



Macroeconomics

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**THE FLEXIBILITY OF COMPETITIVE
STRATEGY TO MINIMIZE COSTS
OF UNITED CORPORATE STRUCTURES
IN AN UNCERTAIN MARKET ENVIRONMENT**

Abstract

Future economic activity always contains an element or elements of uncertainty. The notion of uncertainty in the competitive strategy of a united corporate structure (hereinafter referred to as UCS) in economics entails a new state of doing business when the results of economic activity (e.g., cost values) exceed the limits of given constraints. At the same time, the accounting side of business

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management of the UCS does not allow it to return to the previous constraints. This, therefore, emphasizes the task of creating a new branch of management for a particular process, where the result is innovative economic solutions. The paper proposes a scientific and methodological approach to finding cost management solutions in conditions of uncertainty. The approach follows principle of a closed-loop system with feedback, which, unlike others, entails a continuous comparison by subtracting the control criteria of the pre-determined and actual competitive advantages. The choice of counter-strategy is based on the obtained value and the sign of the subtraction. A set of factors contribute to determining the transition of cost changes under uncertainty and the formation of flexible management of UCS costs. These factors include production features, new types of integration, the law of learning, production and technological capacity, customer preferences, time factors for changes in storage and delivery costs, the production cycle, institutional factors of government policies for economic growth, outputs of a new product, scale of production and scale costs, interaction with suppliers, globalization of markets, and others. The paper develops a structural model of control and management of the total cost of 1t of production in the accounting and flexible areas of management, which is implemented in practice as a control software system.

Key Words:

United corporate structure; uncertainty; flexibility; cost minimization; interaction.

JEL: D8, D2.

2 figures, 2 tables, 7 references.

Introduction

The decision to create a unified corporate structure (hereinafter the UCS) is always based on the formation of price sequences of stages of joint development, preparation of production, manufacturing, sales and warranty service of all types of products. The price sequence of all the above stages is formed based on their costs. The price or value of all costs forms the competitive advantages that determine the position of UCS on one or several markets or market sector. Special competitive advantages, which competitors find difficult or even impossible to duplicate, are created in the course of interaction between the participants of UCS at all stages of adding value. The total costs, which in aggregate should be minimized, are the foundation for effective types of interaction of the UCS. At the same time, it is fundamentally necessary to preserve or increase the sustainability of corporate competitive advantages. Future business activity always contains an element or elements of uncertainty. These elements of uncertainty must be overcome at a cost that will lead to a successful outcome of the corporate activity as a whole. Despite the existing research in this area of economic theory and practice, many problems remain unresolved. This article is devoted to ensuring flexibility or creating a new effective area of competitive cost-minimizing strategy management for united corporate structures in an uncertain market environment.

Problem Statement and Literature Review

The problem investigated in this paper concerns the creation of a flexible and competitive cost-minimizing strategy for united corporate structures in an uncertain market environment. Kitieva et al. (2019) note that the competitiveness of businesses becomes particularly relevant in an unstable external environment. The authors assign an important role to the reduction of production costs in the process of competitiveness growth. The theoretical problems of mutual influence of competitiveness and production costs are investigated in their work. The authors suggest ways of maintaining competitive advantages in terms of managing the factors of minimization of expenses. The proposed methods are of a general nature and do not consider the minimization of costs through the interaction of participants in the integrated corporation.

The article of Gladkov (2018) considers the problems of strategic management in conditions of uncertainty of exogenous parameters of the business environment. The author discusses the concept of economic turbulence, proposes the reasons for its emergence, and determines the levels of uncertainty of

exogenous parameters of the business environment. He argues that instability and uncertainty of the external environment can be viewed as the internal potential for further development of the business environment. Gladkov also determines the extent to which the factor of uncertainty influences the choice of strategy that the organization uses to stabilize and develop competitive advantage. Unfortunately, the proposed levels of uncertainty are disconnected from the types of activities undertaken to create new value.

In Gorshenin (2020), it is noted that in conditions of crisis and recession of economy many companies choose the minimization of costs as their strategy. A reasonable choice of methods and tools to develop and implement an anti-crisis strategy is a fundamentally important factor controlled by the owners. Effective solutions allow the company to build a management system that successfully operates in the event of crisis factors. In a sustainable economy, according to the author, the current management system in crisis conditions is virtually unchanged. This article presents a comprehensive and balanced tool for sustainability and business development, namely the innovative business methodology *GORA*. It is difficult to imagine that this tool is equally effective in horizontal, vertical or mixed integration of UCS. The final aggregate result of activity is important for integrated corporations, which is often obtained through a compromise among the participants of UCS with regard to their activities.

