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THE TECHNOLOGY OF BUDGETING ENTERPRISES WITH THE DIVISIONAL STRUCTURE

The subject matter of the study are the components of budgeting enterprises with the divisional structure. The goal is to determine the composition of budgeting technology and develop its main components for enterprises with the divisional structure. The following tasks are solved in the article: the composition of budgeting technology is justified; the income generation model for an enterprise with a divisional structure is improved; the system of obligatory indicators of an enterprise with the divisional structure is suggested as well as the information model of budgeting the income of the cost centre of the second type. The methods used are — logical and theoretical generalization, formalization, modelling. The following results are obtained. The composition of budgeting technology as a set of formalized knowledge about the implementation of the process of planning for structural divisions is grounded. The efficiency of presenting the budgeting technology as graphic and information models is proved. It is determined that the obligatory indicators of an enterprise that evaluate its goals should be structured to solve the task of composing standard target indicators for responsibility centres of various types. The obligatory income indicator is structured on the basis of the economic model of its generation. The model of income formation for an enterprise with a divisional organizational structure was improved by introducing the indicators of coverage amounts of the first and second level and by excluding the revenues obtained from domestic sales. The obligatory income indicator is structured on the basis of the improved model. The system of obligatory indicators of an enterprise with a divisional structure for each responsibility centre is suggested, particularly, for the strategic economic centre, a income centre, cost centres of the second and third type. The obligatory indicator of the transfer price was introduced to solve the problem of regulating the relations among the divisions of an enterprise with the divisional structure. The information model of budgeting the income obtained from the main activity of an enterprise with a divisional structure was improved by calculating the coverage amounts of the first and second levels, by calculating the income obtained from domestic sales according to transfer prices, and by distinguishing variable and constant parts from the planned expenses. The information model of budgeting the income obtained from the centre of expenses of the second type using the transfer prices is suggested. Conclusions. Graphic and information models should be introduced into the budgeting technology; the model of income generation for an enterprise with a divisional organizational structure should be improved by introducing the coverage amounts of the first and second levels and excluding the income obtained from domestic sales. The obligatory indicator of transfer prices should be used to solve the problem of regulating the relations among business units of an enterprise with the divisional structure; the information model of budgeting the income of the centre of expenses of the second type should be presented with the use of the transfer prices.

Keywords: budgeting, planning technology, obligatory indicators, transfer prices.

Introduction

Planning is an integral part of the management process. It provides an opportunity to determine the goals of the enterprise and identify the ways to achieve it. Therefore, this stage of the management process is essential for any economic relations. The high dynamic character of the environment causes the need for improved methods and planning techniques; the budgeting technology is one of the most important.

The analysis of literary sources and the problem statement

The works of numerous foreign scholars consider the theoretical aspects of budgeting, among them are the works by D. Brimson and D. Antos, J. Hope and R. Fraser, D. Shim и D. Siegel [1; 2; 3]. The definition “budgeting” is of a foreign origin.

Budgeting was introduced into the practice of domestic enterprises and their subdivisions due to Western management and was developed because of the increasing role of planning under the conditions of market transformations. The authors determine the principles of budgeting in their works [4, 5], investigate the stages of budgeting [6], determine the principles of building the centres of responsibility [7] and the aspects of budgeting organization [8] as well as the approaches to establishing planned indicators [9]. Despite the significant contribution of scientists to this area, it should be noted that particular issues of budgeting in terms of structural aspects require further research. This is linked to the proliferation of complex structures with a divisional structure. Managing such multi-level structures is complicated. Under these conditions, there is a problem of taking into account the complicated interconnections among the numerous structural subdivisions and ensuring their unidirectional development. The mentioned problem is solved by budgeting.

The goal and objectives of the study are to determine the composition of the budgeting technology for enterprises with the divisional structure.

The basic material

Vertically-integrated enterprises that appeared in the grain market resulted in the growth of grain companies with the divisional structure. The materials presented in the article were developed and tested for bakery enterprises.

