Planning in production of fat-and-oil products

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Abstract. The article discusses the possibilities of increasing the efficiency of the food industry company through the introduction of long-term strategic planning. The scheme of interaction of the company’s departments in terms of development of strategic planning has been composed. The conducted SWOT analysis defined that the optimal basic strategy for the company is the strategy of strengthening its position in the market. Assessment of competitiveness and analysis of management systems and strategic development showed that the management system of the company under consideration requires adjustment, taking into account the conditions of the internal and external business environment. Based on the studies, the corrective measures are proposed and composed into a strategic planning plan. The proposed measures are given an economic assessment, which confirm the growth of main economic parameters of the company and its strengthening in market.

1. Introduction

The modern experience accumulated over years of domestic and foreign companies shows that unclear planning of production activities in a highly competitive business environment leads to unnecessary economic losses and negatively affects the financial stability of a company. Today strategic planning is a key factor in successful development of a company, it allows taking into account the individuality and specifics of a company, creating unique competitive advantages and conditions for development of a company [1-3].

With the help of production planning, decisions are taken on further activities, some new areas of interests of the company are determined, the satisfaction of consumers’ needs by the purchased goods is increased, promising markets are defined, and strategic business partners are determined [4-11].

The food industry is currently an integral part of economy of Russian Federation. This industry is strategically important for the state, since it forms the food safety of the state, providing the population with access to safe and nutritious food [12-18]. During the recent 5 years this industry has shown steady growth related to range of incentive programs at the federal and municipal levels. But it is also worth to note that the level of competitiveness of Russian food producers is low. This applies to both the external and internal markets. The introduction of long-term production planning will increase the competitiveness of food industry companies [19-25].
2. Materials and methods
The methodology of production planning is a set of techniques and methods, analysis and forecasts, forecasting programs and plans in various levels and time periods, a system of planned parameters, and their interrelations.

The following methods were used in the research:
SWOT analysis method, a method for analyzing the external and internal business environment, which is designed to identify the strengths and weaknesses of a company and their relationship, peculiar for a specific company, as well as the threats and opportunities of the company.

The standard matrix is shown in table 1.

| Opportunities (O) | Threats (T) |
|------------------|-------------|
| Strengths (S)    | It is considered how the strengths of the company can impact on the emerging threats and the possibility of leveling the threats due to the strengths of the company. |
| Weaknesses (W)   | Describe the possible synergy of weaknesses and threats to the company’s business performance and its sustainability. |

| Weaknesses and their impact on the company’s capabilities and possible difficulties that the company may encounter. |
|--------------------------------------------------|
| 1. ....... |
| 2. ....... |

Table 1. Matrix of SWOT-analysis.

The method is based on definition of strengths and weaknesses, threats and opportunities, which are listed above. After making this list for the company, an assessment of their relationship is given. For that it is necessary to consider the directed or counter-directed influence of those items on the company. The name of the method is based on the first letters of English words: S – strengths; W – weaknesses; O – chances, opportunities; T – threats.

The general principle of the analysis can be defined as follows: “when developing a production plan, it is necessary to match the internal resources of the company and the external situation”, because the development plan of the company should be aimed at efficient transformation of the company’s resources into market opportunities and avoiding threats.

The economic results of activities were analyzed according to the following formulas:
Revenue from sales (R):

\[ R = V \times P, \]  \hspace{1cm} (1)

where V – volume of manufactured products;
P – price per unit of products.

Cost of sales (C_s):

\[ C_s = C_{tot} + R_{P_{beg}} - R_{P_{end}} \]  \hspace{1cm} (2)

where \( C_{tot} \) – total cost of manufactured products,
CE – commercial expenses,
\( R_{P_{beg}} \) and \( R_{P_{end}} \) – balances of unsold finished goods at the beginning and end of the reporting period (RP).

Profit from sales (P_s)

\[ P_s = P_y - CE - AE \]  \hspace{1cm} (3)
Where $P_g$ – gross profit;
CE – commercial expenses;
AE – administrative expenses.
Profit before tax ($P_{bt}$):

$$P_{bt} = P_s + I_r - I_p + OI - OE$$

(4)

where:
P$_{bt}$ — profit before tax;
P$_s$ — profit from sales;
I$_p$ — incomes from participation in other companies;
I$_r$ — interests receivable;
I$_p$ — interests payable;
OI and OE — other incomes and other expenses.
Net profit (NP):

$$NP = R - C_s - AE - CE + OI - OE - IT$$

(5)

where:
R — revenue;
C$_s$ — cost of sales;
AE and CE — administrative and commercial expenses;
OI and OE — other incomes and other expenses;
IT — income tax.
Return of assets ($R_a$):

$$R_a = \frac{NP}{S_a} \times 100\%$$

(6)

where NP — net profit;
S$_a$ — sum of assets.
Return on production ($R_{pr}$):

$$R_{pr} = \frac{Pr}{Pc} \times 100\%$$

(7)

where:
R$_{pr}$ — return on production;
Pr — profit;
Pc — prime cost.
Return on sales ($R_s$):

$$R_s = \frac{R}{Pr} \times 100\%$$

(8)

