

Managing Weak Signals In The Foreign Economic Activity of a Modern Enterprise: Preventing a Decrease in the Financial and Economic Security with a Strategic Approach to Solving the Problem

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Abstract

The main purpose of the article is to create a system for responding to weak signals in the foreign economic activity of a modern enterprise. The scientific task is to form models of response and management of weak signals in the foreign economic activity of a modern enterprise, in the context of preventing a decrease in the financial and economic security of the enterprise. The proposed approach is based on the use of methods of DFD and functional modeling. As a result, two key models were formed: the first is the main model of management decision-making in the system of responding to weak signals and the second is the management functions for responding to weak signals. Our research makes an innovative contribution by integrating DFD and functional modeling methodologies to develop comprehensive models that provide deeper and more effective understanding of managerial decision-making in the context of responding to weak signals in a dynamic foreign economic environment.

Keywords: Enterprise, Weak Signals, Threats, Strategic Planning, Functional Models, Business Environment, Management

INTRODUCTION

In the rapidly changing modern economic world, responding to weak signals is becoming an integral part of strategic enterprise management. Weak signals, as early indicators of changes in the external economic environment, may indicate future opportunities or threats, and their timely identification and analysis is key to supporting the financial and economic security of enterprises.

The essence of weak signal response is the ability of organizations to quickly recognize and interpret minor changes in the external environment that may precede more significant events or trends. This includes monitoring various sources of information, data analysis and flexible decision making.

The problem is the difficulty of identifying and correctly interpreting these signals, since they are often unclear and ambiguous. Businesses must develop effective mechanisms to identify and process this information, taking into account its specific nature and potential business impact.

The promise of responding to weak signals lies in the ability of businesses to quickly adapt to change, avoid potential risks and seize new opportunities. This helps strengthen financial stability and create competitive advantages.

However, there are a number of challenges associated with responding to weak signals, such as determining their relevance, integrating information from different sources, and managing large volumes of data. In addition, a culture of continuous learning and innovation is needed to allow organizations to be flexible and open to change.

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In general, responding to weak signals in foreign economic activity is a complex but extremely important aspect of managing a modern enterprise. Considering these factors can help businesses strengthen their position in the market and ensure a sustainable future.

Failure to pay attention to weak signals can lead to significant risks to the financial stability of enterprises. Accordingly, it is important to develop effective mechanisms for their identification and analysis in order to timely adapt the strategies and tactics of the enterprise. Particular attention in this context should be paid to monitoring the external environment, which allows you to quickly respond to changes, reducing potential risks.

The purpose of the study is to consider various aspects of responding to weak signals in the context of foreign economic activity of modern enterprises. We analyze how early identification and correct interpretation of these signals can help enterprises prevent a decline in their financial and economic security.

The focus will be on identifying strategies to not only identify weak signals, but also effectively incorporate them into the strategic planning process. In this case, special attention is paid to determining the role and significance of information systems in the process of monitoring and analyzing these signals.

The main purpose of the article is to create a system for responding to weak signals in the foreign economic activity of a modern enterprise.

LITERATURE REVIEW

In today's dynamic business environment, where change and uncertainty are the norm, responding to weak signals has become a critical component of strategic management. Identification and analysis of such signals allows enterprises not only to prevent possible crisis situations, but also opens the way to new opportunities and competitive advantages. However, given the ever-changing nature of markets and technologies, old approaches to analysis may no longer be relevant. Therefore, a primary study of the literature in this area is a necessary step to identify emerging trends, identify shortcomings and gaps in existing approaches, and create new models and strategies that address contemporary challenges and opportunities. Such an analysis will allow not only to maintain the competitiveness of enterprises in the global market environment, but also to become leaders in introducing innovations and developing new approaches to strategic management.

Thus, a study by Sylkin et al. (2018) focuses on assessing the financial security of engineering enterprises, which is an important aspect when implementing crisis management. The authors analyze practical aspects that make it possible to identify potential financial risks and prevent them.