The previous studies proved the idea that the main task of budgeting is to bring the indicators of the enterprise current plan to individual structural divisions or centres of responsibility [10]. The system of their planned documents is formed in this way. It is the result of applying budgeting technology.

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The budgeting technology is a set of formalized knowledge of the process of planning for structural divisions. This requirement can be met if it comprises:
- a list of obligatory indicators for the centres of responsibility;
- the clear sequence of executing the operations aimed at bringing the policy indicators of the enterprise to its divisions;
- a list of input and output information for each of them;
- a set of methods for receiving and converting input information;
- a list of workers and resources assigned to them.

Since the technology is a formalized knowledge, it can be presented as graphic and information models of the stages of the process (informograms) [11].

The first component reflects the logical sequence of the process stages and their interrelation, the second is the nature of the information transformation (the content and composition of the methods of execution) for each stage or operation.

However, using only graphical models and informograms is not enough. Being implemented within the framework of budgeting, this technology has its own specifics as it operates a special resource – information that requires developing information models of planned calculations and technological maps of the stages of the planning process.

Thus, following planned documents should be developed basing on the typical technology constituents and taking into account the peculiarities of planning for the formalization of the budgeting technology:
- graphic models of planning stages;
- information models of planned calculations;
- informograms of planning stages;
- technological maps of the planning stages.

To develop the composition of the planned indicators for the centres of responsibility of various types, the obligatory indicators of the enterprise that estimate its goals should be structured.

Due to the fact that the economic goal lies on the highest level of the hierarchy, the income indicator should be structured first of all.

Economic relations between the centres of responsibility of an enterprise with the division structure are based on transfer prices. If the responsibility centres of such structures are SEC (strategic economic centre), other market prices are used in the settlements of accounts between them and the income is generated according to the result of their activities. In a case when the centres of responsibility are the units that have the status of PC (income centre) and RC (responsibility centre), the prices that are less than the market domestic prices are used for domestic sales. The economic model should be used for structuring obligatory indicators of an enterprise and for developing the typical composition of planned indicators of responsibility centres.

The economic model of income generated due to the main activity at responsibility centres in the structures of the divisional type which is suggested for using to structure the income obligatory indicator is as follows [7]:

\[
I_{EN} = \sum_{i} I_{iSEC} + \sum_{i} I_{iPC} - (\sum_{i} IRS_{i} + C^{3m})
\]

where \(I_{EN}\) is the income of an enterprise;
\(I_{iSEC}\) is the income of the \(i\)-th SEC;
\(I_{iPC}\) is the income of the \(i\)-th PC;
\(IRC_{2m}\) is the income of the \(i\)-th RC of the second type;
\(C^{3m}\) is the costs of RC of the third type.

The use of the economic model as it stands is not efficient due to some reasons. First, PC is a supplier (a service provider) to domestic and foreign customers. That is why their interim incomes obtained from domestic sales should be excluded from the enterprise income to avoid double calculation. Second, RCs of the second type sale products (services) to other divisions using transfer prices. They actually participate in distributing the enterprise income, i.e. they “draw back” a part of income earned by PC but they formally take part in generating the enterprise income. That is why their income should be taken into consideration while determining the results of the enterprise activities.

Grounding on the stated above, the economic model of the income generated by the main activities of an enterprise with the divisional structure should be improved by excluding the interim incomes of PC and RC. According to this, the economic model is as follows:

\[
I_{EN} = \sum_{i} I_{iSEC} + \sum_{i} I_{iPC} + \sum_{i} I_{2m}^{RC} - \sum_{i} I_{BH}^{RC} - C^{3m}
\]

where \(I_{2m}\) is the income of the \(i\)-th RC of the second type;
\(I_{BH}^{RC}\) is the interim income of the \(i\)-th PC or RC of the second type obtained from selling products to other PCs.