Mikhailov (2019) argues that cost minimization and differentiation strategies, when implemented together, can create a sustainable competitive advantage for integrated corporations. The author argues that the cost minimization strategy alone is not enough in international competition. Therefore, comprehensive and creative solutions to the complex problems associated with product and service differentiation are required. The right design and implementation of differentiation and cost-minimization strategies provide a competitive advantage across several industries. This allows companies to perform better than the industry average. In this case, the use of the synergy effect stabilizes or strengthens both strategies. Nevertheless, the study does not offer suggestions on the actions required for an effective integration of these strategies.

In a recent monograph, the authors have noted that 2020 will go down in history as the year of one of the most severe economic crises of our time and uncertainty of economic processes (Avksentyev et al., 2021). This crisis is neither cyclical nor structural (Avksentyev et al., 2021). The authors of the monograph argue that it is fitting to compare the crisis of 2020 with the situation in the economies of Europe, the United States and Japan at the end of World War II and immediately after. During this period (according to the authors), the economic development was determined by military actions on the territory of European countries and the end of military mobilization of the economies. Meanwhile, the high degree of uncertainty and the unusual nature of the crisis led to a revision of forecasts on the development of the world economy during 2020. International organizations have estimated the fall of world GDP in 2020 at 4.2-4.3%

(the forecast was for a fall of 6-7%) (Avksentyev et al., 2021). This was caused by the rapid recovery of business activity in developed countries in the 3rd quarter of 2020, as well as the steady recovery of the Chinese economy. At the same time, there is virtually no information about changes in the strategies of major corporations.

Remesnik (2020) analyses and systemizes the existing theories of decision-making and management by using probability and statistical models. He shows the importance of using the vector of probability estimates for possible states of economic environment or estimates for unknown values of weight coefficients of economic indicators. He proposes a method of applying Fishburn sequences to models with integral index, which include qualitative and quantitative input data in game-theory models. The proposed economic-mathematical methods and models of application are a convenient toolkit for making management decisions in conditions of chaotic and random uncertainty and conflict. Any application of probability-statistical models requires a general sample of data, followed by a choice of the distribution law for these values. It is extremely difficult to obtain such a sample in practice. Therefore, the effectiveness of the proposed method is reduced.

In Dumanka (2019), the aim of the article is to develop and test the method of system evaluation used to determine the degree of strategic adaptation of the company in an uncertain economic environment, taking into account the innovative aspects of strategic management. The method is tested by industrial enterprises with increased resistance to crisis situations. Strategic adaptation of the organization is inextricably linked to the existing strategy of the organization. In crisis situations this connection is decisive, but the author does not focus on this connection sufficiently.

Research Results

The concept of a flexible competitive strategy of an economic entity is acquiring clear signs of a scientific economic category. We believe that one of such signs is the establishment of business management of an incorporated corporation in conditions of uncertainty. The concept of uncertainty in the competitive strategy of the UCS in the economy entails a new way of doing business due to which the results of economic activity (e.g., the costs) go beyond the boundaries of given restrictions. In this case, the estimated accounting of the business does not allow the USC to return to the previous constraints. Thus, the need for new economic solutions arises, i.e., the task of creating a new branch of management. For this purpose, in our opinion, the subsystem of costs in the general business system of UCS is a priority in conditions of uncertainty to preserve competitive advantages.

The search for a new type of economic solutions begins with the analysis of the emerging business uncertainty conditions in the external and internal environments. Notably, methods and models for processing information arrays of the listed environments under uncertainty are the most important condition for adequate assessments of this analysis. In our opinion, the most effective tool for obtaining adequate estimates is the filter with infinite impulse response or IIR-filter with certain software. The UCS business system is, from the point of view of the theory of systems, an open system. The ability to maintain, under certain constraints, the stability of its internal state indicates the manageability of the system. The first problem of doing business UCS face under uncertainty is related to repeated estimations of demand on the market and ensuring sufficient joint activity of the corporation. The second problem is the search for new variables, constant monitoring of competitive market interactions in costs to ensure the competitiveness of offers. Obviously, launching a fundamentally new product under uncertainty contains new, additional uncertainty and risk.

