International Journal of Engineering & Technology, 7 (4.38) (2018) 195-198

International Journal of Engineering & Technology

Website: www.sciencepubco.com/index.php/IJET

Research paper

Construction: Innovative Approach to Cost Accounting

Larisa Nikolaevna Gerasimova[1*]

[1]*Moscow State University of Civil Engineering (National Research University) (MGSU), 26, Yaroslavskoye Shosse, Moscow, 129337, Russia*

**Corresponding author E-mail: larisa-n-gerasimova@mail.ru*

Abstract

Based on the study of existing methods of cost accounting, this paper examines the innovative approach to the calculation of products.
The article shows that at the time of the decision on investing in a business project related to the development and construction of a new facility, it is advisable to use the target-costing methodology to forecast the cost of a product. For this purpose, when calculating the cost of a product, it is necessary to consider the market research indicators and the values of cost drivers.
The author gives an example of using the "target-costing" method in a construction organization, considering peculiarities of this method in construction.
Based on the results of the study, it can be concluded that the proposed method of cost calculation for a future innovative product allows for an adequate assessment of future costs, which, given a shortage of raw data and the time resource, reduces investment risks.

Keywords: *target-costing, target cost, optimization of technology, costs.*

1. Introduction

Expanding the opportunities associated with the planning of management accounting and its implementation in an enterprise is one of the main directions for improving the management system.
Due to the current situation in the market, there have been radical changes in approaches to the creation of the management systems related to cost management.
Only accurate and timely data on all the production processes and economic activities contribute to correct identification by the company's risk level arising from changes in consumer demand, establishment of a competitive cost of the manufactured products, implementation of the operational analysis, determining the degree of break-even, justifying options for effective policymaking related to finances and investments, considering potential benefits for society [1, 2].
One of the elements of the company's financial efficiency is customer satisfaction with high-quality products and services. The main role here is played by the level of expenses associated with production processes, which is especially important, regardless of the current conditions of the state of the economy, since with increasing competition and a crisis, problems of reducing the cost of are particularly acute.
For this reason, there is a need to create a methodology related to the forecast of production cost for the new goods and services, which contributes to the cost of goods and services being introduced in accordance with the expectations of customers.
The purpose of the research is to find the best methods of accounting for costs associated with the development of an innovative product – a technical facility.

2. Methods

To meet the stated purpose, the author investigated the so-called "target-costing" method. It can be attributed to innovative methods of cost accounting, and it is used at the stage of designing new products or upgrading obsolete products. It is considered to be a method of obtaining the target cost, that is, the cost price having the maximum permissible value, most appropriate to the current market conditions [3].
When comparing this method with traditional ones, it can be concluded that the companies receiving data from standard cost accounting systems spend more time and financial resources on the product development process. This can be explained by the fact that production costs are known only after the end of the product creation process.
If the costs are higher than the market value, then the research is carried out first [4, 5].
Applying the "target-costing" method, it should be considered that this method aims at the systematic planning of the revenue volume, as well as at the consumers, and involves the cost calculation according to a predetermined sales value.
The main task of the target cost calculation is not to identify the value of a new product, but to identify what its cost should be.
Therefore, in the process of creating a new product in accordance with the client's wishes regarding the cost, quality and functionality of the product, the company must always be guided by the market requirements. The cost of production is calculated based on a predetermined sales value [6, 7].
This value is established by conducting market research, that is, in fact, is the planned market value of the product (service). When determining the target cost of goods, the analysis consisting of three levels: product quality, a set of functional features of the product and its value is often used, where the value is assumed or set by the market itself and the customers [6, 8,9].