The income of SEC \(I_{iSEC}\) is calculated according to the formula:

\[
I_{iSEC} = AR_{i} \times P_{i} + AR^{BH}_{i} \times P^{BH}_{i} - C_{i}
\]

where \(AR_{i}\), \(AR^{BH}_{i}\) are the amounts of products sold to foreign consumers and other SECs in actual measurement (if the \(i\)-th SEC manufactures just one product);
\(P_{i}\) is the price of selling the products manufactured by the \(i\)-th unit on a foreign market;
\(C_{i}\) is the costs for manufacturing the products of the \(i\)-th unit (prime costs).

The income of PC \(I_{iPC}\) is calculated according to the formula:

\[
I_{iPC} = AR_{i} \times P_{i} + AR^{BH}_{i} \times P^{BH}_{i} - C_{i}
\]
where $AR_i$ is the amount of products sold to foreign consumers and other PCs in actual measurement (if the $i$-th PC manufactures just one product);

$$P_i^{BH}$$ is the transfer price of selling the products manufactured by the $i$-th unit to other PCs.

To improve recording the economic model in expanded form, it is suggested to:

- distinguish variable and constant parts;
- incorporate coverage amounts into the model.

According to the stated above, the income of PC should be calculated as follows:

$$I_{PC}^i = \sum_i AR_i \times P_i + \sum_i AR_i^{BH} \times P_i^{BH} - \left( \sum_i C_i^{OWN\;\text{var}} + \sum_i IRC_i^{2\;\text{var}} + \sum_i C_i^{OWN\;\text{const}} + \sum_i IRC_i^{2\;\text{const}} \right)$$

where $C_i^{OWN\;\text{var}}$, $C_i^{OWN\;\text{const}}$ are own variable and constant costs of the $i$th PC for manufacturing and selling products;

$IRC_i^{2\;\text{var}}$, $IRC_i^{2\;\text{const}}$ are the cost of services (income) obtained from RC of the second type – variable and constant parts.

The income of SEC is transformed in the same way. Taking into account these transformations and due to the fact that the indicator of coverage amount of the second type (CA2) influences the amounts of sales, the expanded economic model of an enterprise with the divisional structure is as follows:

$$I_{EN}^i = I_{SEC}^i + \sum_i CA2_i + \left[ \sum_i ACR_i \times PH_i - (CRC_i^{2\;\text{var}} + ACR_i + CRC_i^{2\;\text{const}}) \right] - \sum_i I_i^{BH} - C_i^{3\;\text{m}}.$$

The obtained expanded economic model is the basis for structuring the obligatory indicator of the income, which enables developing the system of indicators of responsibility centres of enterprises with the divisional structure (fig. 1).

In accordance with the principles of planning, namely: integrity and completeness, as well as the goal-oriented integration of the sections of the plan, the planned documents should cover not only all areas of the enterprise but also structural units of different levels of the hierarchy. That is, establishing the relationship between the functional plans of one level of the hierarchy as well as between the plans of different hierarchical levels is important.

Fig. 1. Structuring the obligatory indicator of income for enterprises with the divisional structure

While developing planned documents and patterns of their interrelation, the peculiarities of activities of bakery enterprises were taken into consideration, namely:

- seasonal fluctuation of raw materials input, which requires establishing a planned period, i.e. a farming year;
- development of the organizational structure according to product or territory, depending on the degree of integration;
- centralized purchasing raw materials for all departments.

The income plan is the main document that reflects the generation and distribution of incomes. The content of the mentioned planned document is determined by the logic of calculating the obligatory indicator, i.e. the net income, and the starting point of its development is the structure of the income and costs of an enterprise.

The income in divisional structures is generated on the levels of responsibility: SEC and PC (fig. 1). That is why the income should be planned for an enterprise as a whole and for structural divisions.
The sequence of obtaining planned indicators, the methods of their calculation and information sources should be established by developing relevant information models of planned calculations. D. Hahn [12] introduced this model for the first time as the basis for calculating the income plan, but this model was of a general nature and did not take into consideration the specificity of the enterprise organizational structure.