Similar study by Vovk et al. (2018). This article examines the impact of economic and mathematical modeling on increasing the competitiveness of an enterprise through modernization. Simulation is used as a tool to improve the effectiveness of strategic planning, which is key to your topic.

Al Azzam (2019) discusses the adequacy of international cooperation in combating cybercrime and ways to modernize it. This is important for understanding how external factors, such as cybercrime, can affect the financial and economic security of enterprises.

While Krigsholm & Riekkinen (2019) consider the application of text mining to identify future signals in the field of land management. This shows how data processing technologies can be used to detect weak signals, which may be relevant for detecting external economic threats.

An interesting study by Danylkiv et al. (2019). The authors study the financial management of wholesale and retail trade enterprises. They analyze management strategies that can help businesses avoid financial risks and maintain stability.

While Zhao et al. (2023) offer a systematic literature review on the identification and evolution of weak signals for corporate foresight. This study directly addresses our topic by analyzing methods and approaches for identifying weak signals that can influence strategic planning.

A study by Borutska et al. (2023) focuses on the implementation of modeling techniques to formulate change management strategies in enterprise sustainability systems. This is important for understanding how businesses can adapt to external changes using a strategic approach.

In a study by Griol-Barres et al. (2020), the authors developed a system based on text mining and natural language processing to identify weak future signals. This research is important for understanding how data technologies can be used to identify external economic threats and opportunities.

While Kwon et al. (2018) analyze weak signals of industry convergence using product and service information from global listed companies, with a focus on industry driving economic growth in South Korea. This study shows how weak signals can be analyzed to identify future trends in industries.

Alazam et al. (2023) examines the formation of an innovative model for the development of e-commerce as part of ensuring the economic security of business. This highlights the importance of innovation and digital technologies in strategically responding to external changes.

Similar study by Ilyash et al. (2021), which focuses on performance models of trading enterprises under conditions of economic growth. The authors analyze how different management approaches can influence the success of enterprises in changing economic conditions.

However, there are a number of gaps in the literature according to the issues of the article (Fig. 1).