Copyright © 2018 Authors. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

In order to calculate the target cost, one needs to subtract the size of the company's expected profit from the expected market value. Usually, the target profit is based on the parameters of the target profitability of sales. Thus, the required amount of profit is set, and then the most acceptable value of the cost price is calculated.
Further, the engineering design is carried out, and the estimated cost of the project should correspond to the set parameters. The entire production process, starting with the idea of a new product, acquires an innovative character [10, 11].
Analyzing the use of this method, it is possible to determine that the creation of the target cost is influenced by the following factors:
- external environment (for example, a permissible price for the buyer, quality of the new product important for the buyer, concept of the new product). They affect the formation of the target cost;
- internal environment (for example, design, a radical rethinking of processes to achieve dramatic improvements in the value and quality, iterative improvement). They create the estimated cost price.
In an ideal form, the estimated price cost should be equal to the target cost [12, 13, 14].
The convergence of these values is also influenced by several factors: the quality of the completed marketing research, professional level of the designers, analytical thinking and the ethics of the management accounting specialist, the presence of a highly organized team that develops and implements the project.
And yet, if a new product is such that it cannot reach its target cost without deterioration in quality, a decision must be made to stop its development [9, 15, 16].
The order of application of the target-costing method is shown in Fig. 1.



Fig. 1: Stages of applying the target-costing method

Consequently, target-costing provides an opportunity for enterprise managers to make managerial decisions about the production program already in the early stages of the product life cycle (at the initial stage of product development). Moreover, this approach adjusts the company to the market conditions.
The target value is set by the market, depends on the prices of competitors, as well as the requirements and the price preferences of buyers. In essence, this is a unified management concept aimed at reducing costs according to the current market conditions.

3. Results and Discussion

The study demonstrates possibilities of applying the target-costing method in the field of construction at an enterprise that uses the concept of the target cost in the management system that promotes the expression of the general preferences of potential consumers and the technical possibilities to satisfy those preferences through the products of the construction industry at an acceptable cost to the market. This allows making high-quality and demanded construction products.
The construction company decided to start building cottages and carried out marketing research to find free niches with a low level of competition.
Since the cottages were intended for both permanent and temporary residence, belonged to the countryside landscape, though could be built in the city as well, it was found out that customers needed such products provided they were relatively inexpensive.
The structure of demand for the cost of cottages is shown in Fig. 2.

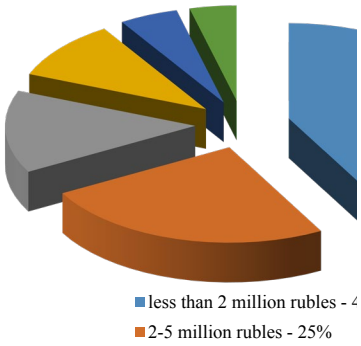


Fig. 2: Sales, %

Consequently, it was found that the maximum demand in the local market was used by cottages that cost no more than 2 million rubles.
Low customer activity was associated with poor transport interchange, weak level of social infrastructure, high cost of households and other factors.
Purchasing preferences for the future product are presented in Table. 1.

Table 1: Preferences of customers to products

No.	Preferences	Priority (weight)
1	Cost per 1 square meter	0.20
2	Living area	0.20
3	Quality of the material and the degree of its environmental friendliness	0.15
4	Land plot area	0.10
5	Communication infrastructure	0.10
6	Level of infrastructure development	0.10
7	Transport	0.05
8	Rationality of planning	0.05
9	Modern architecture of the European level	0.05
Total		1.0

Estimated figures were as follows: expected sales volume was 150 cottages; target value – 2,000,000 rubles; rate of return – 12%; fixed costs for raw stock – 700,000 rubles. Let us calculate the target cost by applying the target-costing method.
The target cost is:
2,000,000 rubles – 2 × 0.12 = 1,760,000 rubles.
Costs that need to be reduced:
1,760,000 – 700,000 = 1,060,000 rubles.
Let us distribute them in accordance with the priorities (Table 2).

Table 2: The planned cost of customer preferences

No.	Preferences	Priority (weight)	Target value
1	2	3	4
1	Cost per 1 square meter	0.20	212,000
2	Living area	0.20	212,000
3	Quality of the material and the degree of its environmental friendliness	0.15	159,000
4	Land plot area	0.10	106,000
1	2	3	4
5	Communication infrastructure	0.10	106,000
6	Level of infrastructure development	0.10	106,000
7	Transport	0.05	53,000
8	Rationality of planning	0.05	53,000
9	Modern architecture of the European level	0.05	53,000
Total		1.0	1,060,000

Therefore, given the buyer's opinion, the developer, being interested in selling the product, is guided by the result of these calculations.
Assessing potential consumers, it is possible to establish ways to reduce the cost of construction work and the market price of this

offer. Marketing research, a set of indicators and the priority of consumer requirements for the product are necessary for the activities of all organizations involved in the development of specific construction industry's products from the design and concept selection stage to the stage of management and development.
In the design process, regardless of the stages, all persons interested in the product must regularly monitor composition, important parameters and functions of the product and determine the main properties of the new products that meet customers' requirements (Table 3).