To make the income plan more advanced, in accordance with the economic model for generating the income obtained from the main activities of an enterprise with the divisional structure and taking into account the specifics of the activities of bakery enterprises, the information models of the planned calculations should be improved by:

- calculating coverage amounts (of the first and second level), which enables distinguishing direct constant costs of structural units from the constant costs of an enterprise and avoiding their allocation to make divisions contribute to the cross-organizational result. This also enables using the “CA2” indicator to determine a part of the income which is transferred to the disposal of responsibility centres;
- calculating the income obtained from domestic sales at transfer prices and the income obtained from selling products to foreign consumers at market prices;
- distinguishing variable and constant parts from planned costs, which enables planning prime costs and financial results more precisely;
- developing a plan for a marketing year because such planned period takes into account the peculiarities of the activity of bakery enterprises, namely, seasonal fluctuations of grain supply in the best way.

The budgeting technology is suggested to be formalized by the information models of planned calculations on the basis of the economic model of the income generated by the main activities of an enterprise with the divisional structure (table 1).

Table 1. The information model of budgeting the income of an enterprise with the divisional structure

<table>
<thead>
<tr>
<th>Indicators</th>
<th>The order of calculation</th>
<th>Sources of information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net income obtained from selling products to foreign consumers</td>
<td>Income obtained from sales – charges on income</td>
<td>Previous calculations</td>
</tr>
<tr>
<td>Income obtained from domestic sales *</td>
<td>∑ Transfer prices × The volume of products sold to other centres</td>
<td>Marketing programme, calculating transfer prices</td>
</tr>
<tr>
<td>Variable costs</td>
<td>∑ PC variable costs + ∑ Variable costs of RC of the second type</td>
<td>Prime cost plan</td>
</tr>
<tr>
<td>Coverage amount I</td>
<td>Net profit – variable costs</td>
<td>Previous calculations</td>
</tr>
<tr>
<td>Constant direct costs</td>
<td>∑ PC constant costs + ∑ Constant costs of RC of the second type</td>
<td>Prime cost plan</td>
</tr>
<tr>
<td>Coverage amount II</td>
<td>Coverage amount I – Constant direct costs</td>
<td>Previous calculations</td>
</tr>
<tr>
<td>Coverage amount II adjusted by the profit amount obtained from domestic sales</td>
<td>Coverage amount II – Income obtained from domestic sales</td>
<td>Previous calculations</td>
</tr>
<tr>
<td>Constant indirect costs</td>
<td>Costs of RC of the third type</td>
<td>Prime cost plan: administrative cost estimate</td>
</tr>
<tr>
<td>Income (losses) obtained from the main activities</td>
<td>Coverage amount II (adjusted) – Constant indirect costs</td>
<td>Previous calculations</td>
</tr>
<tr>
<td>Income (losses) obtained from the operation activities</td>
<td>Income obtained from other operational activities – Costs resulted from other operational activities</td>
<td>Marketing programme, consumer agreements</td>
</tr>
<tr>
<td>The financial result from the operation activities</td>
<td>Income (losses) from the main activities + Income (losses) from other operational activities</td>
<td>Previous calculations</td>
</tr>
<tr>
<td>Income obtained from investment and financial activities</td>
<td>∑ Equity income + ∑ Income on the enterprise security yield + ...</td>
<td>Analysis of the previous period data, information on security yield, equity income</td>
</tr>
<tr>
<td>Costs resulted from investment and financial activities</td>
<td>∑ Equity income costs + ∑ Loan interest + ...</td>
<td>Analysis of the previous period data, bank contracts for receiving a loan</td>
</tr>
<tr>
<td>Financial result obtained from ordinary activities to taxation</td>
<td>Financial result obtained from operational activities + Income obtained from investment and financial activities – Costs resulted from investment and financial activities</td>
<td>Previous calculations</td>
</tr>
<tr>
<td>Income tax</td>
<td>Financial results obtained from ordinary activities before taxation × Taxation rate</td>
<td>Previous calculations, legislative standards</td>
</tr>
<tr>
<td>Net income</td>
<td>Financial results obtained from ordinary activities before taxation – Taxation rate</td>
<td>Previous calculations</td>
</tr>
<tr>
<td>Distribution of the enterprise income</td>
<td>Net income × (Standard charges on income of SEC of the lower level +PC+RC of the second type + RC of the third type)</td>
<td>Owners’ decisions on the income distribution</td>
</tr>
</tbody>
</table>
The suggested information model represents the sequence of obtaining planned indicators and methods of their calculation as well as the source of information taking into account the characteristics of bakery enterprises.

