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ABSTRACT

The primary goal of the study is to form an effective model for countering external threats to the corporate security of engineering enterprises in the context of COVID-19. The priority of forming a methodological basis for ensuring the corporate security of enterprises today is determined primarily by two key circumstances. First, is the need to create safe conditions for development under the influence of COVID-19. Secondly, the importance of the role of corporations functioning today, which they already play in economic processes. The modeling methodology was applied to show the functioning of the system for countering external threats to the corporate security of engineering enterprises in the context of COVID-19. COVID-19 has had a significant impact on the activities of engineering enterprises around the world, especially concerning foreign economic activity. Because of the study, the main stages and processes of countering external threats to the corporate security of engineering enterprises in the context of COVID-19 were identified.

1. INTRODUCTION

The last few decades have been marked at the enterprise by the gradual destruction of the vital relationship between the employee and the enterprise, created under the influence of some ideology. The existing restrictions on the choice of profession, places of study, compulsory referral to the first job, and obstacles to career growth, which were created through the nationality and social status of parents, significantly influenced their behavior, the degree of achievement of certain creative and production results, the ability to fully realize their abilities and personal interests. At the corporate level, ensuring the safety of the enterprise is due to the action of internal institutional constraints. The principles and the current regulatory and legal framework of corporate governance create appropriate conditions for corporate security. In addition to the above, corporate security necessarily involves taking into account the interests of participants in corporate relations and aligning them with development goals under the influence of COVID-19.

The system of priority interests of the enterprise is not invariable: changes affect the behavior of the subjects of the external environment interacting with the enterprise, their priority, and relevance. There is a certain sequence of stages and procedures for a comprehensive analysis of interests, determining their priority and further harmonization with the interests of the subjects of the external environment. The first stage is the formulation of the system of interests, which is carried out on the basis of the analysis of relationships with the subjects of the external environment. In this case, it is important to take into account the aspect of time, since not only the current but also the strategic interests of the enterprise must be formulated. The main requirements of the wording are clarity and unambiguity. It should be noted that the system of interests should include a limited number of interests that are most important from the point of view of the life of the enterprise and are constantly in the field of managerial attention. Allocation of priority interests is the second stage in the formation of an appropriate system. The priority of interests is assessed on the basis of their rating in groups formed according to the functional partnership principle.

The existence and development of an engineering enterprise as a socio-economic system directly depends on the conditions of functioning, that is, the level of their safety. Such conditions are formed not only through the actions of state authorities or public activity of the population, but, first of all, through the creation of appropriate security systems within each business entity. The complexity of systems, their tasks, resource provision, and other parameters depend both on the type of economic activity and on the level of aggressiveness of the functioning environment, but the effectiveness, i.e. A significant problem is the actual lack of experience because of the rapid change in the conditions of functioning, as well as the impossibility of borrowing scientific developments.
Consequently, it becomes important to form a theoretical and methodological basis for ensuring the security of engineering enterprises under the influence of COVID-19.

Corporate security is an integrated, complex concept, which is understood as the state of the main indicators of the socio-economic system, which can determine the level of security as a property of the system, that is, the natural desire for self-preservation, as well as a function of the system, its specific activities to counter threats. Corporate security is a broader concept from the category of "economic security" by increasing the types of security objects. In modern conditions, under the influence of COVID-19, corporate security is one of the main factors in ensuring the stable operation of an engineering enterprise, a development bank, and, on this basis, competitiveness. At the same time, the issues of the process of ensuring corporate security, and the formation of security systems have not yet been sufficiently studied, therefore the need for further scientific research.

Corporate security in the new economic environment must focus on protecting its own functional and structural integrity. Ensuring corporate security from external and internal threats should be aimed at a clear organization of the management system. The study of the development of economic science of the twentieth century is closely related to the study of the development of corporate security, its structure, value, and role in creating an effective system for regulating the optimal economic order, solving fundamental issues of enterprise development. Corporate security is a complex system that is interconnected and interacts with global, national, and regional security systems. The corporate security system fully complements political security (protection of the corporation from internal and external threats from the state and authorities), is included in economic security (protection from external and internal threats of economic nature from other states and corporations). Today corporate security is associated with intellectual and information security.

The emergence of new threats related to corporate security is associated with: modernization of the logic of creating a corporate security system; location of the business entity; the negative impact of global risks on the organization of corporate security; changes in the social structure of society; the growing power of international corporate institutions and the impact of COVID-19.

Corporate security, being part of national security, is a complex system that interacts with global, national, and regional security systems. The corporate security system organically combines political security, economic security, information, and intellectual security.

