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SCENARIO MODELING OF FINANCIAL RESULTS OF COMPANY UNDER UNCERTAINTY: A FUZZY COGNITIVE MAPS APPROACH TO STRATEGIC DECISION-MAKING

Abstract

Amid growing economic uncertainty, companies require flexible tools for forecasting financial results and supporting strategic decisions. Fuzzy cognitive maps enable scenario modeling by analyzing complex causal relationships between key business factors. The purpose of this article is to determine the impact of priority factors on the financial results of companies using scenario modeling through the use of the fuzzy cognitive maps (FCM) method. To achieve this goal, the theoretical aspects of the company's financial activities and their classification were studied, the study of the operating activities of the company under study through the analysis of policies and factors affecting the dynamics of cash flows, the analysis of the negative impact of active personnel movement on financial results. The expected result is the development of a pragmatic concept based on scenario models to reduce negative factors and improve the company's financial results. Based on an analytical forecast based on scenario models, the economic effect was determined and the hypothesis of financial recovery of the research object was confirmed. As a working hypothesis, a version was put forward that reducing the influence of key factors identified using the fuzzy cognitive maps method in the FCM program would allow the development of scenario models to improve the company's financial results through the creation of a motivational lever for a stable contingent of staff and their professional growth.

Keywords: fuzzy cognitive maps, scenario modeling, financial results, operating activities, labor productivity, employee turnover, financial performance improvement.

Introduction

In the modern economy, characterized by a high degree of uncertainty, scenario modeling is one of the promising approaches to forecasting. The fundamental difference of this forecasting method from others is that it does not use retrospective extrapolation when developing scenarios, meaning it does not assume that trends observed in the past will continue into the future. At the same time, the possible development of the situation and the occurrence of critical moments, which can only be explained by the past, are studied. Scenario analysis, as a forecasting method, allows for a detailed description of the sequence of events that can, with a given probability, lead to a desired or planned financial state of the enterprise under various development options [1]. The use of scenario modeling as a forecasting method allows, on the one hand, to identify, assess, and reduce the level of uncertainty of key factors affecting both the current activities and the development of the enterprise. On the other hand, scenario modeling can be used to form and evaluate the enterprise's strategy, which is especially valuable in an unstable economic environment [2].

In general, the relevance of the topic of scenario modeling of company financial results amid increasing employee turnover and declining demand for products and services is associated with the need to ensure the stability and quality of the company's operations, as well as to take measures to minimize risks and enhance the efficiency of its activities. Understanding the probabilistic nature of

the influence of various factors will help companies make the right decisions and develop strategies to improve their financial results. Moreover, the implementation of such scenarios allows for more flexible responses to changes in the internal and external environment, contributing to the sustainable development and competitiveness of the company.

Materials and methods

The financial results of companies are determined by a wide range of factors, both internal and external. Priority factors such as operational efficiencies, market conditions, strategic decisions, and technological innovations can significantly influence a company's financial performance. In addition, scenario models are crucial tools used to predict how different variables will interact and affect outcomes in dynamic environments. This literature review discusses the importance of identifying priority factors and using scenario models to understand and forecast the financial dynamics of companies.

Scenario models are tools that help organizations simulate different future environments by varying key assumptions and inputs. These models are essential for understanding how changes in priority factors might affect a company's financial results under various scenarios [3]. Scenario planning allows companies to prepare for uncertain outcomes, such as economic recessions, market shifts, and regulatory changes, by predicting potential impacts on their operations and financial performance [4].

Scenario models are particularly useful in corporate finance for assessing the impact of different strategies and decisions on future performance [5]. For instance, capital investment decisions can be modeled to assess their potential return on investment under various economic conditions. Additionally, companies use scenario models to evaluate the effect of cost-cutting measures, new product launches, and market expansions on profitability [6].

One of the primary applications of scenario models is risk assessment. Companies can use these models to simulate worst-case scenarios, such as an economic downturn or a sudden rise in raw material costs [7, 8]. By identifying and quantifying potential risks, scenario models provide companies with a better understanding of how to mitigate those risks to protect financial performance [9, 10].

The research methodology includes effective theoretical investigation methods such as deduction, hypothetico-deductive and inductive analysis, the use of fuzzy cognitive maps in the FCM program, as well as economic-statistical and factual analysis [11]. Developing scenarios is a creative process that cannot be strictly defined within a formalized procedure. The form, methodology, and calculations are chosen based on the specific characteristics of the research object, the availability of information technologies, the qualifications of the experts involved, and other relevant factors. Key methods for scenario development include the method of references, system diagram method, critical path method, "headline news" method, event cross-impact matrix, Bayesian method, and "logic of possible development" method [8], as well as methods involving fuzzy cognitive maps.

Main Methods of Scenario Modeling:

Passive Scenario – forecasting the development of a situation based on extrapolating existing trends into the future or predicting potential changes.

Active Direct Scenario – Forecasting the development of a situation with a selected set of management actions aimed at realizing the interests of stakeholders.

Active Reverse Scenario – A set of measures aimed at achieving necessary changes in the situation.

The financial performance of companies is shaped by a combination of priority factors such as internal operations, technological advancements, market conditions, and macroeconomic variables. The use of scenario models helps organizations forecast the potential impact of different variables on their financial results, providing valuable insights for decision-making. By incorporating these tools, companies can better prepare for uncertain outcomes and develop strategies to enhance their financial sustainability in the face of changing market conditions.

Results and discussion

Scenario analysis is conducted based on assessments of the situation to justify corresponding plans. Subsequently, decision-makers choose a specific plan as a guiding one based on established

parameters. Scenario modeling, as one of the most effective methods of strategic planning, involves the cognitive component and aims to develop several scenarios for the object's development based on identified trends and patterns. The cognitive component is based on cognitive activities. Figure 1 illustrates a scenario planning model where decisions are made by subjects with specific skills and competencies to achieve effective results.

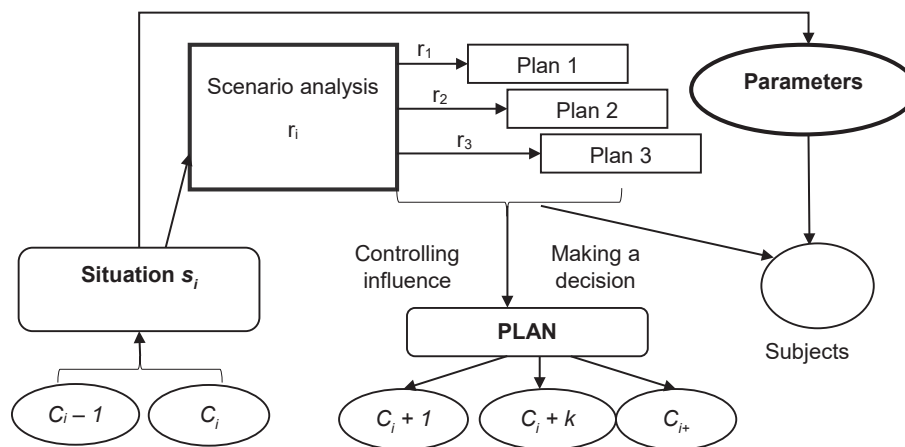


Figure 1 – Scenario planning diagram

Note: Compiled by the authors based on the source [6].