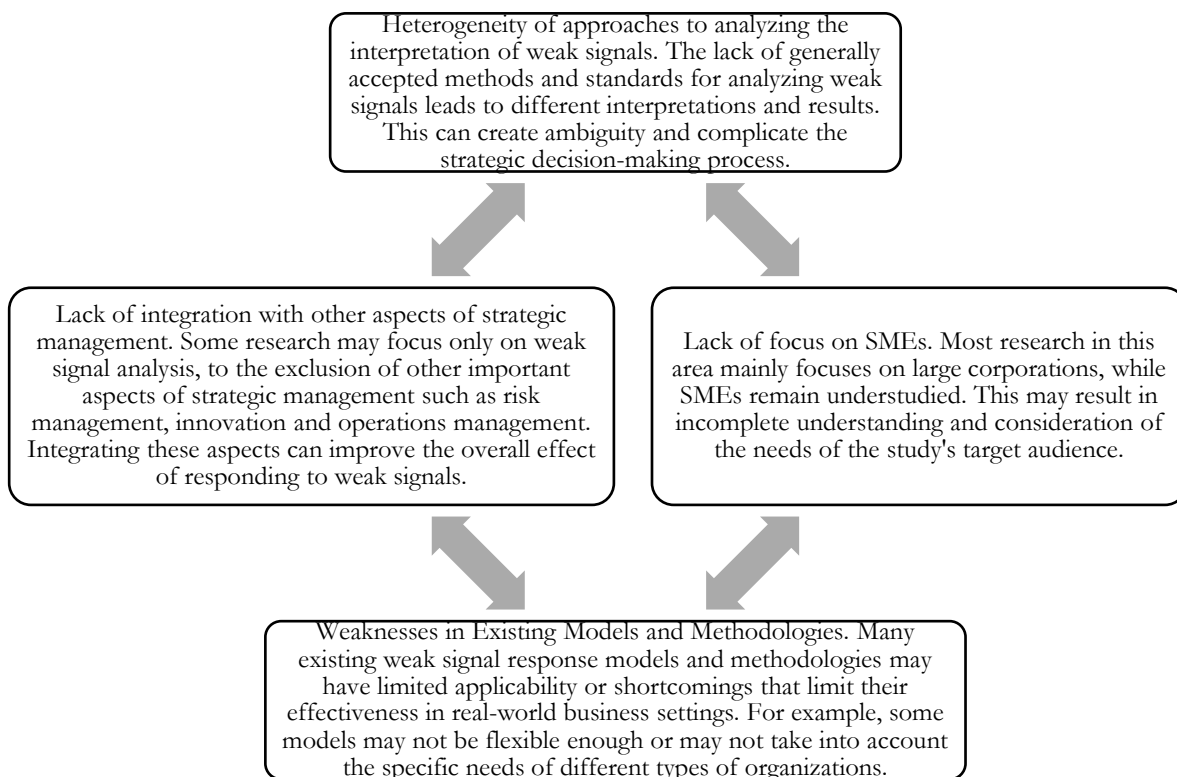


Figure 1. The main gaps in the literature according to the issues of the article

Despite the significant amount of available research in the field of responding to weak signals in foreign economic activity, there are significant gaps that require further study and clarification. One of the main problems is the heterogeneity of approaches to the analysis and interpretation of weak signals, which can lead to ambiguous results and incorrect strategic decisions. In addition, there are shortcomings in existing models and methodologies that may limit their applicability in real-world business settings. It should also be noted that many studies in this area are mostly focused on large corporations, while small and medium-sized enterprises

remain understudied. Given the rapid changes in today's business environment, it is important to explore and develop new approaches that take into account all aspects and needs of different types of organizations to ensure their sustainability and success in the future.

METHODOLOGY

The research methodology includes a number of methods. The Functional Data Flow Diagram (FDD) method is used to visualize the flow of data and interactions between different elements of a system. This method provides a clear picture of how data moves within a system, allowing you to identify the sources, destinations, and changes of data at different stages. In the context of responding to weak signals, DFD helps to identify how external influences can be transmitted through different processes in an organization.

The main advantage of the DFD method is its ability to clearly visualize relationships and data flows, which helps business management understand how weak signals can be integrated into the decision-making process. This facilitates better analysis and assessment of the potential impact of these signals on the enterprise's activities. However, the method has certain limitations, in particular the difficulty of managing large and complex systems, as well as the possibility of losing broader context when focusing on individual data streams.

Functional modeling, on the other hand, focuses on the analysis and design of system functions. It determines which functions are necessary to achieve the organization's goals and creates a structured model of these functions. In the context of responding to weak signals, this approach helps in developing a systematic approach to identifying, analyzing and responding to these signals.

The benefit of functional modeling is its ability to structure decision making and change management processes. It also helps improve coordination between different departments and functions within the enterprise. However, this method can be difficult to perform as it requires a deep understanding of all aspects of the system and also depends on the accuracy of the input data for effective analysis.

Combining these two methods can bring significant benefits in the context of responding to weak signals. Using DFD provides a clear understanding of data flows and their interactions, while functional modeling helps optimize the functional design to more effectively detect and respond to these signals.

The application of these methods within the framework of weak signal response research allows enterprises to create an effective, flexible and adaptive control system that quickly responds to changes in the external environment. This not only provides increased financial and economic security, but also contributes to the development of competitive advantages in an unpredictable and dynamic business environment.