Table 3: Properties of new products

No.	Preferences of potential customers	Essence of preferences
1	Cost per 1 square meter	30,000-40,000 rubles
2	Living area	80-100 square meters
3	Quality of the material and the degree of its environmental friendliness	Brick, wood (fit for Russia's climate, economics and environmental compatibility of building materials)
4	Land plot area	6-12 acres
5	Communication infrastructure	Road, electricity, gas, water and sewerage
6	Level of infrastructure development	Kindergarten, school, supermarket, polyclinic, post office, gym
7	Transport	Public transport no more than 15 minutes' walk
8	Rationality of planning	Living area: bedroom, living room, study, dining room. Nonresidential premises: laundry, terrace, dressing room
9	Modern architecture of the European level	Architecture in classical and neoclassical style

Therefore, the reduction in the cost of the object should be performed within the amount of 1,060,000 rubles from the 1st cottage, without reducing the quality of building materials.
Alternatives can be different, for example, the use of modern methods of production of building materials, reducing overhead costs, finding new forms of interaction with suppliers.
Based on the assessment of potential customers of Table 3, the authors investigate certain possibilities of management decisions of the construction industry to reduce the target cost within the amount of 1,060,000 rubles from the 1st cottage.
Cost price per 1 square meter
Decisions related to the reduction of the cost price per 1 m2 can be as follows:

- finding new suppliers of building materials that are ready to sell them at reduced prices;
- reduction of advertising costs;
- reduction in the number of internal divisions of the enterprise;
- Optimization of the living area of cottages by reducing the total price for the buyer.

Quality design
It implies compliance with the timing of project implementation for the detailed development of architectural, engineering and other elements of the facility. For example, it is impossible to accurately calculate the load on the floors, while it is not known what the roof will be made of. With the reduction of terms intended for design, the designers calculate the maximum load. As a result, the cost of the project increases at the initial stage.
Quality of the material and its ecological friendliness
To date, about 40% of private suburban housing in our country is made of wood. The technologies in the segment of wooden construction do not stand still. While previously the main building materials were profiled beam or round log, today laminated veneer lumber is the most demanded material for construction of houses; it is considered a new trend.
Advantages of laminated veneer lumber relative to other materials are as follows:

- minimum shrinkage (0.5% versus 6-8% for an ordinary beam or log), since shrinkage and destressing, which promote deformation, are carried out by the factory. In this regard, it is possible to reside in cottages erected from laminated veneer lumber immediately after the end of installation, while houses made of standard wooden building materials need significant work related to processing and finishing for at least one year;
- this material has increased strength and durability, moisture resistance and frost resistance since normally it is made of coniferous forest species;
- enables to significantly shorten construction time (2-3 times) in comparison with the ordinary wood, because the customer receives a set of house components that are ready for construction by the constructor's method.

The variety of building materials in the market is growing every 10 years. If in the Middle Ages the main building materials were wood, artificial stone and brick, today there are many new building materials with improved performance. One of such materials with high efficiency is aerated concrete, which belongs to one of the types of cellular concrete, as well as gas-foam concrete and foam concrete, also included in this group.
Aerated concrete can be easily processed, it can be sawed, drilled, scraped with ordinary steel tools. Moreover, one can easily drill nails, staples and mounting materials into it. Over time, aerated concrete hardens even more. It does not burn since it contains only mineral constituents. Due to its low price, one can choose the best options, partially replacing wood and brick.
Contrary to the fact that new building materials with better functionality appear in the market regularly and building technologies become more sophisticated, brick is still the most optimal material for building houses, primarily because of its versatility in the Russian climate and the ability for realization of various constructive decisions.
Area of the land
One of the methods to reduce the cost of construction works today is the purchase of a plot of land at the lowest cost. This is possible because the supply of plots for construction has increased, and demand has decreased: in a crisis, developers do not launch new projects, or completely refuse them.
Improving financial performance
It is known that the pace of construction of residential facilities has impact on the cost of construction work. The sooner is the payback of the project costs – the less is the cost. Whereas, the downtime in work very badly affects the cost of one square meter.
This direction aims to increase the speed of turnover of own capital, that is, to shorten the terms of construction work. This is possible due to:

- optimization of management processes;
- increase in the capacity of contracting organizations and increase in their number;
- search and use of innovative engineering and construction technologies;
- attracting specialists in narrow areas at all stages of construction. Working with such specialists contributes to minimizing the human factor in the failure to meet construction deadlines or the poor quality of performing the assigned tasks.

In many cases, developers save at all stages of construction work, they ignore hiring expensive specialists, which eventually does not guarantee high-quality housing at low cost.
Optimization of construction works for organization
To create the target cost one can try optimizing the relationship with the current contractors, along with additional tendering. In some areas, substitution in favor of domestic producers, that is a reduction in the costs of the building materials used in construction and assembling with the use of high-quality European materials in the main positions, contributes to maintaining a high quality of construction work with optimal and effective cost reduction.
Construction logistics significantly reduce the cost of erecting country houses, which if duly performed contributes to the calcu-

lation of the most optimal time for the purchase of building materials in the period of minimal demand. For example, it is more expedient to buy sand and concrete in winter, which makes it possible to save 3 to 5% of the normal price of building materials.

Optimization of construction technologies

The enterprise optimizes construction technologies through the distribution of the construction stages of objects. For example, laying the foundation is carried out simultaneously at all planned facilities, which contributes to the simultaneous completion of the construction stages at all buildings, and avoids disruptions in the expected deadlines.

Maintaining project's comfort and attractiveness due to extra options

Contrary to the orientation toward the mass segment, premium projects are being developed, suggesting a higher standard of living. For example, in addition to the normal cost, options are included that improve the level of the object and its status:

- unique building materials for installation of facades and entrance groups;
- electrical and plumbing equipment;
- outdoor furniture.

Consequently, by varying these options, a construction company can reduce the cost of construction for amounts calculated based on the assessment of potential consumers.

Once the properties are determined and technologies are selected, the specialists develop a new construction product, subject that the production costs do not exceed the target cost.

The indicators of production technology and other components are studied in detail. If the costs for selected options are higher than the target cost, they need to be revised until the actual expenditure indicators are close to the target.

The total actual cost of development of the building product, in the end, amounted to 1,750,000 rubles.

At the same time, the enterprise received the following income:

(2,000,000 rubles – 1,750,000 rubles) × 150 cottages = 37,500,000 rubles.

With the traditional method of accounting for expenses to achieve the expected rate of return, the cost of the first cottage should be 2,200,000 rubles (1,960,000 rubles as the estimated cost, 12% of income).

As a result, the company would receive an income:

(2,200,000 rubles – 1,960,000 rubles) × 150 cottages = 36,000,000 rubles.

This is 1,500,000 rubles less than while using target costing.

In this example, the introduction of only one of the many opportunities to reduce the upcoming running costs of core activities during the design phase is considered. Implementation of this type of costing contributes to the creation of significant competitive advantages and allows the company to effectively develop in the future.

As the practical experience shows, when creating new products, enterprises cannot always achieve the target cost. However, enterprises should continue to develop different options until the actual cost of the product is close to the target.

Therefore, with the target costing of the product, a preplanned detailed cost information is created in the accounting. Accordingly, the staff of the main divisions of the company control the forthcoming current costs and look for the ways to reduce costs, while retaining certain functionality and product quality.

4. Conclusion

Besides from cost accounting, the target-costing method covers a variety of management functions, including planning, monitoring, organizing, budgeting, creating responsibility centers. Marketing and project development are carried out simultaneously, the final product complies with the most relevant preferences of customers and the most optimal cost of implementation.