P$_s$ — profit from sales;
R$_s$ — revenue from sales.
Net profit margin

$$R = \frac{NP}{R} \times 100\%$$

(9)

Where R — is the revenue from the sales;
NP — net profit.
The share of risk (simple) is determined based on their totality. The results obtained are corrected by the formula:

\[ W^1_i = W^0_i + \sum_{i=1}^{k} W^o_i \]  

where \( W^1_i \) is a weight of the \( i \)th group of priorities after its correction.

3. Results and discussion

Below is presented the process of long-term strategic planning for a company engaged in fat-and-oil in industry. This company is located in Moscow region. It is an industrial partner of the K G Razumovsky Moscow State University of technologies and management (Design Engineering Department (DED)).

We have developed a diagram of operating relations between departments, which diagram is necessary when developing a strategic plan for the company. Figure 1 below shows the proposed interaction stages for developing a business plan:

![Diagram of operating relations between departments](image)

**Figure 1.** The scheme of interaction between the company’s departments in terms of developing the strategic planning: 1 - order on preparation of documents for planning, terms and persons responsible for certain areas; data and priorities for development of the company for the upcoming period; 2 - providing the responsible persons with basic information about the planned events and innovations; 3 - transfer of data to persons in charge for the study of certain details of the general plan; 4 - granting of information from the structural units for drawing up a production plan; 5 - submission of the draft planning plan for its approval; 6 - in case of a positive assessment of the production plan by development team, the plan is sent for consideration to the CEO of the company.

The implemented analysis made it possible to reveal a range of directions for development of the analyzed company. Let’s consider the most promising ones [8-10]. The strategy is chosen with the help of matrix below (table 2).
Table 2. Matrix of characteristics.

| Strategy                        | Increasing of market share | Increasing of productivity | Reducing of costs | Assessment |
|---------------------------------|----------------------------|----------------------------|-------------------|------------|
| Strategy of market development  | 8×0.16                     | 5×0.16                     | 6×0.18            | 2.86       |
| Strategy for strengthening of market position | 8×0.19                     | 7×0.17                     | 8×0.17            | 3.73       |
| Price advantage                 | 8×0.15                     | 6×0.14                     | 3×0.14            | 1.98       |
| Strengthening of the products position | 4×0.16                     | 4×0.13                     | 6×0.13            | 1.78       |
| Expansion of the goods assortment | 6×0.10                     | 5×0.12                     | 5×0.11            | 1.57       |
| Costs cutting course           | 5×0.13                     | 7×0.15                     | 6×0.15            | 2.6        |
| Strategy of reverse vertical integration | 6×0.11                     | 5×0.13                     | 7×0.12            | 2.15       |

The matrix is filled in by two scales: the first characterizes the achievement of the aim when using the strategy (ten-point scale), the second scale determines the probability of the plan implementation (scale from 0 to 1). The most efficient strategy is considered to be the one with the largest amount of products. Based on the obtained data, we choose a strategy to strengthen our position in the market. This strategy will be used as basic one, and the strategy of concentrated growth will be used as the revamped one.

Let us determine the estimates, which will be used by experts group as criteria of assessment of the company’s activities:

The company’s performance parameters were evaluated on a five-point scale:

1. the company’s management system is operating inefficiently, the company's performance decreases steadily;
2. the company’s management system is inefficient, the company’s performance are stable, close to unsatisfactory;
3. the company’s management system operates with unstable, varying degrees of success, but the dynamic of change for the better is observed;
4. the system is efficient with a perspective of development;
5. the system is efficient.

Let’s consider the main directions of the company’s activity and analyze them. The first parameter is the competitiveness of production:

\[ K_{1gen} = 2.41 \text{ scores} \] (11)

The obtained result shows the low competitiveness of production. We can say that the company’s production does not fully meet the needs for production, which insufficiency negatively affects the achievement of set aims. Technological equipment and technological processes are on low level.

The second parameter is the financial standing of the company:

\[ K_{2gen} = 2.44 \text{ scores} \] (12)

The obtained value shows that financial management should be revised, since the current level is unsatisfactory.