RESULTS AND DISCUSSIONS

Within the framework of the DFD (Data Flow Diagram) methodology, the first step is defined, which consists in the formation of the first basic model for making management decisions. This model reflects the key stages and processes that occur when responding to weak signals in the foreign economic activity of an enterprise. The first main model acts as a basic framework that provides a general understanding of how the various components and processes interact in this context. At the same time, an important aspect is to ensure that the level of financial and economic security of the enterprise is not reduced, which is a key task in the context of a strategic approach to responding to weak signals.

After the formation of the first basic model of management decision-making, further development of the methodology involves a more in-depth study of each of the three stages of responding to weak signals. Carrying out analysis and identifying key processes and relationships in this model will allow us to clarify and supplement it, making it more accurate and adapted to the specific needs of the enterprise. At the same time, it is necessary to constantly improve response strategies taking into account ensuring the financial stability and economic security of the enterprise.

Further, the use of DFD to model response processes to weak signals will allow the enterprise to obtain a tool for analyzing and optimizing its strategy in conditions of uncertainty and changes in the external environment. This methodology allows for a systematic approach to developing and improving strategic decisions, providing

the enterprise with greater flexibility and compliance with changes in the market, taking into account maintaining and increasing the level of financial and economic security.

Thus, Fig. 2 shows the main model of management decision-making in the system of responding to weak signals in the foreign economic activity of a modern enterprise in the context of preventing a decrease in financial and economic security.