One of the key factors influencing organizational activities is economic conditions. The operational activities of companies heavily depend on the state of the economy in the country or region where they operate [12]. During periods of economic downturn or growth, demand for services can fluctuate. Competitive environment also significantly impacts the operational activities of service companies. A high number of competitors can lead to price reductions in services, which can affect company profitability. Companies will need to develop new marketing strategies and enhance service quality to differentiate themselves from competitors. Among internal factors, the qualifications and professionalism of personnel play a crucial role: the quality of a company's services directly depends on the qualifications and professionalism of its employees. Continuous professional development, providing information on new requirements, and offering training programs are essential [13]. The introduction of new technologies can significantly impact company operations: effective use of software and automated systems can improve business process efficiency and reduce costs. Organizational structure and management systems also influence operational activities: efficient structure and management processes can enhance productivity and efficiency. Adequate financial resources are necessary for the proper conduct of operational activities by service companies. Lack of financial stability may restrict access to resources and services necessary for effective service delivery.

Human capital and its impact on financial results in companies. In any company, human capital plays a crucial role in achieving financial results and ensuring high-quality services [14]. This quality is determined by the level of personnel, a favorable work environment for developing and improving cognitive abilities, work motivation, and justified expectations of employees for the work done.

Assessment of the negative impact of active workforce turnover using the FCM method. To assess the impact of individual factors on financial results, a decision was made to build a model using the Fuzzy Cognitive Mapping (FCM) method. FCM is an analysis method that allows evaluating the degree of interrelation and influence of various factors on the target variable [15].

Using a hypothetico-deductive approach based on the FCM method, a scale of fuzzy indicators and the corridor of this school are established, ranging from -1 to 1. For each factor, an assessment of its interrelationships with other variables was conducted to establish cause-and-effect relationships between factors (table 1) [15].

Table 1 – Definition of Relationships between Variables

№	Variables	Weight	Description
1	Volatility of operating expenses <-> Gross profit of the company	-0.5 (moderate inverse relationship)	Increasing cost volatility can lead to a decrease in gross profit, while decreasing cost volatility can contribute to an increase in gross profit.
2	Absence of large and successful projects and their financing <-> Level of gross revenue from operating activities	-0.7 (strong inverse relationship)	The absence of large and successful projects can significantly reduce gross revenue, whereas the presence of such projects can greatly increase gross revenue.
3	Employee turnover rate and percentage of employees leaving in the first year <-> Business process improvement	-0.6 (moderate inverse relationship)	High turnover rates and a large percentage of employees leaving in the first year can negatively impact business process improvement, while low turnover rates and a small percentage of employees leaving in the first year can contribute to improving business processes.
4	Decrease in demand for services of company X <-> Level of gross revenue from operating activities	-0.8 (strong inverse relationship))	A decrease in demand for services can lead to a reduction in gross revenue, whereas an increase in demand can contribute to an increase in gross revenue.
5	Pricing policy and flexible management tools <-> Operating costs of service delivery	0.4 (moderate direct relationship)	Changes in pricing policies and the use of flexible management tools can affect operating costs, either increasing or decreasing them.
6	Volatility of operating expenses <-> Labor productivity	-0.4 (moderate inverse relationship))	Increasing cost volatility can lead to a decrease in labor productivity, while decreasing cost volatility can contribute to an increase in labor productivity.
7	Employee turnover rate and percentage of employees leaving in the first year <-> Operating costs of service delivery	0.6 (moderate direct relationship)	Increasing turnover rates and the percentage of employees leaving in the first year can lead to an increase in operating costs, while reducing turnover rates and the percentage of employees leaving in the first year can contribute to reducing operating costs.
8	Decrease in demand for services of company X <-> Business process improvement	0.3 (weak direct relationship)	A decrease in demand for services can stimulate a company to seek new ways to optimize its operations and improve business processes, whereas an increase in demand can allow the company to focus on fulfilling current tasks without the need for significant changes in business processes.
9	Pricing policy and flexible management tools <-> Gross profit of the company	-0.7 (strong inverse relationship))	Changes in pricing policies and the use of flexible management tools can significantly impact the company's gross profit, either increasing or decreasing it.
10	Labor productivity <-> Business process improvement	0.5 (moderate direct relationship)	Increasing labor productivity can contribute to improving business processes, whereas decreasing labor productivity may require changes to existing business processes to enhance their efficiency.
Note: Compiled by the authors.			

Analysis of dependencies between operational performance indicators has identified several key relationships that significantly influence its effectiveness. The strongest correlations are observed between the decrease in demand and the level of gross revenue (-0.8), as well as between pricing policies, flexible management tools, and company gross profit (-0.7). These dependencies underscore the importance of adapting pricing policies and cost management to support and increase company profitability. Additionally, there is a moderate direct relationship between employee turnover rate and the percentage of employees leaving in the first year of employment, and operational costs from service delivery (0.6), highlighting the need for developing employee retention strategies to minimize operational costs.

Simultaneously with the cognitive map, a pairwise comparison matrix is compiled in FCM-Expert (figure 2).

Step	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
2	0.6792	0.168	0.4134	0.5744	0.4502	0.525	0.5866	0.7311	0.657	0.3176
3	0.6579	0.0988	0.427	0.7277	0.5456	0.5326	0.5888	0.6113	0.7414	0.0721
4	0.6402	0.0673	0.4532	0.7878	0.5805	0.5361	0.5892	0.8388	0.7635	0.0841
5	0.6474	0.0618	0.4922	0.8033	0.5815	0.5388	0.5843	0.8375	0.7713	0.087
6	0.6468	0.0666	0.4414	0.8068	0.5805	0.5378	0.5855	0.8381	0.7722	0.0875
7	0.6499	0.0653	0.4428	0.8077	0.5802	0.5367	0.5825	0.8378	0.7719	0.0875
8	0.6508	0.0602	0.4456	0.808	0.5803	0.5359	0.5818	0.8373	0.7716	0.0875

Figure 2 – Cognitive map for the base scenario

Note: Compiled by the authors based on FCM Expert program data.

Using the FCM method, data on relationships between different variables were obtained, allowing for the identification of key factors influencing the company's financial activities. The visualization of convergence of factors for the base scenario development is presented in figure 3.

