk Sewing Factory «Lileia». 31 experts (M=31) were involved to provide assessments of negative impact factors and price policy proposals (Table 1). The first round was almost successful – only one of the six RMSDs violated the requirement (9), where experts' judgments diverged too much regarding the negative impact of the presence of «grey import» (Table 4).

Although the average value of the factor turned out to be close to 0.5, and 24 out of 31 experts rated this factor exactly 0.5, the opinions of the remaining seven experts diverged. Thus, three of them assessed the threat of «gray import» as insignificant, and four experts assessed the threat of «gray import» as high because in their opinion the negative impact of «gray import» is maximum. The remaining five factors received assessments without such discrepancies. In particular, the negative impact of the presence of force majeure circumstances was assessed by 30 experts as high, and only one expert gave a neutral score of 0.5 (middle level of negative impact). The situation was approximately the same in the case of a resource deficit. Only one expert gave it a score of 1, while the other 30 gave it a score of 0.5. The assessments of the negative impact of the fall in solvent demand were not as one-sided: 26 experts advocated a minimal negative impact, while five experts advocated a medium negative impact, giving a score of 0.5.

A certain unanimity of experts' opinions was also observed in the assessments of negative institutional impact, where 29 experts indicated the maximum negative impact of aggressive fiscal policy, imperfect permitting system, and bureaucratic obstacles. Only two experts here gave a score of 0.5. The opinions of experts regarding the price policy turned out to be almost unanimous: only four experts indicated a value of 0.5, believing that the value added was moderate, as were the average prices at PrJSC «Khmilnyk Sewing Factory «Lileia», while 27 experts believed that the value added was not high and the average prices were relatively low. However, despite the relative unanimity of expert judgments regarding the negative impact of factors $x_{\text{ForceMajor}}$, x_{Deficit}, $x_{\text{PopytFall}}$, $x_{\text{NegatInstit}}$ and short-term price policy, the second round of surveys had to be conducted due to the excessively high RMSD for «gray import».

Table 4. Results of two rounds of surveys at PrJSC «Khmilnyk Sewing Factory «Lileia»