The income obtained from domestic sales should be taken into consideration in subsequent calculations to prevent a double counting for representing the results of the enterprise activities.

According to the structure, the first eight indicators of a PC planned document should be similar to the ones of the SEC plan. However, in order to detail the cost according to the place of their origin, they should be divided into the cost of services of RC of the second type and the costs that PC had.

### Table 2. The information model for budgeting the income of RC of the second type

<table>
<thead>
<tr>
<th>Indicators</th>
<th>The order of calculation</th>
<th>Sources of information</th>
</tr>
</thead>
<tbody>
<tr>
<td>The income obtained from selling PC products (services)</td>
<td>[ \sum \text{Transfer prices} \times \text{The volume of services sold to the ith PC} ]</td>
<td>Work schedule, transfer costs calculations</td>
</tr>
<tr>
<td>General cost limit, including variable</td>
<td>[ \sum \text{Variable costs of RC} + \sum \text{Constant costs of RC} ]</td>
<td>Estimate of costs</td>
</tr>
<tr>
<td></td>
<td>Variable cost rate ( x ) \times \sum \text{The volume of PC services sold}</td>
<td>Estimate of costs</td>
</tr>
<tr>
<td>constant</td>
<td>[ \sum \text{Constant costs according to the cost estimate} ]</td>
<td>Estimate of costs</td>
</tr>
<tr>
<td>The income obtained from selling PC services</td>
<td>The income obtained from selling PC products (services) – General cost limit</td>
<td>Previous calculations</td>
</tr>
</tbody>
</table>

In this case, the RC income does not increase the enterprise income but redistribute it among the units with the help of transfer prices.

### Conclusions

All the stated above make it possible to make the following conclusions:

1) the main task of budgeting is to bring the indicators of the enterprise current plan to the centres of responsibility. Graphical and informational models should be introduced into the structure of the budgeting technology as a set of formalized knowledge about the process of planning for structural subdivisions;

2) typical planned indicators for the centres of responsibility of various types should be accomplished by structuring the enterprise obligatory indicators which estimate its goals. Structuring the income obligatory indicator should be based on the economic model of its generation. The appropriate model for generating income for an enterprise with the divisional organizational structure should be improved by introducing the indicators of coverage amounts of the first and second level and excluding the obtained from domestic sales;

3) for solving the problem of regulating the relations between divisions of an enterprise with the divisional structure, the obligatory indicator of the transfer price should be used;

4) the informational model for budgeting the income obtained from the main activities of an enterprise with the divisional structure should be improved by calculating the indicators of coverage amounts of the first and second levels, by calculating the income obtained from domestic sales at transfer prices, by distinguishing variable and constant parts from the planned costs;

5) the informational model of budgeting the income of the centre of costs of the second type should be presented with the use of transfer prices.