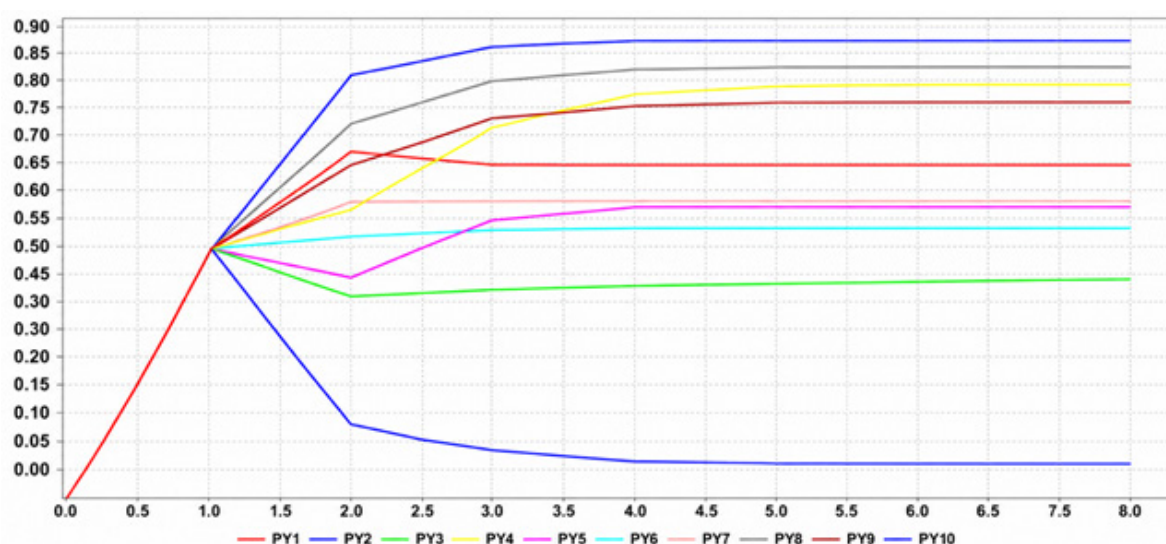


Figure 3 – Visualization of convergence of factors for the base scenario development

Note: Compiled by the authors based on FCM Expert program data.

A detailed analysis of the base scenario results is presented below.

Volatility of operating expenses (C1): this factor starts with neutral influence (0.5) but peaks at the second step (0.6792) and stabilizes around 0.65. This indicates that cost instability can influence other business aspects.

Absence of large and successful projects and their financing (C2): in this case, the influence decreases from 0.5 to 0.06, which may indicate a reduction in the impact of project absence on other indicators. This could be a positive sign for the company.

Employee turnover rate and percentage of employees leaving in the first year of employment (C3): the influence of this factor diminishes over time to around 0.06. This shows that employee turnover has minimal long-term impact on the company's operational activities.

Decrease in demand for company services (C4): the influence of this factor increases over time, reaching around 0.81. This indicates the seriousness of demand reduction and the need to consider this factor in strategic planning.

Pricing policy and flexible management tools (C5): the influence of this factor increases over time and stabilizes around 0.5. This means that pricing policy and management flexibility have a constant impact on the company's operational activities.

Gross revenue from operational activities (C8): the influence of this factor grows over time to around 0.84, indicating a strong and growing influence of gross revenue on the company's financial results.

Company's gross profit (C9) and labor productivity, assessed on a 10-point scale (C10): both factors show similar dynamics with increasing influence, emphasizing their importance for overall financial health of the company.

Thus, building a model using the FCM method allowed for the assessment of negative impacts of individual factors on financial results, the change of which depends on a multitude of factors, including cost volatility, absence of major projects, employee turnover, declining demand for services, pricing policy and management tools, as well as gross revenue and profit. It is important for the company's management to pay attention to these factors and develop strategies to minimize their negative impact. Consequently, the greatest impact on financial results was exerted by the decrease in demand for company services and the level of gross revenue from operational activities. It is also important to note that effective management of personnel and stability in major projects can significantly mitigate the impact of adverse factors on overall financial performance. Therefore, the company should develop and implement effective management strategies focused on increasing demand, improving internal business processes, and adapting to market trends to ensure sustainable development and achieve financial goals.

Results of scenario models for improving financial stability of companies. To select promising directions for improving financial results of the company, scenario modeling was conducted based on four scenarios of development and comparison of their results with the base scenario. The results of each scenario are presented below.

Scenario 1 "Diversification and expansion of service range".

Typically, there is a minimum range of services provided, and the company aims to expand its service portfolio and improve financial results. Within this scenario, it is proposed to create a new direction – services in the field of ECG and sustainable development, which involve the implementation of a complex of environmental, social, and managerial tools to ensure sustainable development of the company. To implement this scenario, market analysis is required to identify customer needs and develop appropriate products and services. Training and certification of specialists in the field of ECG and sustainable development will also be needed, along with establishing partnerships with other companies and organizations specializing in this area. It is important to ensure the availability of necessary resources and infrastructure to support new initiatives. Successful implementation of the project will require continuous monitoring and evaluation of results for timely adjustments. Implementation of this scenario will expand the service portfolio, attract new customers, and improve financial results.

C1: Increase negative weights to revenue (-0.5) and profit (-0.6) due to demand decline.

C2: Reduce revenue–profit weight to 0.5, reflecting lower efficiency.

C5: Decrease impact on productivity to -0.3, reflecting expansion-driven gains.

C6: Increase negative effect on processes to -0.4, highlighting turnover impact.

Simultaneously with the cognitive map in FCM-Expert, a pairwise comparison matrix is compiled for Scenario 1 (figure 4).

Step	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
2	0.5374	0.0998	0.4134	0.5125	0.3894	0.475	0.5866	0.7311	0.657	0.8020
3	0.4538	0.0514	0.4401	0.6149	0.4588	0.4814	0.5983	0.8197	0.7453	0.8412
4	0.4194	0.0417	0.4403	0.6408	0.4597	0.4988	0.609	0.8448	0.7685	0.8510
5	0.3994	0.0402	0.4367	0.6419	0.452	0.4958	0.6145	0.8527	0.7725	0.8518
6	0.393	0.0401	0.4341	0.639	0.4475	0.4993	0.6173	0.8555	0.7775	0.8518
7	0.3898	0.0402	0.4324	0.6367	0.4454	0.5015	0.6199	0.8568	0.7785	0.8517
8	0.3879	0.0403	0.4312	0.6353	0.4445	0.5029	0.62	0.8576	0.779	0.8517
9	0.3867	0.0403	0.4304	0.6344	0.444	0.5038	0.6208	0.858	0.7794	0.8517
10	0.3859	0.0403	0.4299	0.6339	0.4437	0.5044	0.6213	0.8584	0.7796	0.8517

Figure 4 – Pairwise comparison matrix for the first scenario of development

Note: Compiled by the authors based on FCM Expert program data.

Based on the scenario modeling, several general conclusions can be drawn:

ESG services reduced cost volatility; factor C1 dropped to 0.3859. ESG services had minimal effect on project availability; C2 ~0.04. ESG opportunities lowered employee turnover; factor C3 decreased to 0.4299. Resource shift to ESG reduced demand for traditional services; C4 rose to 0.6339. Pricing and flexible management remain critical; factor C5 stable at 0.5044. ESG services slightly increased operating costs; factor C6 rose to 0.5044. ESG services improved business processes and efficiency; C7 increased to 0.6213. Diversification significantly boosted gross revenue; factor C8 reached 0.8584. ESG services supported gross profit growth; factor C9 rose to 0.7796. New directions increased labor productivity sustainably; C10 reached 0.8517. Comparing these results with the base scenario, it can be concluded that the introduction of new ESG services can be an effective way to enhance the company's financial performance.

Scenario 2 “Implementation of Flexible Working Hours Mechanism and Career Growth Package”

Within the second scenario of company development, the implementation of a flexible working hours mechanism and a career growth package for employees is proposed. This initiative aims to attract and retain talented specialists, enhance their motivation and loyalty, and improve the overall work environment. Flexible working hours involve choosing convenient start and end times for the workday, as well as the option to work remotely. This allows employees to more effectively manage their time considering personal circumstances and needs. The career growth package includes free psychologist services for employees, premium bonuses for marriage, gym discounts, and hospital discounts (similar to PwC). Implementing flexible working hours and a career growth package will create more comfortable conditions for employees, increase their motivation and loyalty, and improve the overall team climate.