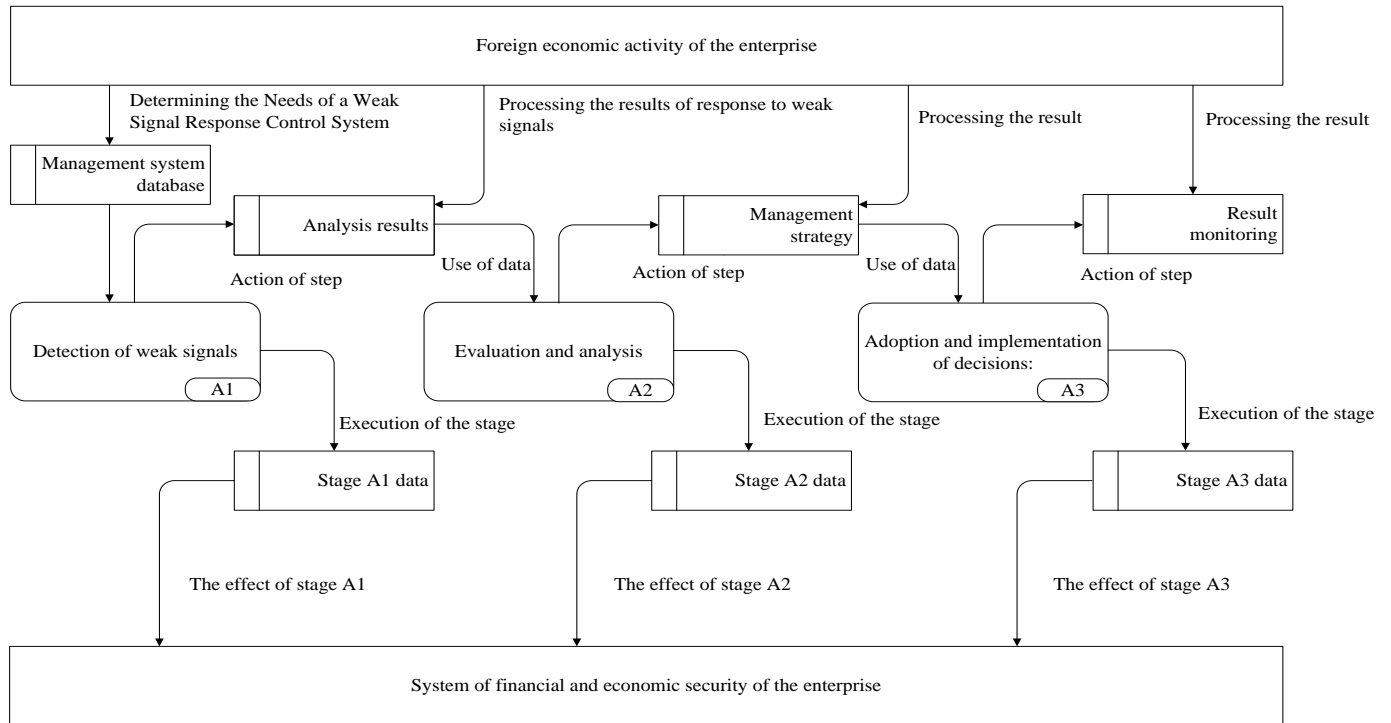


Figure 2. The main model of management decision-making in the system of responding to weak signals in the foreign economic activity of a modern enterprise economic security

Let's look at each stage in more detail.

A1. Identifying weak signals. At the first stage, it is important to systematically monitor the external environment in order to promptly identify potentially important but unobvious changes. This may include analyzing market trends, monitoring competitors, studying legislation and political context. Conducting this analysis allows the company to recognize signals that may affect financial and economic stability. For example, changes in legislation or changes in consumer demand may be signals that should be carefully considered.

Once weak signals are detected, it is important to systematically document them and classify them according to their potential impact and importance. This allows the enterprise to maintain a systematic database of potential risks and opportunities. This approach allows for an objective assessment and preparation for further analysis and decision-making. An important part of this phase is also the implementation of a signal response system, which involves identifying responsible individuals and procedures for responding to detected signals in the most effective way.

A2. Assessment and analysis. Once weak signals are detected, they must be assessed and analyzed to determine the potential impact on the financial and economic stability of the enterprise. This process may include conducting a SWOT analysis to identify strengths, weaknesses, opportunities and threats. It is then important to carefully examine the possible consequences of these changes and determine the optimal response strategies. For example, if identified changes may have a negative impact on financial stability, the enterprise may consider implementing additional protection measures or resource reservation.

An additional component of this stage is also an analysis of the competitive environment and an assessment of the actions of competitors in response to the same weak signals. This helps the company avoid negative consequences and identify opportunities for growth and development.

A3. Making and implementing decisions. At this stage, the enterprise develops and implements a strategy to respond to identified weak signals in order to maintain and increase the level of financial and economic security. This may include the development of new financial strategies, the establishment of additional controls or the introduction of other protection measures. It is important to consider not only the current situation, but the possible consequences of these decisions in the future. For example, if a weak signal indicates a likely decline in demand for a product, the company may consider reducing production size or diversifying its product line.

Decision making at this stage requires care and analysis. In addition, it is important to ensure appropriate implementation of the chosen strategies, including staff training, changes to processes and management systems. This will help ensure the effective implementation of strategies and provide the enterprise with an optimal level of financial and economic security. In particular, an enterprise can develop a plan of measures to monitor and control the implementation of decisions made, as well as evaluate their effectiveness to further improve management strategies.

The next stage will be the formation of a model for implementing management functions to respond to weak signals in the foreign economic activity of a modern enterprise in the context of preventing a decrease in financial and economic security with a strategic approach to solving the problem (Fig.3).