The general operating strategy of UCS, which determines the corporate competitive cost advantage, is always based on the internal and external conditions prior to the onset of uncertainty. The approach to developing a new UCS strategy is based on several well-known principles. Of primary importance is the principle of interconnection in logistics, production, marketing, warranty service, and auxiliary activities. This principle is the basis for creating new competitive advantages of UCS. This article adopts the strategy of cost minimization as the general and main one. At the same time, the costs of the compromise of interaction between the participants are reasonably accepted. The essence of compromise – minimization of total costs of UCS – does not mean minimization of costs for each participant of the united structure. However, the benefits received from the compromise and the results of activity of UCS are distributed proportionally to the incurred expenses. The analysis of new levels of demand on the market under the influence of uncertain conditions can lead to the conclusion that the earlier operating strategy of expense minimization should be changed completely or supplemented with another general strategy for UCS (Mikhailov, 2019). We suggest an algorithm of decision-making for development of UCS strategy, which can be rendered in the form of a diagram (fig.1). Figure 1 shows the sequence of actions for decision-making, with the 1st step (2A) and the 2nd step (2B) at the top.

Thus, in the particular case presented in Figure1, it was decided to continue the strategy of minimization, as a single strategy of activity for the UCS in the new conditions with the factors of uncertainty. Therefore, further search for a new solution will take into account the cost minimization strategy as the common strategy for all participants of the UCS. Next, it is necessary to analyze several main factors, characterizing the state of external and internal environment, which are influenced by the costs. The main factors and the nature of their impact on costs in the transition to uncertainty, as well as the establishment of flexible management are given in Table 1.

Figure 1

Cost management in conditions of uncertainty based on the principle of closed-loop systems with feedback