The corporate security of the company is a new and insufficiently researched concept, the enthusiasm for which is dictated by the current conditions for the development of entrepreneurship. The formation of a corporate security system at engineering enterprises is motivated by increased economic instability not only within the national economy but also in world markets, which requires a focus on security aspects.

We can say that COVID-19 has introduced many new external threats. That is why the key role of study is to form an effective model for countering external threats to corporate security of engineering enterprises in the context of COVID-19.

Thus, the main contribution of the study can be considered that the basic mechanism of counteraction to external threats to corporate security of engineering enterprises in the context of COVID-19 was formed.

2. LITERATURE REVIEW

A significant number of scientists and practitioners around the world are studying the problems of ensuring corporate security and countering threats. Let's consider several such works in order to understand the level of the topic under study and the relevance of the results for our study.

So, to begin with, let's consider scientists who studied the processes of formation of the main aspects of countering threats to corporate security, its essence, and key elements. For example, Rewinkel [1] and Fakiha [2] identified key aspects of an enterprise's security management system. The basic elements form the basis of any study.

Moreover, it is important to provide some kind of security, what is the environment of the enterprise and what are the external conditions. As Zhang and Cao [3] and Tulenkov [4] note, it is the ability to respond correctly to the negative impact of threats that makes it possible to effectively manage an enterprise.

You should also take into account the specifics of the action of COVID-19. Kuznetsova et al. [5] did a good job of assessing the negative impact of COVID-19 on business and security in general.

The next important topic is the study of key aspects of corporate impact on the enterprise security system [6, 7].

It should be noted that enterprises turned out to be the most sensitive socio-economic systems to the negative impact of threats, therefore, a significant number of scientific works are devoted to this aspect and problem [8, 9].

As noted by Shinkar et al. [10], we must always adapt our methodology to the specifics of the type of security and the type of threats.

In general, there are various methods of countering enterprise security threats, certain solutions are offered by a significant number of scientists [11-14], however, in our opinion, it is necessary to demonstrate all your methods in stages and separate the counteraction to external and internal threats.

Publishing the own scientific achievements of many scientists and practitioners in the field of solving corporate security problems, it should be noted that today's conditions are different from previous years and therefore today the search for ways to counter threats to enterprise engineering security is again relevant, especially external threats due to the impact of COVID-19.

3. METHODOLOGY

Considering the set of methods that form our methodology, one should first highlight those methods that made it possible to theoretically analyze the essence and features of ensuring corporate security of an enterprise: methods of analysis and synthesis of information, to form the essential characteristics of the process of ensuring corporate security of an enterprise, which is extremely important in modeling ways of countering the negative impact of threats; methods of abstract analysis and synthesis - to generalize the information received and form, based on the result of the analysis, appropriate conclusions.

In addition, the main research method involves the use of modeling techniques already known in mathematical circles.
through IDEF, which allows you to demonstrate a graphical display of any processes associated with socio-economic systems.

We can talk about the fact that countering external threats due to the influence of COVID-19 is a process that should include several stages, including a number of incoming and outgoing information and other properties. This fits very well with our methodology.

So, for the application of the chosen methodology, several basic aspects must be described: the main goal of modeling is to build a model that will facilitate the adoption of effective management decisions to counter external threats to the corporate security of an engineering enterprise; purpose: for subjects of corporate security, whose activities provide for the development and implementation of management decisions in the context of COVID-19; the main technology of the applied modeling method is IDEF0 (Integrated Computer Aided Manufacturing) DEFinition for Function Modeling); software involves the use of an application program to build vector models and diagrams. The main advantage of this method is that it makes it possible to visually depict and clearly form all the stages of achieving the ultimate goal A0.

In order to better represent the main goal and its sub-goals for our model of countering external threats to the corporate security of the engineering enterprise, we will also apply the decision tree method for a better graphical display (Figure 1).

![Diagram](image)

**Figure 1.** The main goal and its sub-goals in the form of corresponding hierarchical blocks (decision tree) for the model of countering external threats to corporate security of the engineering enterprise

So, further, in the text in the results of our research, we will demonstrate the main stages of our modeling and a ready-made model of countering external threats to the corporate security of an engineering enterprise.

**4. RESULTS OF RESEARCH**

So, the first stage will be the formation of a diagram using the example of a black box, where we will clarify the main inputs, outputs, the control system, and the mechanisms of the model for countering external threats to the corporate security of the engineering enterprise in the conditions of COVID-19 (Figure 2). Thus, the main function of Figure 2 consists in demonstrating what elements must exist to achieve A0, as well as explaining the essence of the elements of inputs, outputs, mechanisms and resources.