Considering this “Implementation of Flexible Working Hours Mechanism and Career Growth Package” scenario, the following weight changes were proposed compared to the base scenario:

C1: Reduce cost volatility–productivity link to -0.3, reflecting efficiency gains.

C2: Increase negative impact on processes to -0.3, improving environment efficiency.

C3: Reduce turnover–productivity link to -0.4, reflecting higher motivation.

C4: Increase demand–cost volatility link to 0.8, mitigating demand shocks.

C5: Increase pricing–demand link to 0.5, reducing demand decline impact.

C6: Increase process–turnover link to 0.6, improving retention and efficiency.

C7: Increase productivity–revenue link to 0.6, reflecting higher output.

C8: Increase cost volatility–pricing link to -0.6, improving cost control.

Simultaneously with the cognitive map in FCM-Expert, a pairwise comparison matrix is compiled for Scenario 2 (figure 5).

Step	C ₁	C ₂	C ₃	C ₄	C ₅	C ₆	C ₇	C ₈	C ₉	C ₁₀
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
2	0.5374	0.0871	0.3894	0.4502	0.3894	0.4875	0.5866	0.7311	0.657	0.8022
3	0.4369	0.0456	0.3911	0.5391	0.4699	0.5101	0.6086	0.8257	0.7509	0.8412
4	0.3836	0.0345	0.3762	0.558	0.4714	0.5308	0.629	0.8559	0.7793	0.8521
5	0.3593	0.0329	0.3641	0.5519	0.4613	0.5454	0.6412	0.8673	0.7897	0.8584
6	0.3466	0.0328	0.3585	0.5429	0.4548	0.5547	0.6484	0.8725	0.7943	0.8594
7	0.3391	0.0329	0.3517	0.536	0.4514	0.5608	0.6531	0.8754	0.7968	0.8596
8	0.3343	0.033	0.3486	0.5314	0.4495	0.5648	0.6562	0.8773	0.7984	0.8598
9	0.3311	0.033	0.3465	0.5284	0.4484	0.5675	0.6583	0.8785	0.7995	0.8599
10	0.3291	0.033	0.3451	0.5264	0.4477	0.5693	0.6597	0.8792	0.8002	0.86
11	0.3277	0.033	0.3441	0.5251	0.4473	0.5705	0.6606	0.8798	0.8006	0.8561
12	0.3268	0.033	0.3435	0.5242	0.447	0.5713	0.6612	0.8801	0.8009	0.8561

Figure 5 – Pairwise comparison matrix for the second scenario of company X's development

Note: Compiled by the authors based on FCM Expert program data.

Based on the scenario modeling, several general conclusions can be drawn:

Social programs reduced cost volatility; C1 fell to 0.3268. Minimal impact on attracting major projects; C2 stable near 0.033. Social programs improved retention; turnover C3 decreased to 0.345. Social bonuses mitigated demand decline; C4 slightly reduced to 0.5242. Pricing policies stabilized; C5

decreased to 0.447, supporting revenue stability. Operating costs rose due to program implementation; C6 increased to 0.5713. Business processes improved significantly; C7 increased to 0.6612. Gross revenue grew strongly, reflecting higher loyalty and reputation; C8 reached 0.8801. Gross profit increased, indicating better financial performance; C9 rose to 0.8009. Labor productivity improved due to motivation and conditions; C10 reached 0.8561.

The convergence visualization of factors for the second scenario of company X's development is presented in figure 6.

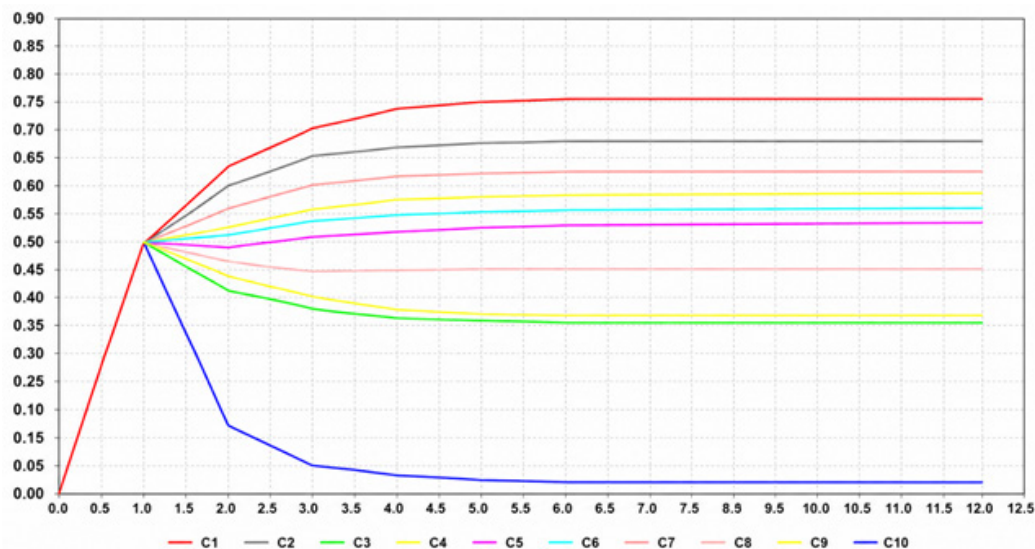


Figure 6 – Convergence visualization of factors for the second scenario of development

Note: Compiled by the authors based on FCM Expert program data.

Comparing these results with the base scenario, it can be concluded that the implementation of social programs and flexible working hours can be an effective way to enhance the company's financial performance, as these programs led to reduced employee turnover, increased gross revenue and profit, and improved labor productivity.

Scenario 3 “Enhancing Company Competitiveness through the Creation of a Forensic Department”.

Within the third development scenario, the company establishes a specialized Forensic department focused on corporate investigations and expert support in legal and financial matters. This unit is staffed with highly qualified professionals in law, finance, accounting, and auditing, capable of conducting complex analyses, processing large datasets, and delivering evidence-based expert conclusions. The creation of the department is expected to expand the company's service portfolio, strengthen its competitive position, and enhance client trust in handling sophisticated legal and financial issues.

In this scenario, several adjustments to the inter-factor weights are proposed. The relationship between gross revenue and the lack of major projects is increased to -0.2, reflecting reduced revenue due to limited large-scale investments. The link between operational costs and declining demand is adjusted to -0.1, acknowledging potential cost pressures. The influence of employee turnover on cost volatility is moderated to -0.3, considering structural changes within the company. The connection between pricing strategy and process improvement rises to 0.6, emphasizing the need for efficiency.

Additionally, the turnover–revenue relationship shifts to 0.1, highlighting possible revenue losses from staff exits. The demand–cost relationship increases to 0.2, while the impact of project availability on revenue improves to -0.4, reflecting growth potential through successful project realization.

Simultaneously with the cognitive map, a pairwise comparison matrix is compiled in FCM-Expert for Scenario 3 (figure 7).

Based on the scenario modeling results, several key conclusions can be drawn. The creation of the Forensic department reduced the volatility of operating costs (C1 decreased from 0.5 to 0.3268), indicating improved cost planning and control. At the same time, its impact on attracting large projects

remained limited (C2 stayed around 0.033). A positive effect was observed in employee retention, as turnover declined (C3 decreased from 0.5 to 0.345).