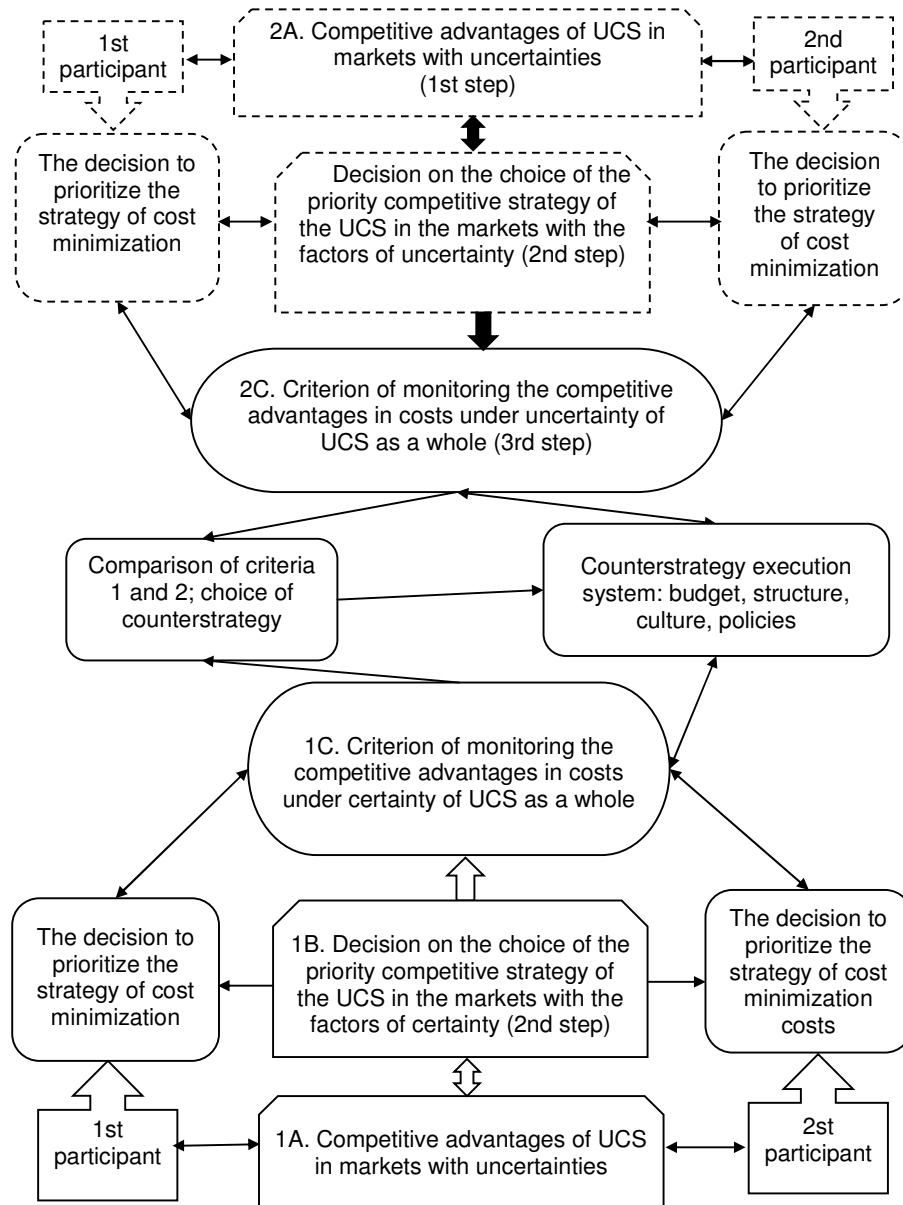


Table 1

**Factors determining the transition of costs to uncertain conditions
and establishment of flexible cost management for UCS**

Factors in the external market environment	Nature of changes in the UCS costs	Impact of flexible UCS management on costs
1. Production capacities and technologies of manufacturing with new innovations	1. Changes in competitive cost advantages	1. Development of production and technological innovations at an advanced rate relative to competitors
2. Emergence of a new type of association of market (market segment) participants	2. The factor determines the new value of the minimum cost	2. Introduction of new cost values in the business unit value chain. Integration with a new participant
3. The law of learning	3. New total amount of costs and new production volume in the market	3. Introducing a new learning effect to adequately respond to competitors. Ahead of the learning curve relative to competitors
4. Structure of production and technological capacities	4. New level of costs and new production volume in the market	4. Introduction of a competitive structure of production and technological facilities. Integration with a new participant
5. Preferences of buyers	5. New level of costs and the emergence of new competitive advantages	5. Implementation of continuous monitoring of purchasing preferences for competitive actions
6. Time factors for changes in storage and delivery costs. Changes in production cycle time	6. Source of changes in costs, both increases and decreases them	6. Monitoring the time factors of cost changes and adapting to new conditions
7. Institutional factors of economic activity	7. Source of cost increases, in rare cases decreases	7. Broad and ongoing participation in formal and informal organizations that shape the institutional rules of doing business
8. Government policies for economic growth	8. Source of unpredictable cost changes	8. Adaptation based on reserve resources in minimum time
9. Launch of a new product with a competitive advantage	9. Change in the competitive advantages in the market	9. Leading the development of new products with competitive manufacturing costs

Factors in the external market environment	Nature of changes in the UCS costs	Impact of flexible UCS management on costs
10. Scale of production	10. Source of changes in costs, production and market volume	10. Adapting capacity structure to suit the new market conditions
11. Interaction with suppliers	11. Breakdown of interaction with suppliers with different values	11. Contracting multiple suppliers and merging with suppliers
12. Global markets for UCS activities	12. Factor that affects the competitive cost advantage	12. Ensuring adequate competitive cost management through all possible types of interaction

In view of the data in Table 1, the solution should be sought in the existing and new arrays of business costs and cost management for all UCS participants, i.e., in the 1st step (2A), 2nd step (2B) and 3rd step (3B) in the upper part of Figure 1. The new breadth of cost values also has limitations and is determined by the available resources, specifically reserved for flexible management. According to previous experience, this value is no more than 30% of the cost of the average quarterly sales, for example, in the metallurgical and machine-building industries. This value is not absolute, but rather reasonably significant.

The search for cost management solutions under uncertainty should have a certain logical sequence of action based on closed-loop conditions and feedback (Fig.1). If the conditions the UCS business system are certain, cost management is conducted based on accounting or pre-determined norms. Quantitative estimates of the costs of each participant and continuous monitoring of the adopted values ensure the manageability of the minimization strategy for the business system of the UCS as a whole. We define uncertainty in costs as the condition of the UCS business system, when the average values and interval of changes in the costs of current activity exceed the given constraints. At the same time, the accounting data or normative values, which were previous used to ensure predictable operation, are no longer capable of performing such a function. Thus, for a time the USC business system operates without proper controls and the expected indicators are not met. Moreover, all pre-determined normative control actions are no longer applicable. The new state of the UCS business system requires a decision on further continuation of activities and the search for a new management strategy to minimize costs. Therefore, the principal method of assessment and management of costs should be based on the calculated total costs of 1t of production, the calculated interval of possible changes in the total

costs of 1t of production for each participant of the UCS. The calculated interval of possible changes in the total cost of 1 ton of sold products shows that the business is profitable at a certain capacity utilization. The actual profit received is taken into account at the end of the accounting period.