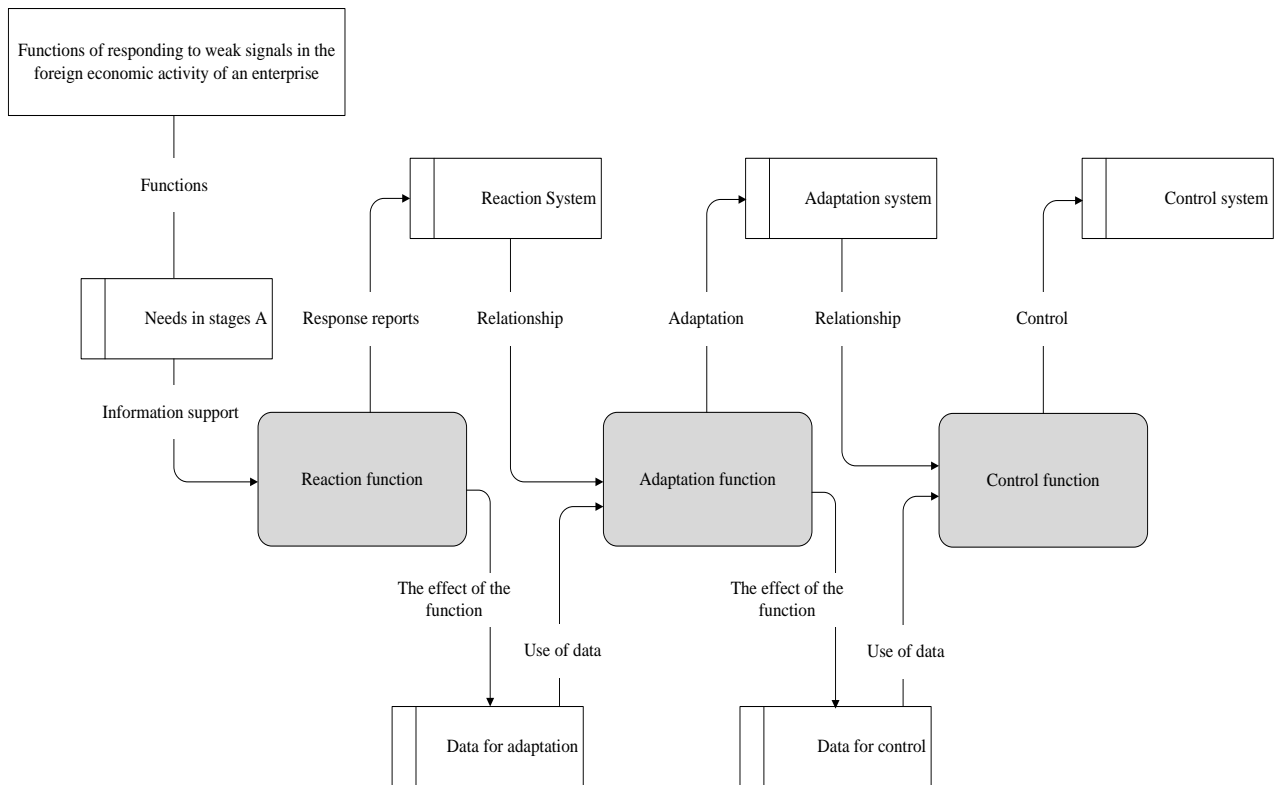


Figure 3. The model for implementing management functions to respond to weak signals in the foreign economic activity of a modern enterprise

Reaction function. First of all, the response function implies the presence of sensitive and dynamic monitoring mechanisms. An enterprise must constantly monitor changes in its external environment, as well as in internal processes, in order to quickly detect weak signals. This may include the use of specialized software tools for data analysis, monitoring market trends, and organizing a feedback system with customers and partners. Having effective warning and communication systems is also key to ensure rapid response to detected signals. For this

function to function successfully, it is necessary to have clear procedures and responsible individuals responsible for making decisions and coordinating actions when weak signals are detected.

In addition, the response function implies flexibility and adaptability in the actions of the enterprise. It should enable rapid response to changes in the environment, including the implementation of temporary strategies or experiments to quickly test the effectiveness of new approaches. An important aspect is being prepared for possible risks and failures, because responding to weak signals sometimes requires a large dose of innovation and risk. Therefore, the enterprise must have flexible management structures and a culture that supports an open and experimental approach to problem solving.

Adaptation function. The adaptation function is key to successfully responding to weak signals in the context of a strategy for managing the financial and economic security of an enterprise. This function implies not only the recognition of changes in the environment, but also the ability of the enterprise to actively adapt to them. It includes the development of new strategies, methods and tools that allow an enterprise to remain competitive and sustainable in changing conditions. For example, this could mean quickly adopting new technologies, reviewing the business model, or developing alternative marketing and sales strategies.