Step	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
2	0.5374	0.0871	0.3894	0.4502	0.3894	0.4875	0.5866	0.7311	0.657	0.8022
3	0.4369	0.0456	0.3911	0.5391	0.4699	0.5101	0.6086	0.8257	0.7509	0.8412
4	0.3836	0.0345	0.3762	0.558	0.4714	0.5308	0.629	0.8559	0.7793	0.8521
5	0.3593	0.0329	0.3641	0.5519	0.4613	0.5454	0.6412	0.8673	0.7897	0.8584
6	0.3466	0.0328	0.3585	0.5429	0.4548	0.5547	0.6484	0.8725	0.7943	0.8594
7	0.3391	0.0329	0.3517	0.536	0.4514	0.5608	0.6531	0.8754	0.7968	0.8596
8	0.3343	0.033	0.3486	0.5314	0.4495	0.5648	0.6562	0.8773	0.7984	0.8598
9	0.3311	0.033	0.3465	0.5284	0.4484	0.5675	0.6583	0.8785	0.7995	0.8599
10	0.3291	0.033	0.3451	0.5264	0.4477	0.5693	0.6597	0.8792	0.8002	0.86
11	0.3277	0.033	0.3441	0.5251	0.4473	0.5705	0.6606	0.8798	0.8006	0.8561
12	0.3268	0.033	0.3435	0.5242	0.447	0.5713	0.6612	0.8801	0.8009	0.8561

Figure 7 – Pairwise Comparison Matrix for the Third Development Scenario

Note: Compiled by the authors based on the FCM Expert program.

Although demand for traditional services slightly decreased (C4 rose to 0.5242), this decline was less pronounced than in the base scenario due to the added value of new services. Pricing policy became more stable (C5 decreased to 0.447), supporting revenue consistency. However, operational costs increased (C6 to 0.5713) due to implementation expenses.

The department significantly improved business processes (C7 to 0.6612), boosted gross revenue (C8 to 0.8801), and increased gross profit. Labor productivity also rose substantially (C10 to 0.8561), reflecting enhanced motivation and efficiency.

The convergence visualization of factors for the third development scenario is presented in figure 8.

Step	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
2	0.657	0.148	0.4134	0.5744	0.5987	0.525	0.5866	0.7311	0.657	0.8455
3	0.621	0.0684	0.4092	0.7355	0.7395	0.5407	0.6086	0.8243	0.7544	0.9076
4	0.599	0.0499	0.4049	0.7947	0.7648	0.5521	0.6247	0.8523	0.7635	0.9218
5	0.5913	0.0459	0.402	0.8079	0.7669	0.5578	0.6308	0.8603	0.7942	0.9251
6	0.5882	0.0452	0.4003	0.81	0.7667	0.5606	0.6332	0.8628	0.7967	0.9259
7	0.5866	0.045	0.3992	0.8101	0.7666	0.5621	0.6344	0.8637	0.7976	0.9262
8	0.5856	0.045	0.3985	0.8099	0.7666	0.563	0.6351	0.8642	0.7981	0.9262

Figure 8 – Convergence Visualization of Factors for the Third Development Scenario

Note: Compiled by the authors based on Company X data.

Comparing these results with the base scenario, it can be concluded that the implementation of social programs and flexible work schedules can be an effective way to improve the company's financial performance, as the introduction of these programs led to reduced employee turnover, increased gross revenue and profit, as well as improved labor productivity.

Scenario 4 “Creation of a Development Fund through Savings in the Cost Component of Service Delivery”.

Within the fourth development scenario, the company proposes establishing a Development Fund formed through savings in the cost component of service delivery. The primary objective of this fund is to reinvest resources into both organizational growth and employee development. Employees will receive performance-based bonuses tied to achieving key targets, which is expected

to enhance motivation and productivity. Additionally, the fund will support professional development through access to language training, educational platforms, and online courses, thereby strengthening employees' cognitive skills and overall effectiveness.

In this scenario, multiple adjustments to inter-factor relationships are introduced. The link between cost volatility and operational costs is neutralized (from -0.7 to 0), reflecting improved cost control. The relationship between project availability and operational costs is weakened (to -0.1), indicating potential cost reductions through new project inflows. The negative impact of turnover on productivity is reduced (to -0.4), while the effect of declining demand on gross profit is moderated (to -0.6), suggesting improved resilience.

Furthermore, pricing strategy significantly strengthens its influence on gross profit (to 0.8), and the connection between revenue and profit increases to 0.9, highlighting efficiency gains. Business process improvements play a more substantial role in reducing cost volatility and operational costs. At the same time, reduced cost volatility contributes to lower turnover and improved project attraction. Overall, these changes reflect a shift toward greater financial stability, operational efficiency, and sustainable company growth through strategic reinvestment.

Simultaneously with the cognitive map, a pairwise comparison matrix is created in FCM-Expert for Scenario 4 (figure 9).

Step	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
2	0.657	0.148	0.4134	0.5744	0.5987	0.525	0.5866	0.7311	0.657	0.8455
3	0.621	0.0684	0.4092	0.7355	0.7395	0.5407	0.6086	0.8243	0.7544	0.9076
4	0.599	0.0499	0.4049	0.7947	0.7648	0.5521	0.6247	0.8523	0.7635	0.9218
5	0.5913	0.0459	0.402	0.8079	0.7669	0.5578	0.6308	0.8603	0.7942	0.9251
6	0.5882	0.0452	0.4003	0.81	0.7667	0.5606	0.6332	0.8628	0.7967	0.9259
7	0.5866	0.045	0.3992	0.8101	0.7666	0.5621	0.6344	0.8637	0.7976	0.9262
8	0.5856	0.045	0.3985	0.8099	0.7666	0.563	0.6351	0.8642	0.7981	0.9262

Figure 9 – Pairwise Comparison Matrix for the Fourth Development Scenario

Note: Compiled by the authors based on FCM Expert program data.

Based on the scenario modeling results, several general conclusions can be drawn: establishing the development fund led to moderate changes in key indicators. Cost volatility slightly decreased (C1 to 0.4101), suggesting controlled but potentially riskier investments. The impact on attracting large projects remained minimal (C2 $\approx$ 0.0381). Employee turnover declined (C3 to 0.3911), reflecting improved retention. Demand for traditional services decreased (C4 to 0.7423), though less critically than in the base scenario. Pricing policies became more stable (C5 to 0.4339), supporting revenue stability. Operating costs slightly decreased (C6 to 0.5035). Business processes improved (C7 to 0.6666), while gross revenue (C8 to 0.8499), gross profit (C9 to 0.774), and labor productivity (C10 to 0.854) increased significantly.

The convergence visualization of factors for the fourth development scenario of Company X is presented in figure 10.

Compared to the base scenario, establishing the development fund had a positive impact on labor productivity, profit level, and gross revenue, while reducing employee turnover. This suggests that investments in personnel development and process optimization have borne fruit. However, it should be noted that some indicators, such as the lack of major projects and reduced demand for services, may require further analysis and adjustment of the company's development strategy.

Economic effect from the pilot implementation of the results of Company X's study.