Let us consider a practical example of cost management for the adopted method. A company's name has been changed to «Eastern Aluminum». The array of data is made up of changes in the total cost of 1 ton of aluminum depending on the engagement of production capacity (Table 2). The company's products are manufactured according to GOST 4784-2019 (replacing GOST 4784-97) and meet European and international standards EN 573-3:2013 and ISO 209:2007. The product grades are AD000, AD00, AD00E, AD0, AD0E with aluminum content within 99.5-99.8%. The united corporation includes nine plants with different capacities (Table 2).

Table 2 shows that optimal cost management is provided at capacity engagement of 90-100% and has the smallest variation of the total cost of 1 ton of production. Therefore, activities at this capacity are the most effective. When the production capacities of the plants are at 75-80%, the activity becomes unprofitable. Flexible cost management with significant fluctuations in production volumes can ensure profitable operation, provided that a certain structure of production capacities is ensured. For example (Table 2), combining capacities of plants No.1 and No.9 to produce 975 thousand tons results in the total cost of 1t of production at 1,48 USD/t, which translates into a quite high profit. Here, a combination of two profitable total costs per 1 ton of products was used – 1.47 thousand US dollars / ton for the production of 920 thousand tons, and the unprofitable total cost per 1 ton of products of 1.8 thousand US dollars / ton for the production of 55 thousand tons.

The most important condition in managing the minimization of costs, or rather the total cost of 1t of production, is the availability of an information system of control and management. The structural model of the control and management of full cost of 1t of production through optimal and flexible management is presented in Figure 2.

The UCS consists of two participants. The cost accounting system adopted in Figure 2 consists of variable (production, administrative, sales) and fixed (production, administrative, sales) costs. The 1st and 2nd participants of the UCS have calculated the possible values of costs as a closed range of changes for each type of cost. The calculated values are not invariable. The intervals of all types of costs accepted in the calculation are subject to change and can be managed. Activities within these parameters are profitable. The 1st and 2nd participants continuously monitor the changes in the current or actual values of costs of all kinds. The values of pre-determined and actual costs of all types are compared (subtracted) and displayed on the screen. If there is a discrepancy in the value or sign that is beyond the allowed limit, a controlled decision is made either

within the bounds of optimal or flexible cost management. the IIR filter is an integral part of the control system (a filter with infinite impulse response). This filter makes it possible to perform software filtering of the values of measured cost indicators of all kinds.

Table 2

Analytical indicators of the company «Eastern Aluminum»