The effectiveness of this method is to ensure the adoption of managerial decisions not only based on the originally established level of costs but also based on market indicators. The target-costing method encourages staff motivation and orientation of the market, considering an acceptable cost from the market position, which should be targeted if the company strives to be profitable under the conditions of existing competition.

References

[1] Kaverina OD (2015), Organizatsiya upravlencheskogo ucheta: problemy i suzhdeniya [Organization of management accounting: problems and judgments]. *Auditorskie vedomosti,* 8, 48-61.

[2] Mizikovsky IE, Pivkin SA (2015), Kalkulirovanie zatrat na vypolnenie proekta v innovatsionnoi deyatelnosti [Calculation of the costs of project implementation in innovation activities]. *Upravlencheskii uchet,* 5, 17-24.

[3] Serova AI (2017) Genpodryadnye uslugi: uchet i nalogi [General contracting services: accounting and taxes]. *Stroitelstvo: bukhgalterskii uchet i nalogooblozhenie*, 11. https://www.audar-press.ru/magazine/stroitelstvo-buhgalterskiy-uchet-i-nalogooblozhenie/2017-11.

[4] Fullerton R, Kennedy FA, Widener SK (2014), Lean Manufacturing and Firm Performance: The Incremental Contribution of Lean Management Accounting Practices. *Journal of Operations Management,* 32(7), 414-428.

[5] Gerasimova LN (2012), Rol uchetnykh mekhanizmov v upravlenii innovatsionnoi deyatelnostyu organizatsii [The role of accounting mechanisms in the management of innovative activity of the organization]. *Finansovyi vestnik: finansy, nalogi, strakhovanie, bukhgalterskii uchet,* 12, 11-15.

[6] Chopra A (2013), Lean Accounting – An Emerging Concept. International Journal of Marketing. *Financial Services & Management Research*, 2(8), 79-84.

[7] Denisova MO (2016), Raspredelenie zatrat na stroitelstvo mezhdu neskolkimi obektami [Distribution of construction costs between multiple objects]. *Stroitelstvo: bukhgalterskii uchet i nalogooblozhenie*, 1.

[8] Drury K (2015), *Upravlencheskii i proizvodstvennyi uchet* [Managerial and production accounting]. UNITI-DANA, Moscow.

[9] Roslender R & Hart S (2003), In search of strategic management accounting: theoretical and field study perspectives. *Management Accounting Research,* 14, 255-279.

[10] Garrison RH, Noreen EW, Brewer PC (2011), *Managerial Accounting for Managers*. McGraw-Hill Irwin, New York.

[11] Gerasimova LN (2014), Sovremennye tendentsii formirovaniya konsolidirovannoi otchetnosti gruppy kompanii [Modern trends in the formation of consolidated statements of a group of companies]. *Finansovaya analitika: problemy i resheniya*, 13, 11-22.

[12] Douglas J, Kaplan RS, Hook BB (1989), Looking for Mr. Overhead: An Expanded Role for Management Accountants. *Management Accounting,* November (11), 65-68.

[13] Semenikhin VV (2016), *Investitsionno-stroitelnaya deyatelnost. Dolevoe uchastie v stroitelstve* [Investment and construction activity. Equity participation in construction]. GrossMedia, ROSBUKH, Moscow.

[14] Zimakova LA, Shtefan YaG (2017), Integratsiya sovremennykh metodov upravlencheskogo ucheta na predpriyatiyakh berezhlivogo proizvodstva [Integration of modern methods of management accounting at lean manufacturing enterprises]. *Mezhdunarodnyi bukhgalterskii uchet*, 6, 340-350.

[15] Dombrovskaya EN (2016), O metodologii ucheta zatrat i kalkulirovaniya sebestoimosti v kompaniyakh s gosudarstvennym uchastiem [On the methodology of cost accounting and costing in companies with state participation]. *Biznes. Obrazovanie. Pravo. Vestnik Volgogradskogo instituta biznesa*, 3(36), 58-64.

[16] Galenko V (2017), Uchet nedvizhimosti u investora [Accounting for real estate investors]. *Novaya bukhgalteriya*, 3. https://www.eg-online.ru/article/369314/.