Thus, to select the most suitable development scenario for Company X, a comparison was made based on the change in gross profit (factor C9 in the FCM model) for each scenario:

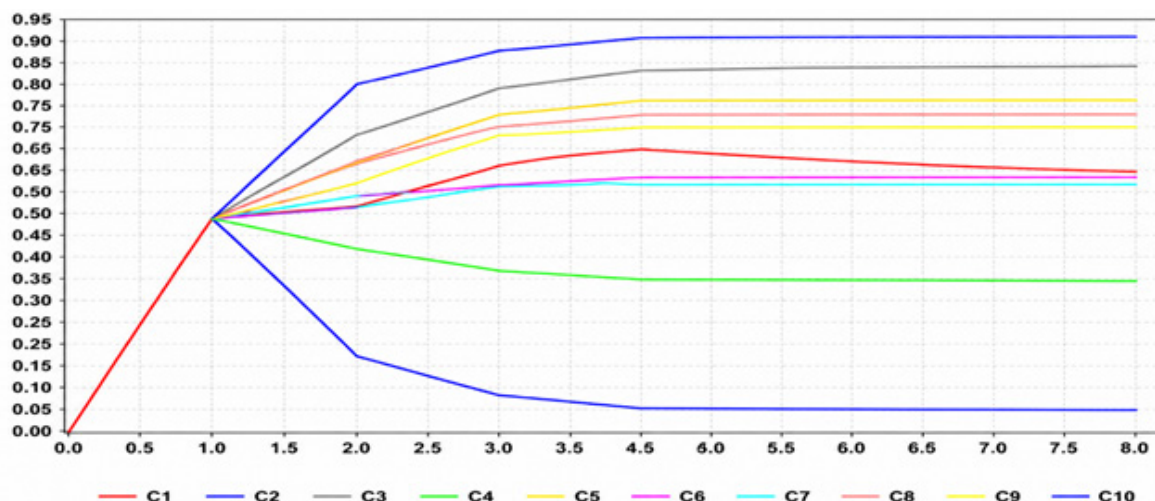


Figure 10 – Convergence Visualization of Factors for the Fourth Development Scenario

Note: Compiled by the authors based on data from Company X.

A comparison of the scenario modeling results shows that Scenario 2 – “Implementation of flexible working hours and a social package for career growth” (0.8009) has the strongest positive impact on financial performance, outperforming diversification (0.7796), the development fund (0.774), and the Forensic department scenario (0.5).

This scenario focuses on increasing organizational flexibility and employee well-being. Flexible work arrangements include reduced working hours, shift-based schedules, and job sharing, while ensuring compliance with monthly workload requirements and service quality standards. Employees are also given autonomy to adjust the start and end of their workday, improving work–life balance and motivation.

To support this approach, the implementation of Workforce Management (WFM) systems is proposed. These systems enable demand forecasting, automated scheduling, real-time monitoring, and productivity analysis, significantly improving operational efficiency and transparency.

Additionally, enhancements to the social package – such as psychological support, milestone bonuses, and health-related benefits – contribute to higher employee satisfaction, reduced turnover, and increased productivity.

Overall, Scenario 2 demonstrates the most sustainable and impactful pathway for improving both financial results and organizational performance. Such measures can increase employee satisfaction with their work and life, as well as strengthen their loyalty to the company.

However, it should be noted that the implementation of these changes will require additional costs, so it is necessary to analyze the budget and determine how justified these measures are in terms of the financial capabilities of the company.

The estimated costs of implementing the proposed recommendations are presented in table 2.

Table 2 – Calculation of costs for implementing proposed recommendations

№	Name of the costs	Amount per year, thousands of tenge
1	Cost of the WFM system for creating flexible work schedules (using the Naumen WFM cloud platform as an example)	1 800
2	Psychologist services (forecasting 20 employees’ visits to a psychologist an average of 5 times a year at a cost of 12,000 tenge)	1 200
3	Employee bonuses on special occasions (forecast for 30 employees and a bonus amount of 150,000 tenge)	4 500
4	Payment for gym memberships	1 500
5	Payment for gym memberships	1 500
6	Total expenses	10 500

Note: Compiled by the authors based on their own research and sources [16, 17].

The economic efficiency of implementing the proposed measures in Company X was subsequently assessed. The main expected economic effects are as follows:

Flexible working arrangements significantly enhance productivity by reducing commuting time, enabling longer effective working hours, and improving concentration due to fewer office distractions. Remote work also increases employee satisfaction, which positively affects efficiency and overall company performance. Organizations offering flexible schedules are more attractive to highly qualified professionals, improving talent acquisition and retention. Additionally, flexible planning within a standard 40-hour workweek helps optimize overtime costs. Overall, such practices strengthen employee engagement, increase job satisfaction, and contribute to sustainable improvements in both individual and organizational productivity.

The impact of the proposed measures on the company's financial results was assessed using the forecast financial statement presented in table 3.

Table 3 – Forecast Financial Results Report, thousands of tenge

№	Indicators	2025	Forecast year	Change for 2020–2024	
				thousands of tenge	%
1	Revenue	375 171	412 688	37 517	10,0
2	Cost of goods sold	200 545	210 572	10 027	5,0
3	Gross profit	174 626	202 116	27 490	15,7
4	Other expenses	126 162	136 662	10 500	8,3
5	Profit (loss) before tax	48 464	65 454	16 990	35,1
6	Corporate income tax expense	14 392	13 091	-1 301	-9,0
7	Profit (loss) for the year	34 072	52 363	18 291	53,7

Note: Compiled by the authors based on Company X data [16, 17].

Thus, the forecast expectations suggest that increasing labor productivity will contribute to a minimal revenue increase of 10%, whereas the cost amount (cost of goods sold) will only increase by 5% due to optimizing employee work, reducing payments for overtime work and working on weekends. The costs of implementing the proposed measures were included in the other expenses item, which increased by 35.1%. As a result, it can be noticed that the amount of Company X's net profit will increase to 52 million tenge or will give an increase of 18.3 million tenge. From here it follows that the introduction of the mechanism of flexible working hours and the expansion of the social package

Conclusion

The conducted study allowed us to draw the following conclusions: scenario models are an important tool for analyzing and forecasting the development of various systems and processes. They enable the identification of causal relationships between different factors, determine possible development scenarios, and select the optimal course of action. There are numerous methods and technologies for creating scenario models that take into account various aspects of the studied system, facilitating more accurate forecasts. Operational activities of service companies are influenced by external and internal factors, and successful management requires regular monitoring by the company.

Human capital plays a crucial role and directly influences their financial results. The selection and development of competent employees, their motivation and professionalism, as well as investments in their training and development, all contribute to improving the quality of services provided and the company's success. Human resource management systems in companies are shaped by the unique characteristics of the service market and labor market specifics. The limited target segment of the labor market is due to high requirements for the intellectual, creative, and personal qualities of specialists. Nevertheless, the process of personnel management in companies must be comprehensive, coordinated, and dynamic, aimed at strengthening the company's positions both nationally and internationally.