### References

Відомості про авторів / Сведения об авторах / About the Authors

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ТЕХНОЛОГІЯ БЮДЖЕТУВАННЯ ДІЯЛЬНОСТІ ПІДПІРЯЄМСТВ З ДІВІЗІОНАЛЬНОЮ СТРУКТУРОЮ

Предметом дослідження є складові бюджетування діяльності підприємств з дівізіональною структурою. Ціль роботи - визначити склад технології бюджетування та розробити її основні компоненти для підприємств з дівізіональною структурою. В статті вирішено завдання: обґрунтовано склад технології бюджетування; вдосконалено модель формування прибутку для підприємства з дівізіональною структурою; запропоновано систему директивних показників підприємства із дівізіональною структурою; запропоновано інформаційну модель бюджетування прибутку центру витрат другого типу з використанням трансфертних цін.

Використано результати наукових досліджень та технічних підходів, завдяки чому вважаємо, що пропонувана модель розкриває можливості управління фінансами підприємства з дивізіональною структурою.
Проблеми регламентації відносин між підрозділами підприємства з дивізіональною структурою досить використовувати використання трансфертної ціни; інформаційну модель бюджетування припинити витрат другого типу довільно представити з використанням трансфертних цін.

Ключові слова: бюджетування, технологія планиування, директивні показники, трансфертні ціни.

ТЕХНОЛОГІЯ БЮДЖЕТИРОВАННЯ ДЕЯТЕЛЬНОСТІ ПРЕДПРИЙМІЙ С ДИВІЗІОНАЛЬНОЮ СТРУКТУРОЮ

Предметом исследования является составляющие бюджетирования деятельности предприятий с дивизиональной структурой. Цель работы - определить состав технологии бюджетирования и разработать ее основные компоненты для предприятий с дивизиональной структурой. В статье решены задачи: обосновано состав технологии бюджетирования; усовершенствована модель формирования прибыли для предприятия с дивизиональной структурой; предложена система директивных показателей предприятия с дивизиональной структурой; предложена информационная модель бюджетирования прибыли центра затрат второго типа. Использованы методы: логико-теоретического обобщения, формализации, моделирования. Получены следующие результаты. Обоснован состав технологии бюджетирования как совокупности формализованных знаний о выполнении процесса планирования по структурным подразделениям. Доказана целесообразность представления технологии бюджетирования в виде графических и информационных моделей. Определено, что для реализации задачи формирования типового состава плановых показателей для центров ответственности различных типов целесообразно структурировать директивные показатели предприятия, измеряющие его цель. В основу структурирования директивного показателя прибыли положено экономическую модель его формирования. Модель формирования прибыли для предприятия с дивизиональной организационной структурой усовершенствована авторами путем введения показателей сумм покрытия первого и второго уровня, и исключения доходов от внутренней реализации. На основании усовершенствованной модели структурирован директивный показатель прибыли. Предложена система директивных показателей предприятия с дивизиональной структурой для каждого центра ответственности, а именно: для стратегического хозяйственного центра, центра прибыли, центров затрат второго и третьего типа. Для решения проблемы регламентации отношений между подразделениями предприятия с дивизиональной структурой введено директивный показатель трансфертной цены. Усовершенствована информационная модель бюджетирования прибыли от основной деятельности предприятия с дивизиональной структурой путем введения расчетов показателей сумм покрытия первого и второго уровней, введения отдельного расчета дохода от внутренней реализации по трансфертным ценам, выделение в составе плановых расходов переменной и постоянной части. Предложена информационная модель бюджетирования прибыли центра затрат второго типа с использованием трансфертных цен. Выводы: в состав технологии бюджетирования уместно ввести графические и информационные модели; модель формирования прибыли для предприятия с дивизиональной организационной структурой целесообразно усовершенствовать путем введения показателей сумм покрытия первого и второго уровня, и исключения доходов от внутренней реализации; для решения проблемы регламентации отношений между подразделениями предприятия с дивизиональной структурой следует использовать директивный показатель трансфертной цены; информационную модель бюджетирования прибыли центра затрат второго типа целесообразно представить с использованием трансфертных цен.

Ключевые слова: бюджетирование, технология планирования, директивные показатели, трансфертные цены.