To effectively implement the adaptation function, the enterprise must have a flexible and innovative structure. An important part is the ability to quickly adapt internal processes and structures to changes in the external environment. Also important is readiness for change and openness to new ideas and approaches. Actively accepting change and being open to new opportunities will allow the enterprise to effectively adapt to weak signals and ensure resilience in unexpected conditions.

Control function. The control function is an integral component of the strategy for managing the financial and economic security of an enterprise in the context of responding to weak signals. Its main goal is to ensure effective tracking and evaluation of the results of implementation of response strategies, which allows the enterprise to timely identify and correct negative trends. One of the key control functions is the systematic monitoring of financial indicators, identifying anomalies and risk areas, as well as analyzing their impact on the financial stability of the enterprise. This allows the enterprise to quickly respond to potential threats and minimize their negative consequences.

Additionally, the control function involves the establishment of clear internal control systems and responsibility for the implementation of developed response strategies. This includes developing procedures and standards, monitoring their implementation and identifying possible deviations, as well as developing mechanisms for reporting and recording results. This helps the enterprise to ensure effective coordination of actions and confidence in the implementation of planned strategies, which helps to increase the level of financial and economic security.

In general, both formed models are an important tool for an enterprise in solving problems of financial and economic security in conditions of unpredictability and a changing external environment. Their use will allow enterprises to ensure sustainability and competitiveness in the global market environment.

Once our results are available, it is important to conduct a comparative analysis of our own results with those of previous studies to determine the novelty, uniqueness, and significance of our findings in the context of the existing scientific literature. Comparison with other studies serves to highlight our contributions to the field, highlight similarities and differences in findings, and identify potential future research opportunities in the field. Such an analysis helps confirm the reliability and significance of the findings and open new horizons for further scientific activity.

Thus, in a study by Alazzam et al. (2024) the authors consider a methodological approach to choosing a business management strategy taking into account changes in business activity. The authors focus on the importance of adapting management strategies to changing conditions. In the context of our work, it should be noted that this study, although it highlights the importance of flexibility in control strategies, is less specific regarding response to weak signals.

While Avanesova & Chuprin (2017) describe the essence of the concept of economic security of an enterprise. They emphasize the importance of developing effective strategies to ensure enterprise stability. Our study complements this work by providing specific methodological tools for identifying and responding to weak signals that can affect economic security.

About the study by Bondarenko et al. (2021), this article develops a model of the economic security of an enterprise taking into account changes in investment support. The authors explore the impact of investments on the stability of an enterprise. This study emphasizes the importance of financial aspects in the context of management decisions, while our study focuses more on a broader range of weak signals.

A study by Griol-Barres et al. (2019) focuses on improving strategic decision making by identifying weak signals in various documents using text mining techniques. This approach is rooted in our model of managerial decision making, although our research may provide a more integrated view of management processes in the context of weak signals.

While Ilchenko (2016) analyzes the problems of introducing innovative approaches at wholesale trade enterprises. This study highlights the importance of innovation in enterprise development, which is key to understanding the broader context in which weak signals can emerge and influence strategic decisions.

In a study by Ivanova et al. (2021) pay special attention to the features of the development of e-commerce in the digital economy. The authors analyze the trends and challenges that businesses face in the digital environment. This complements our research by highlighting the importance of taking digital trends into account when developing weak signal responsive control models.

The study by Kryzhanovska (2018) is interesting. This work focuses on the effectiveness of trading companies as an object of management. The author analyzes key indicators and factors influencing efficiency. This study points to the importance of focusing on performance measures when modeling managerial decisions, which is a relevant basis for our models. At the same time, our research continued this topic in the form of formed models.