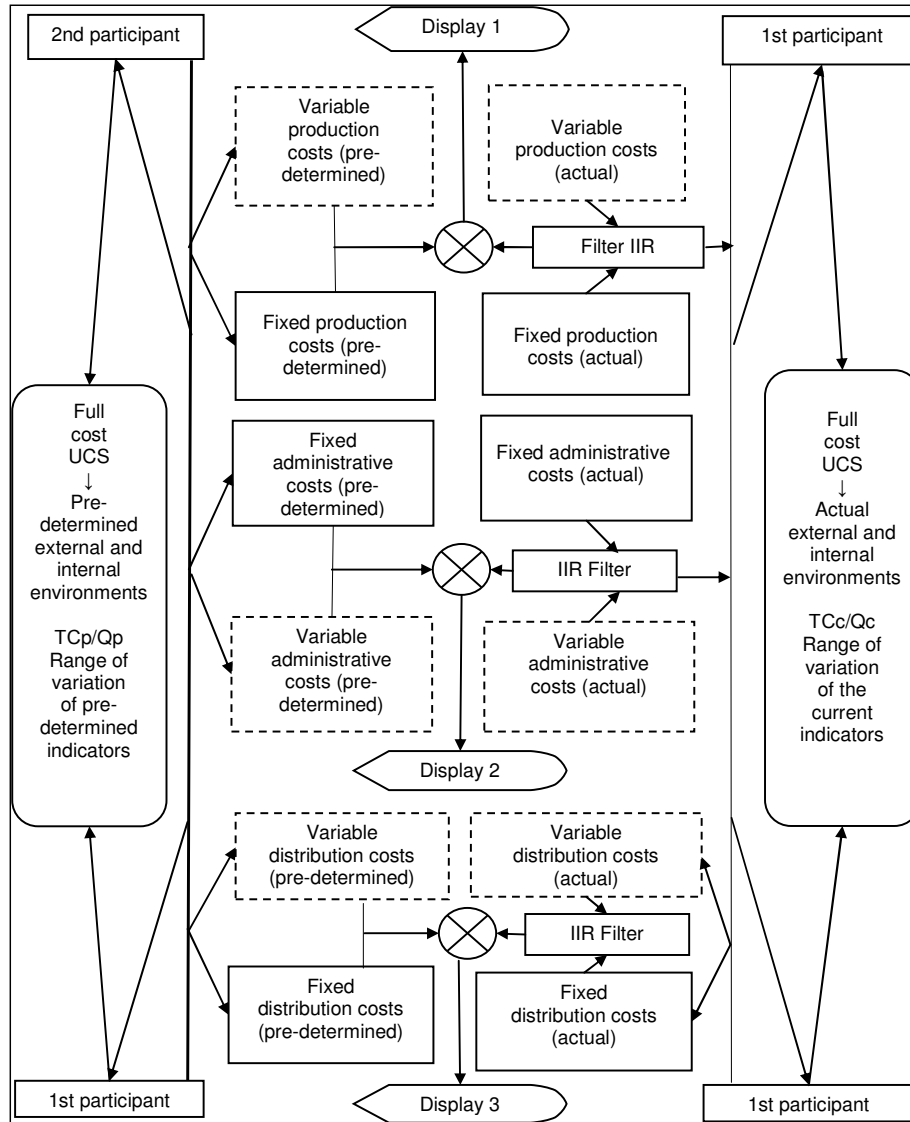
Annual capacity of the plants, thousand tons / %	Engagement of production capacities of the plants, %				
	75...80	80...85	85...90	90...95	95...100
	Total cost of production per 1 ton at the given capacity, thousand US dollars/ton				
1	2	3	4	5	6
No.1 – 920 / 27	1,79	1,71	1,58	1,50	1,47
No.2 – 860 / 25,3	1,79	1,70	1,56	1,51	1,48
No.3 – 420 / 12,3	1,81	1,70	1,56	1,51	1,47
No.4 – 365 / 10,7	1,79	1,72	1,57	1,53	1,49
No.5 – 350 / 10,3	1,79	1,74	1,58	1,55	1,49
No.6 – 175 / 5,2	1,79	1,72	1,57	1,54	1,51
No.7 – 165 / 4,9	1,79	1,73	1,58	1,54	1,51
No.8 – 75 / 2,2	1,80	1,75	1,61	1,57	1,53
No.9 – 70 / 2,1	1,80	1,76	1,62	1,57	1,53
–	Average values of total production costs at the given capacity, thousands of US dollars per ton				
Amount 3400 / 100	1,794	1,725	1,581	1,535	1,498
Cost management scenarios	Incurring losses Inadvisable CM	Possible cost management	Optimal cost management		
	Flexible cost management For example, we need the volume of production in the amount of 975 thousand tons per year. Then the total cost of 1t Al at the given capacity engagement (plant no.1, 920 thousand tons + plant no. 9, 55 thousand tons = 975 thousand tons) is equal with the corresponding shares of production output: $1,47 \times 0,94 + 1,8 \times 0,056 = 1,38 + 0,1 = 1,48$				

Notes: *The full cost of 1t of production at the break-even point is \$1,78 thousand dollars per ton.

Source: calculated by the authors using the data of Finam.ru.

Figure 2

Model of control and management of the total cost of 1t of production in the optimal and flexible cost management



TCp – pre-determined total costs. Qp – pre-determined total sales volume. TCC – current total costs. Qt – current total sales volume. ⊗ – Subtraction. IIR Filter – filter with infinite impulse response.

Conclusions

The authors have suggested an algorithm for finding solutions to cost management in the face of uncertainty, following the principle of a closed loop system with feedback. The algorithm has been in use by a real UCS referenced here during the pandemic of 2020-2021, so it is proposed to introduce it into practical application in other corporate associations.

The research has allowed the identification of the factors that determine the transition of changes in costs to the stage of uncertainty and establishment of flexible cost management of UCS. The analytical data prove the high efficiency of using the set of these factors for the UCS business activity under uncertainty. They have practical importance for the development of the corporate structure in the strategic context.

Finally, the authors have developed a structural model of control and management over the full cost of 1t of production in terms of pre-determined and current values for optimal and flexible cost management. The model contributes to the assessment of uncertainty of the business system of UCS. It is of practical importance as it is developed as a system with an accompanying software product and has been successfully implemented in practice by corporate structures in various areas.

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