So, as a result of our research, we will form the main decomposition of the model of countering the main external threats to ensuring corporate security of an engineering enterprise in the context of the negative impact of COVID-19 (Figure 3).

Thus, the symbolic designation A0 represents the ultimate goal of the current model - countering existing threats. At the same time, in order to achieve the final goal, according to the chosen model, there are certain stages, denoted by mathematical symbols - A1-A4.

So, let's take a closer look at each of the stages of the process of countering external threats to the corporate security of the engineering enterprise:

A1 - Implementation of changes to the structure of the security service. The corporate security system of an enterprise is individual. Its completeness and effectiveness depend on the legislative framework in force in the state, on the amount of material, technical and financial resources allocated by the heads of enterprises, on the understanding of each employee of the importance of ensuring business safety in the context of COVID-19. Therefore, to ensure break-even activity, the management should change the corporate security department in the context of COVID-19. The main task of reorganizing the corporate security service of an engineering enterprise should be to anticipate and anticipate possible threats leading to a crisis state, as well as to conduct anti-crisis management aimed at bringing the engineering enterprise out of a crisis state; minimizing of external threats, in particular, to its financial, material, informational, human resources, based on a developed set of measures of an economic, legal and organizational nature under the influence of COVID-19.

A2 - The optimal combination of economic methods, levers, and tools. In the modern realities of transformational changes, the issues of corporate security, and in particular its diagnostics, acquire key importance for engineering enterprises. This can be facilitated by a number of economic methods and tools. One of these is diagnostics. Diagnostics allows you to identify problems in the management system at any of the levels of economic relations while protecting the country's economy from internal negative factors under the influence of COVID-19. The main tools and economic methods for ensuring the security of an enterprise in the context of the impact of COVID-19 should include such forms of influence on the process of making and implementing management decisions as profit (for example, profit can be distributed to further financing measures to strengthen the security system of the enterprise), depreciation (they affect technical and technological safety), product price, discounts (impact on buyers, help to attract additional customers); investment (impact on the enterprise itself); dividends (impact on investors, safety and reputation of the enterprise); synergy (this effect affects the whole management system as a whole); wages, bonuses (impact on employees, motivation to work effectively, not to resort to theft, sales of confidential information, etc.); penalties, fines (impact on counterparties).

A3 - Continuous monitoring of the external environment. The external environment has a significant impact on the results of economic activities of enterprises, therefore, external factors are an important object of controlling in the conditions of COVID-19, about the state of which controllers should receive information from the subsystem for collecting information about the state of the external environment. The external environment as an object of controlling the management of an engineering enterprise and ensuring its corporate security is a system of factors that directly or
indirectly affect the economic activity of an engineering enterprise entity, which are formed outside its economic system under the influence of a set of economic entities, economic and social processes in society, natural conditions, state, and interstate government and public structures, etc. Environmental factors cannot be considered in isolation, controllers must have a complete information picture of the state of external factors since the success of an enterprise depends on the completeness of knowledge about its environment. To ensure timely accounting and forecasting of the influence of environmental factors on the economic system of enterprises, it is necessary to receive information promptly. The task of timely provision of information data on the state of the external environment is assigned to the corresponding subsystem of the controlling information support system by monitoring the main external factors.

A4 - Formation of a new anti-crisis management department. The rapid and changeable development of economic relations in the modern world under the influence of COVID-19 has led to a discussion of a wide range of experts on the determination of a new model of further economic development that can help overcome internal and external contradictions of various systems through their elimination at the international level. These contradictions arise in the context of the internationalization of the economic sphere based on progressive and innovative technologies, on the one hand, and dynamic changes in the development of national economies, on the other. In recent years, the crisis factor has played a crucial role in the enterprises of the overwhelming majority of sectors of the national economy. Elements of the economic crisis due to COVID-19 at the microeconomic level are manifested, first of all, in mass loss and low profitability of production, price and structural imbalances, insufficient level of competitiveness, unsatisfactory balance sheet structure at the enterprise level, shortage of working capital, insolvency, insolvency, insolvency. These facts actualize the issues of organizing countering crisis phenomena within the framework of creating effective mechanisms for anti-crisis management. This, in turn, requires in-depth development and implementation of effective anti-crisis programs to counter threats to the corporate security of the engineering enterprise. The development of an enterprise's anti-crisis program under the conditions of COVID-19 impact should be a reasonable set of measures that must be taken to achieve certain goals and fulfill the tasks of anti-crisis management. The content of the program should be stipulated by the results of the diagnostics, time, and resource constraints of the anti-crisis process. It usually includes separate anti-crisis policies - a set of actions, means, and tools to achieve certain results.