The study was conducted based on data from Company X. The company is a professional consultant in various business sectors, providing personnel, legal, tax, and management consulting

services, conducting asset valuation, and offering accounting outsourcing services. The company helps its clients effectively manage their businesses, minimize risks, and enhance their value. Thanks to the experience and professionalism of its employees, the company holds a strong position in the consulting services market and continues to expand its range of business solutions. Analysis of the financial and economic indicators for 2023 showed a deterioration in the company's financial condition compared to 2020. One of the key issues is the decrease in labor productivity amid increasing wage costs, indicating shortcomings in the employee incentive and motivation system. Building a model using the FCM method helped assess the negative impact of individual factors on the company's financial performance. Overall, the analysis results demonstrate that the financial performance of the company depends on a multitude of factors, including cost volatility, lack of major projects, employee turnover, declining demand for services, pricing policies and management tools, gross revenue, and profit. It is important for companies to focus on these factors and develop strategies to minimize their negative impact and reduce risks. As a result, it can be concluded that the greatest impact on the financial results of the research subject was caused by the decline in demand for the company's services and the level of gross revenue from operational activities. In order to select promising directions for improving the company's financial results, scenario modeling was conducted:

- ◆ Scenario 1 “Diversification and expansion of services”
- ◆ Scenario 2 “Implementation of flexible working hours and a social package for career growth”
- ◆ Scenario 3 “Enhancing competitiveness through the establishment of a specialized Forensic department”
- ◆ Scenario 4 “Establishing a development fund through cost savings on service delivery”.

Upon comparing the obtained results, it can be observed that Scenario 2 “Implementation of flexible working hours and a social package for career growth” has the greatest impact on financial results. Implementing flexible working hours and expanding the social package for company employees aimed at supporting career growth represents a strategically important decision capable of significantly influencing the financial performance of the company. Flexible working hours contribute to increased employee satisfaction, reduced turnover, and improved working atmosphere, which in turn leads to increased productivity and the quality of services provided. The social package, including additional benefits and opportunities for professional and personal development, enhances employee loyalty and motivates them to achieve better results. Economic efficiency analysis showed that such measures can lead to an increase in gross revenue and gross profit for the company by increasing employee motivation and satisfaction, as well as by improving the quality of services provided. Furthermore, reducing turnover and increasing labor productivity can lead to a reduction in operating costs and overall company efficiency. It is also worth noting that investments in employee development contribute to strengthening corporate culture and employee loyalty.

REFERENCES

- 1 Meadows D.H. Thinking in Systems: A Primer / D.H. Meadows. White River Junction: Chelsea Green Publishing, 2008. 211 p.
- 2 Senge P.M. The Fifth Discipline: The Art and Practice of the Learning Organization / P.M. Senge. New York: Doubleday, 2006. 445 p.
- 3 Kahneman, D. Prospect theory: An analysis of decision under risk / D. Kahneman, A. Tversky // *Econometrica*. 1979. Vol. 47. No. 2. P. 263–291.
- 4 Schoemaker P. Scenario planning: a tool for strategic thinking / P. Schoemaker. ResearchGate: URL: https://www.researchgate.net/publication/220042263_Scenario_Planning_A_Tool_for_Strategic_Thinking
- 5 Епитроп В.Д. Сценарное планирование специальных мероприятий и его особенности // В сборнике: Практический маркетинг. Материалы IV международной студенческой научно-практической конференции. Ответственный редактор И.Л. Сурат. – Москва, 2019. – С. 379–381.
- 6 Bishop P., Hines A., Collins T. The current state of scenario development: An overview of techniques. The current state of scenario development: An overview of techniques. URL: https://www.researchgate.net/publication/228623754_The_current_state_of_scenario_development_An_overview_of_techniques
- 7 Bradfield R., Wright G. The origins and evolution of scenario techniques in long range business planning. URL: <https://core.ac.uk/download/pdf/22862852.pdf>

- 8 Wright G., Cairns G. Scenario thinking. Practical approaches to the future. URL: https://www.researchgate.net/publication/309458472_Scenario_Thinking_Practical_approaches_to_the_future
- 9 Godet M. Creating futures. Scenario planning as a strategic management tool. URL: https://issuu.com/asap1/docs/creating_futures_scenario_planning_strategic_mana
- 10 Bradfield R., Wright G. The origins and evolution of scenario techniques in long range business planning. URL: <https://core.ac.uk/download/pdf/22862852.pdf>
- 11 Веб-инструмент для моделирования нечетких когнитивных карт / Е. Папагеоргиу, К. Папагеоргиу, З. Дикопулу, А. Моухрир // BYU ScholarsArchive: [сайт]. – 2018. URL: <https://scholarsarchive.byu.edu/iemssconference/2018/Stream-C/73>
- 12 Шагеев Д.А. Методы принятия управленческих решений и методы исследования в менеджменте: учебник / Д.А. Шагеев. – Москва: КноРус, 2021. – 301 с.
- 13 Егоршин А.П. Эффективный менеджмент организации: учебное пособие / А.П. Егоршин. – Москва: ИНФРА-М, 2021. – 388 с.
- 14 Борщ Л.М., Жарова А.Р. Методология развития человеческого капитала с позиций цифровой экономики // Креативная экономика. – 2019. – Том 13. № 11. – С. 2141–2158.
- 15 Petukhova A.V., Kovalenko A.V. Methods for forecasting the development of complex systems using the theory of fuzzy cognitive map // Computational Mathematics and Information Technologies. – 2022. – Т. 1. – № 2. – С. 81–95.
- 16 Депозитарий финансовой отчетности Министерства финансов Республики Казахстан: официальный интернет-ресурс. URL: <https://opi.dfo.kz/p/ru/DfoAuditors/objects/teaser-view/143273>
- 17 Grant Thornton Kazakhstan: официальный сайт компании. – Раздел «Консалтинг». URL: <https://www.grantthorntonkz.com/service/advisory/>

REFERENCES

- 1 Meadows D.H. (2008) Thinking in Systems: A Primer / D.H. Meadows. White River Junction: Chelsea Green Publishing. 211 p. (In English)
- 2 Senge P.M. (2006) The Fifth Discipline: The Art and Practice of the Learning Organization / P.M. Senge. New York: Doubleday. 445 p. (In English)
- 3 Kahneman, D. (1979) Prospect theory: An analysis of decision under risk / D. Kahneman, A. Tversky // Econometrica. Vol. 47. No. 2. P. 263–291. (In English)
- 4 Schoemaker P. Scenario planning: a tool for strategic thinking / P. Schoemaker. ResearchGate: URL: https://www.researchgate.net/publication/220042263_Scenario_Planning_A_Tool_for_Strategic_Thinking (In English)
- 5 Epitrop V.D. (2019) Scenarnoe planirovanie special'nyh meroprijatij i ego osobennosti // V sbornike: Prakticheskij marketing. Materialy IV mezhdunarodnoj studencheskoj nauchno-prakticheskoy konferencii. Otvetstvennyj redaktor I.L. Surat. Moskva. P. 379–381. (In Russian)
- 6 Bishop P., Hines A., Collins T. The current state of scenario development: An overview of techniques. The current state of scenario development: An overview of techniques. URL: https://www.researchgate.net/publication/228623754_The_current_state_of_scenario_development_An_overview_of_techniques (In English)
- 7 Bradfield R., Wright G. The origins and evolution of scenario techniques in long range business planning. URL: <https://core.ac.uk/download/pdf/22862852.pdf> (In English)
- 8 Wright G., Cairns G. Scenario thinking. Practical approaches to the future. URL: https://www.researchgate.net/publication/309458472_Scenario_Thinking_Practical_approaches_to_the_future (In English)
- 9 Godet M. Creating futures. Scenario planning as a strategic management tool. URL: https://issuu.com/asap1/docs/creating_futures_scenario_planning_strategic_mana (In English)
- 10 Bradfield R., Wright G. The origins and evolution of scenario techniques in long range business planning. URL: <https://core.ac.uk/download/pdf/22862852.pdf> (In English)
- 11 Veb-instrument dlja modelirovanija nechetkih kognitivnyh kart / E. Papageorgiu, K. Papageorgiu, Z. Dikopulu, A. Mouhrir // BYU ScholarsArchive: [sajt]. 2018. URL: <https://scholarsarchive.byu.edu/iemssconference/2018/Stream-C/73> (In Russian)
- 12 Shageev D.A. (2021) Metody prinjatija upravlencheskih reshenij i metody issledovanija v menedzhmente: uchebnyk / D.A. Shageev. Moskva: KnoRus. 301 p. (In Russian)
- 13 Egorshin A.P. (2021) Jefferktivnyj menedzhment organizacii: uchebnoe posobie / A.P. Egorshin. Moskva: INFRA-M. 388 p. (In Russian)