Expert number	First round (inconsistency of experts' judgments was detected - marked in bold)						Second round					
	$x^{(i)}_{\text{ForceMajor}}$	$x^{(i)}_{\text{Deficit}}$	$x^{(i)}_{\text{PopytFall}}$	$x^{(i)}_{\text{GrayImport}}$	$x^{(i)}_{\text{NegatInstit}}$	$x^{(i)}_{\text{PricePolicy}}$	$x^{(i)}_{\text{ForceMajor}}$	$x^{(i)}_{\text{Deficit}}$	$x^{(i)}_{\text{PopytFall}}$	$x^{(i)}_{\text{GrayImport}}$	$x^{(i)}_{\text{NegatInstit}}$	$x^{(i)}_{\text{PricePolicy}}$
1	1	0,5	0,5	0,5	1	0	1	0,5	0,5	0	1	0
2	1	0,5	0	0	1	0	0,5	0,5	0	0,5	1	0
3	1	0,5	0,5	0,5	1	0	1	0,5	0,5	0,5	1	0
4	1	0,5	0,5	0,5	0,5	0	1	0,5	0,5	0,5	1	0,5
5	1	0,5	0	1	1	0	1	0,5	0	0,5	1	0,5
6	1	0,5	0	0,5	1	0	1	0,5	0	0,5	1	0,5
7	1	0,5	0	0	1	0	1	0	0	0,5	1	0
8	1	0,5	0	1	1	0,5	1	0,5	0	0,5	1	0
9	1	0,5	0	0,5	1	0	1	0,5	0	0,5	1	0
10	1	0,5	0	0,5	1	0,5	1	0,5	0	0,5	1	0
11	1	1	0,5	0,5	1	0	1	0,5	0	0,5	1	0
12	1	0,5	0	0,5	1	0	1	0,5	0	0,5	0,5	0
13	1	0,5	0	0,5	1	0,5	1	0	0	0,5	1	0
14	1	0,5	0	0,5	1	0	1	0,5	0	0,5	1	0
15	0,5	0,5	0,5	0,5	1	0	1	0,5	0	0,5	1	0
16	1	0,5	0	0,5	1	0,5	1	0,5	0	0,5	0,5	0
17	1	0,5	0	0,5	1	0	1	0	0	0,5	1	0
18	1	0,5	0	0,5	1	0	1	0,5	0	0,5	1	0
19	1	0,5	0	0,5	1	0	1	0	0	0,5	1	0
20	1	0,5	0	0,5	1	0	1	0,5	0	0,5	1	0
21	1	0,5	0	0	1	0	1	0,5	0	0,5	1	0
22	1	0,5	0	0,5	1	0	1	0,5	0	0,5	1	0
23	1	0,5	0	1	1	0	1	0,5	0	0,5	1	0
24	1	0,5	0	1	1	0	1	0,5	0	0,5	1	0
25	1	0,5	0	0,5	1	0	0,5	0,5	0	0,5	1	0
26	1	0,5	0	0,5	1	0	1	0,5	0	0,5	1	0
27	1	0,5	0	0,5	0,5	0	0,5	0,5	0	0,5	1	0,5
28	1	0,5	0	0,5	1	0	1	0,5	0,5	0,5	1	0
29	1	0,5	0	0,5	1	0	1	0,5	0	0,5	1	0
30	1	0,5	0	0,5	1	0	1	0,5	0	0,5	1	0
31	1	0,5	0	0,5	1	0	1	0,5	0	0,5	1	0
Average	0,9839	0,5161	0,0806	0,5161	0,9677	0,0645	0,9516	0,4355	0,0645	0,4839	0,9677	0,0645
RMSD	0,0898	0,0898	0,1869	**0,241**	0,1249	0,1704	0,1503	0,1704	0,1704	0,0898	0,1249	0,1704

As a result, all the RMSDs have satisfied the requirement (9), not exceeding the value of 0.1704. It is not surprising that in the second round the RMSD for «gray import» turned out to be the lowest (the value of 0.0898 is almost three times less than the RMSD for «gray import» in the first round) – the experts took into account the discrepancies after the first round, with only one of the 31 experts giving a score of 0, and the rest giving a score of 0.5, which resulted in a rather low RMSD along with the average value, which again differs from 0.5 by 0.0161. However, it should be noted here that for the sake of the «purity» of the experiment, the actual scores are not reported to the experts after the first (or any other) round, if the latter revealed inconsistencies in the experts' opinions. Furthermore, neither the values of the RMSD nor the mean values of the factor scores are reported (should not be disclosed at all even after the end of the experiments; the access to this information is restricted through the management of the institution where the testing was conducted).

It should also be noted that in the second round, the experts proved to be less unanimous regarding the impact of force majeure circumstances and deficit of resources, while the assessments of negative institutional impact and price policy turned out to be the same (although some experts changed their opinion-judgment, the overall indicators - average and RMSD – remained the same as after the first round), again making up a ratio of 29:2 of scores1 and 0.5 for institutional impact and a ratio of 27:4 of scores 0 and 0.5 for price policy.

The obtained average values (6) in the second round were submitted to the input of the fuzzy inference system (Figure 4) and the following levels of indicators (2) were obtained, which satisfy condition (4):

$$\begin{aligned} \bar{y}_{\text{ProfitIncrease}} &= 0{,}2 \\ \bar{y}_{\text{Competitiveness}} &= 0{,}4 \\ \bar{y}_{\text{MarketPartInc}} &= 0{,}6 \\ \bar{y}_{\text{ReputCap}} &= 0{,}8 \end{aligned} \tag{13}$$