The third parameter is the competitiveness of sales and product market promotion:

\[ K_{3gen} = 2.91 \text{ scores} \] (13)

Based on the performed calculation, we conclude that the competitiveness of the company’s sales can be assessed as low competitiveness. Here it is necessary to clarify several key points: the company sells its products of variable specificity, and does not fully use all the opportunities for sale, i.e. the tool for promoting the products within the virtual space is practically not used.
The fourth generalizing criterion is the competitiveness of management activities at the company:

\[ K_{gen} = 2.41 \text{ scores} \]  

(14)

The final fourth criterion also proves low level of the parameter. Summing up the generalizing parameters, it is possible to state that the management system does not solve the assigned tasks; it inefficiently uses the available resources and capabilities.

It is necessary to take corrective measures to change the current situation.

The risks were also assessed. For this the share of each risk from the complete list was assessed in its entirety.

This calculation allows determining the probability of events with certain type of risk. The results of calculation are presented below in table 3.

**Table 3. Assessment of risks.**

| Group                  | Designed Wi | Corrected Wi₁ |
|------------------------|-------------|---------------|
| Financial risks        | 0.26        | 0.41          |
| Commercial risks       | 0.23        | 0.26          |
| Industrial risks       | 0.19        | 0.16          |
| Social risks           | 0.15        | 0.08          |
| Political risks        | 0.08        | 0.03          |
| Environmental risks    | 0.09        | 0.06          |

The results of table 3 above show that the group of political risks has the least share, its value is equal to 0.08, while the most significant are the risks which belong to the financial group, with a share of 0.26.

The following corrective measures are suggested:

- change the model of the company’s management system; adjust the financial activities; improve the production planning;
- direct the main changes to adjust the production schedule; consider the possibility of transfer to shift production; change the motivational component of employees’ salaries;
- improve the procurement and sales, as well as financial activities.

So, let’s give a summary for the above: the head of the company runs the strategic management, makes decisions based on received information, approves decisions aimed to implementation of the project. The employees at local levels implement the tasks assigned to them, report on their job in appropriate way and send data to the coordination center. We use the data for the reporting period as the initial data.

Let’s calculate the change in economic parameters, taking into account the measures planned to adjust the company’s activities. The results are shown in table 4.

**Table 4. Economic results for 2020 and forecast for 2021.**

| Parameter                          | 2020      | Forecast value | Change, + | Ratio, % |
|------------------------------------|-----------|----------------|-----------|----------|
| Sales proceeds, thous. rub.        | 585.643   | 655.920        | 70.277    | 112.00   |
| Cost of sales. thous. rub.         | 516.998   | 558.358        | 41.360    | 108.00   |
| Administrative expenses, thous. rub.| 40.752    | 42.790         | 2.038     | 105.00   |
| Profit (loss) from sales, thous. rub.| 27.893    | 54.773         | 26.880    | 196.37   |
| Profit before tax, thous. rub.     | 25.218    | 52.098         | 26.880    | 206.59   |
| Net profit, thous. rub.            | 19.400    | 41.678         | 22.278    | 214.84   |
| Return on assets, %                | 6.67      | 14.33          | 7.66      | 214.84   |
The data in table 4 shows that the corrective measures of the company will increase the revenue from sales by 70,277 thousand rubles, which revenue value grows by 12%, while the prime cost of production increases by 8%.

It should be noted that the profit from sales doubled, and the return on products and return on sales increased by 1.5 times.

The implementation of all planned corrective measures will allow the company to achieve higher stability in the market. Optimization of costs will allow the company to use resources in more efficient way, which in its turn will generate additional profit.

4. Conclusion
Introducing of the project into operation will allow achieving sustainable development of the company. The introduction of the project assumes its financing. It is rather difficult to define the exact cost of the project, but it is possible to estimate the financial investments for similar projects.

According to the available data, the cost of introducing the strategic planning in this company, taking into account the specifics of its scale and the specifics of its activities, is assessed as amount more than 8 million rubles, and the payback period is less than a year.

The results of the proposed planning include the following: increase in volume of products sales (+21.0%), increase of profits (+28.02%), increase in labor productivity rate (+17.79%).

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|                | 5.40 | 9.81 | 4.41 | 181.82 |
|----------------|------|------|------|--------|
| Return on product, % |      |      |      |        |
| Return on sales, %   | 4.76 | 8.35 | 3.59 | 175.33 |
| Net profit margin, % | 3.31 | 6.35 | 3.04 | 191.82 |
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