Magruk's (2018) study focuses on weak signals in logistics in the context of the phenomenon of uncertainty. The author explores how weak signals can influence logistics processes. Although this study also generates patterns of response to weak signals, it is limited to a selected area of enterprise activity, while our study covers the entire enterprise activity.

The work of Ozerova & Sharopatova (2021) examines financial risks and their impact on the economic security of agricultural enterprises. The authors analyze risk factors and methods for minimizing them. This expands our understanding of how financial aspects influence enterprise safety, which is important for our weak signal management models.

By comparing the results of our study with previous studies in the industry, we can conclude that our research is relevant and has scientific novelty. Having discovered coincidences and disagreements between our results and the results of other studies, we confirm the relevance and significance of our work in the context of modern challenges and problems in the field of responding to weak signals in foreign economic activity. Our contribution is to identify new perspectives and approaches to this problem, which opens the way for further research and development in this area.

CONCLUSION

The current state of responding to weak signals in the foreign economic activities of enterprises requires a deep understanding of the dynamics of the global market and the ability to adapt to uncertainty and change. In this context, the key is to develop a clear strategic approach that will not only identify weak signals, but also respond effectively to them. At the present stage, with increasing competition and the speed of innovation, the importance of this approach cannot be overestimated. This requires enterprises not only to attract resources to monitor the external environment, but also to develop an internal culture aimed at flexibility and innovation.

Ensuring financial and economic security in the context of globalization and changing market conditions requires enterprises to be able to quickly respond to challenges and use the potential of weak signals to increase their competitiveness. Incorporating weak signals into strategic planning allows businesses to stay ahead by adapting to changes before they become noticeable and impact market dynamics. This, in turn, requires the provision of appropriate analytical and management capabilities within the organization.

In this context, the role of information systems, analytical tools and personnel training becomes crucial. Modern technologies provide opportunities for efficient data collection and processing, allowing businesses to collect a wide range of information about the external environment. At the same time, the key factor is the development of the competencies of personnel capable of correctly interpreting the data obtained and using them to develop strategies.

Taking into account the above, we can conclude that responding to weak signals in foreign economic activity is fundamental to maintaining and developing the competitiveness of modern enterprises. In our research, we found that an integrated approach involving continuous monitoring, data analysis and adaptive planning is key to effectively responding to weak signals.

We also emphasize the importance of developing and implementing strategic approaches that include not only technological aspects, but also organizational culture and people development. This enables businesses not only to survive, but also to thrive in an unpredictable external environment.

Our research demonstrates that modern businesses that respond effectively to weak signals have a greater chance of success because they can more quickly adapt to change and take advantage of new opportunities on the horizon. This approach creates a sustainable and flexible business model that is critical to long-term growth and success.

The research used functional data flow diagram (DFD) and functional modeling techniques to develop two key models in a weak signal response system. The first model is the basic management decision-making model that integrates data analysis and a functional approach, allowing you to effectively identify, analyze and respond to market changes. The second model focuses on management functions, including monitoring, planning, analysis, and implementing strategies to respond to weak signals.

The use of these models has proven effective in ensuring a quick and accurate response to changes in foreign economic activity. This not only strengthened the financial and economic security of enterprises, but also provided them with strategic flexibility and adaptability, which is extremely important in the unpredictable conditions of the modern market. Thus, our results highlight the importance of an integrated management approach that covers both the technological and strategic aspects of responding to weak signals.

As a result, two key models were formed: the first is the main model of management decision-making in the system of responding to weak signals and the second is the management functions for responding to weak signals. Our research makes an innovative contribution by integrating DFD and functional modeling methodologies to develop comprehensive models that provide deeper and more effective understanding of managerial decision-making in the context of responding to weak signals in a dynamic foreign economic environment. A limitation of our study is that it focuses primarily on theoretical aspects of modeling and may require further empirical testing in different industry contexts. Prospects for future research include expanding and adapting models for specific sectors of the economy and introducing artificial intelligence algorithms to improve the accuracy and efficiency of identifying weak signals.

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