14 Borshh L.M., Zharova A.R. (2019) Metodologija razvitija chelovecheskogo kapitala s pozicij cifrovoj jekonomiki // Kreativnaja jekonomika. Vol. 13. No. 11. P. 2141–2158. (In Russian)

15 Petukhova A.V., Kovalenko A.V. (2022) Methods for forecasting the development of complex systems using the theory of fuzzy cognitive map // Computational Mathematics and Information Technologies. Vol. 1. No. 2. P. 81–95. (In English)

16 Depozitarij finansovoj otchetnosti Ministerstva finansov Respubliki Kazahstan: oficial'nyj internet-resurs. URL: <https://opi.dfo.kz/p/ru/DfoAuditors/objects/teaser-view/143273> (In Russian)

17 Grant Thornton Kazakhstan: oficial'nyj sajt kompanii. Razdel «Konsalting». URL: <https://www.grantthorntonkz.com/service/advisory/> (In English)

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БЕЛГІСІЗДІК ЖАҒДАЙЫНДА КОМПАНИЯНЫҢ ҚАРЖЫЛЫҚ НӘТИЖЕЛЕРІН СЦЕНАРИЙЛІК МОДЕЛЬДЕУ: СТРАТЕГИЯЛЫҚ ШЕШІМДЕР ҚАБЫЛДАУҒА АРНАЛҒАН АНЫҚ ЕМЕС КОГНИТИВТІК КАРТАЛАРҒА НЕГІЗДЕЛГЕН ТӘСІЛ

Андапта

Экономикалық белгісіздіктің күшеюі жағдайында компанияларға қаржылық нәтижелерді болжауға және стратегиялық шешімдер қабылдауды қолдауға мүмкіндік беретін икемді құралдар қажет. Анық емес когнитивтік карталар негізгі бизнес-факторлар арасындағы күрделі себеп-салдарлық байланыстарды талдау негізінде сценарийлік модельдеуді жүзеге асыруға мүмкіндік береді. Осы мақаланың мақсаты – анық емес когнитивтік карталар (FCM) әдісін қолдану арқылы сценарийлік модельдеу негізінде компаниялардың қаржылық нәтижелеріне басым факторлардың әсерін анықтау. Қойылған мақсатқа қол жеткізу үшін компанияның қаржылық қызметінің теориялық аспектілері мен олардың жіктелуі зерделенді. Зерттелетін компанияның операциялық қызметі ақша ағындарының динамикасына әсер ететін саясат пен факторларды талдау негізінде қарастырылды. Сонымен қатар, кадрлар қозғалысының жоғары қарқындылығы мен қызметкерлер ауысымдылығының компанияның қаржылық нәтижелеріне теріс әсеріне талдау жүргізілді. Зерттеудің күтілетін нәтижесі – теріс факторлардың ықпалын төмендетуге және компанияның қаржылық нәтижелерін жақсартуға бағытталған сценарийлік модельдер негізіндегі практикалық тұжырымдаманы әзірлеу. Сценарийлік модельдер негізінде жасалған аналитикалық болжам нәтижесінде экономикалық әсер айқындалып, зерттеу объектісін қаржылық сауықтыру мүмкіндігі туралы гипотеза расталды. Жұмыс гипотезасы ретінде FCM бағдарламасында анық емес когнитивтік карталар әдісі арқылы анықталған негізгі факторлардың ықпалын төмендету қызметкерлер құрамының тұрақтылығын қамтамасыз етуге және олардың кәсіби өсуін ынталандыруға бағытталған мотивациялық тетіктерді қалыптастыру есебінен компанияның қаржылық нәтижелерін жақсартуға мүмкіндік беретін сценарийлік модельдерді әзірлеуге негіз болады деген болжам ұсынылды.

Тірек сөздер: анық емес когнитивтік карталар, сценарийлік модельдеу, қаржылық нәтижелер, операциялық қызмет, еңбек өнімділігі, кадрлар ауысымдылығы, қаржылық көрсеткіштерді жақсарту.

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СЦЕНАРНОЕ МОДЕЛИРОВАНИЕ ФИНАНСОВЫХ РЕЗУЛЬТАТОВ КОМПАНИИ В УСЛОВИЯХ НЕОПРЕДЕЛЕННОСТИ: ПОДХОД НА ОСНОВЕ НЕЧЕТКИХ КОГНИТИВНЫХ КАРТ ДЛЯ СТРАТЕГИЧЕСКОГО ПРИНЯТИЯ РЕШЕНИЙ

Аннотация

В условиях растущей экономической неопределенности компаниям требуются гибкие инструменты для прогнозирования финансовых результатов и поддержки стратегических решений. Нечеткие когнитивные карты позволяют моделировать сценарии путем анализа сложных причинно-следственных связей между ключевыми бизнес-факторами. Целью данной статьи является определение влияния приоритетных факторов на финансовые результаты компаний с помощью сценарного моделирования с использованием метода нечетких когнитивных карт (FCM). Для достижения поставленной цели были изучены теоретические аспекты финансовой деятельности компании и их классификация, проведено изучение операционной деятельности исследуемой компании посредством анализа политики и факторов, влияющих на динамику денежных потоков, проведен анализ негативного влияния активного перемещения персонала на финансовые результаты. Ожидаемым результатом является разработка прагматичной концепции на основе сценарных моделей для снижения негативных факторов и улучшения финансовых результатов компании. На основе аналитического прогноза, основанного на сценарных моделях, был определен экономический эффект и подтверждена гипотеза о финансовом оздоровлении объекта исследования. В качестве рабочей гипотезы была выдвинута версия о том, что снижение влияния ключевых факторов, выявленных с помощью метода нечетких когнитивных карт в программе FCM, позволило бы разработать сценарные модели для улучшения финансовых результатов компании за счет создания мотивационного рычага для стабильного контингента сотрудников и их профессионального роста.

Ключевые слова: нечеткие когнитивные карты, сценарное моделирование, финансовые результаты, операционная деятельность, производительность труда, текучесть кадров, повышение финансовых показателей.

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