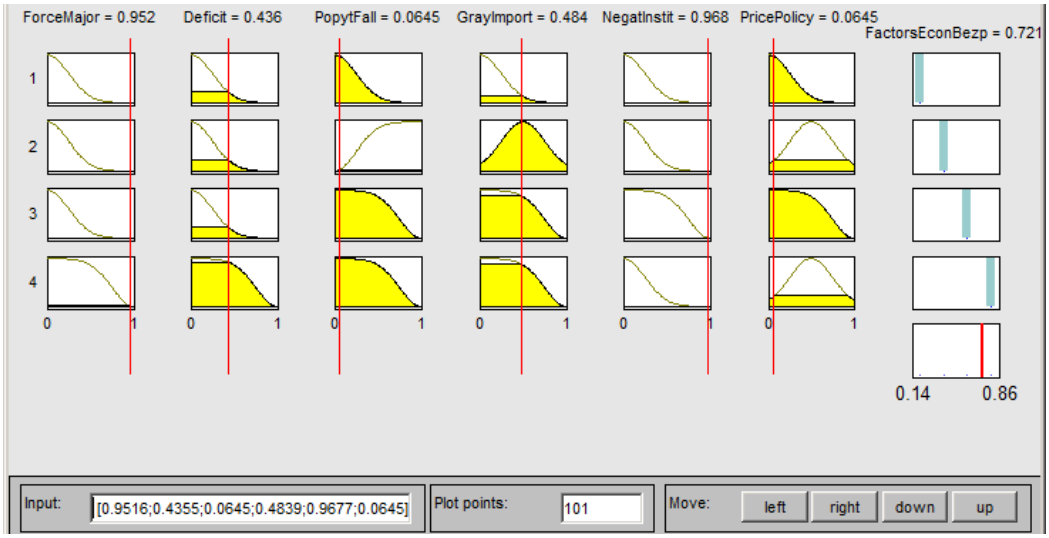

Figure 4. The result of fuzzy inference and defuzzification based on the averages from Table 4 (second round) for PrJSC «Khmilnyк Sewing Factory «Lileia»

As can be seen from formula (13), the increase in profitability and ensuring competitiveness are not very relevant indicators of ensuring the economic security of PrJSC «Khmilnyk Sewing Factory «Lileia». Therefore, mainly, the optimal set of marketing tools, taking into account the company's price policy and current factors of negative impact on the activities of PrJSC «Khmilnyk Sewing Factory «Lileia», should consist only of those that correspond to an increase in market share and the formation of positive reputational capital of the enterprise.

But a new question arises here: how to take into account the values of the indicators $y_{\text{MarketPartInc}} = 0{,}3811$ and $y_{\text{ReputCap}} = 0{,}6145$? After all, judging by these values, increasing market share and forming a positive reputational capital are not equivalent at the enterprise. Therefore, in this case, it is necessary to find a rational ratio of these indicators, according to which the marketing tools of the third and fourth columns of Table 5 should be combined (i.e., alternated). It is not possible to take the ratio of 0.3811/0.6145 directly, as it is impossible to implement in practice because the action and change of one marketing tool last at least several days (moreover, some other marketing tools «manifest themselves» over time, i.e. are quite inertial, and the validity period is measured in weeks or even months).

So, it is necessary to approximate the fraction:

$$\frac{0{,}3811}{0{,}6145} = \frac{3811}{6145} \approx 0{,}6202$$

some other fraction whose numerator and denominator would be much smaller integers than 3811 and 6145, respectively.

In this situation, it is possible to try to discard at least two digits of lower grades in each of the specified numbers and check how close the new fraction 38/61 is to the value 0.6202. In this case, there is 38/61≈0.623, where the difference between these fractions does not exceed 0.5%:

$$\frac{100 \cdot \left|\frac{3811}{6145} - \frac{38}{61}\right|}{\left(\frac{3811}{6145}\right)} \approx 0{,}447\%$$

Therefore, the ratio between $y_{\text{MarketPartInc}} = 0{,}3811$ and $y_{\text{ReputCap}} = 0{,}6145$ can be approximated by the fraction 38/61, the denominator of which can be considered the number of days in two months. Next, the sum of the numerator in the denominator is considered as the total number of days during which PrJSC «Khmilnyk Sewing Factory «Lileia» will use marketing tools in turn to increase its market share and form a positive reputational capital.

Thus, marketing tools to increase market share will be used for 38 of the 99 days, and tools to build a positive reputation capital will be used for the remaining 61 days. Such use will not follow a «consecutive» pattern but will be subject to a pre-established plan of alternating switching from a set of tools of one key indicator of economic security to another.

Such a plan is generated in advance using a random number generator (sequence) with a length of 99 positions (Figure 5).

Table 5. Focus of Internet marketing tools on ensuring economic security

Marketing tool	Key indicators of ensuring economic security			
	Profitability increase	Ensuring competitiveness	Increasing market share	Forming a positive reputational capital of the enterprise
SEO	+	+	+	+
Contextual advertising		+	+	
SMM	+	+	+	+
Targeted advertising	+		+	
Email-marketing	+		+	
Mobile applications	+		+	
Banner and teaser advertising		+	+	+
Viral advertising			+	+
Content marketing			+	+
Video marketing	+	+	+	+
Retargeting	+		+	
Aggregator sites			+	
Online gaming	+		+	
Affiliate programs and CPA networks	+	+		
Crowd marketing			+	+
Native information			+	+
Messengers	+		+	
Traffic arbitrage		+		
Crazy marketing	+	+	+	+
Storytelling	+		+	+
Trivertising	+	+		
Sensitive marketing	+	+		

As a result of using the plan in Figure 5, during three and a half months of 2023, the market share of PrJSC «Khmilnyk Sewing Factory «Lileia» increased by 1.2%, and the growth trend remains as of 01.01.2024. As for the positive reputational capital, this indicator is much more difficult to assess than market share.

However, the growth of market share contributes to the growth of sales volumes, which is indirectly related to the positive trends in the reputational capital of the enterprise.

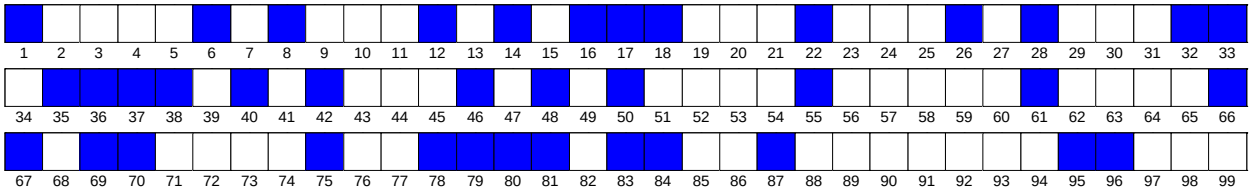

Figure 5. A plan (one of the possible examples) for implementing the ratio in (formula 13) between increasing market share and forming a positive reputational capital for PrJSC «Khmilnyk Sewing Factory «Lileia» in days

4. Conclusions

The article presents a model for ensuring the economic security of the enterprise, which allows finding the optimal set of marketing tools, taking into account the price policy and current factors of negative impact on its activities, which allows making effective managerial decisions that have a positive impact on the economic security, namely: lead to an increase in the sales volumes, growth of the market share owned by the enterprise, provides strengthening of the economic security of the enterprise by increasing profits and forming a positive reputational capital of the enterprise.

The testing of the developed model demonstrates its practical value and provision of a new approach to making strategic marketing decisions that positively affect the financial results of the studied enterprises and their economic security. Substantiating the choice of the necessary marketing tools for a particular enterprise in the appropriate time period, which is characterized by the specific conditions of their functioning, allows ensuring the target financial result and minimizing risks.

In general, the flexible use of marketing tools has a positive impact on the economic security of the studied enterprises, provides an opportunity for an effective impact of the marketing system on the activities of enterprises, and meets the needs of managers of enterprises that make strategic decisions regarding the formation of price policy, sales policy, and promotion of goods in certain market segments.

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