**Figure 2.** Diagram of the main elements of the model of countering external threats to corporate security of an engineering enterprise in the context of COVID-19

**Figure 3.** The main decomposition of the model of countering the main external threats to ensuring corporate security of an engineering enterprise in the context of the negative impact of COVID-19
Separately, it should be noted that from the standpoint of ensuring corporate security in the process of developing corporate culture, security subjects should pay maximum attention to such points as:
- compliance with the norms and rules of corporate culture by shareholders, members of the supervisory board, and managers as a role model for employees;
- selection and recruitment of personnel, which consists in assessing the experience, qualifications, psychological compatibility of applicants, identifying possible representatives of the "risk group";
- formation of a system of values and ensuring their observance by all participants;
- motivation of employees, providing for the introduction of timely and necessary changes in the motivation system to stimulate productive and creative work through the use of material and non-material forms;
- an adaptation of new participants (employees, managers, shareholders) to the corporate culture in order to reduce the time of adaptation and ensure the inheritance of labor traditions;
- personnel control aimed at reducing the level of conflict and ensuring a comfortable microclimate, reducing staff turnover, detecting fraud and the use of official positions by management;
- strengthening ties in the "corporate family" by paying attention and assistance in solving the problems of each participant. Certain points should be included in the list of tasks of security subjects, which provides support and control of the development of corporate culture.

It should be noted that our study was aimed at a qualitative analysis, which does not involve certain mathematical calculations and the demonstration of quantitative results. The model is only theoretical and informational in nature.

5. DISCUSSIONS

It is necessary to understand that corporate security is not a security guard at the entrance or a video surveillance system. These tools are greetings from the distant past, they have long been unable to provide your restful sleep and confidence in the future. Today, building corporate security at an enterprise is a complex and lengthy complex process. First of all, this is the forecasting and identification of threats. The difficulty lies in sensing in advance that a storm is approaching, knowing exactly where lightning may strike, and preventing a crisis situation from arising.

Where are the problems coming from? There are many options. All risks can be divided into external and internal. As sad as it may sound, the biggest threat to business in Ukraine is the state, that is, corrupt elements from among law enforcement officers and controllers. Most businessmen know this firsthand: doing business becomes very difficult when you have to fight off corrupt officials every day. But as the results of activities show, an important external threat is COVID-19 and its consequences.

Discussing the results of the study, for a start, it should be noted that the problem of ensuring corporate security of engineering enterprises in the context of instability and uncertainty of the market situation and the impact of COVID-19 is important and relevant. Under these conditions, one of the fundamental directions of ensuring the corporate safety of companies in the market environment is the introduction of the principles of anti-crisis management both at the level of an individual company and at the level of inter-organizational interaction. This led to the allocation of the anti-crisis component of corporate security to counteract the impact of COVID-19. The number of connections with this component is one of the largest, and therefore the number of threats, in our opinion, is also significant, which requires increased management attention to counter these threats.

The evolution of corporate management is taking place, but there are still quite a few gaps and vulnerabilities in the corporate security system and an important area of work.

Discussing the subject matter, research results, and problems in general, it should be noted that a significant number of works are devoted to corporate security and the main aspects of its provision. For example, Calder [15] and Mukherjee [16] identified modern features of corporate security and highlighted the main threats. However, our research differs in that we decided not to cover all possible threats to corporate security of the engineering enterprise, but to focus our scientific attention precisely on the external conditions of the impact of COVID-19.

A large number of modern scientists and practitioners strive to identify new methods for countering security threats [17-21], however, it should be noted that the current operating conditions and the impact of COVID-19 allows us to talk about a change in the environment of engineering enterprises and requires new approaches to determining ways to counter threats to corporate security. Our study has some differences, and mainly, they consist in the formed functional model for determining the main ways to counter external threats to corporate security of engineering enterprises under the influence of COVID-19.

6. CONCLUSIONS

Thus, the main subjects involved in the development of corporate culture were identified: the working group and the security service of the engineering enterprise. Their mutually coordinated actions and cooperation with all participants, which should provide for the formation of an initial information basis by interviewing shareholders, management and all personnel of the enterprise, should contribute to the achievement of the set task - the development and implementation of a model of a new corporate culture to increase the competitiveness of the enterprise and achieve the required level of corporate security.

Summing up the results of the study, it should be noted that we tried to form a theoretical and methodological model that would reflect the main stages and processes of countering external threats to corporate security of engineering enterprises in the context of COVID-19. Over time, when the impact of COVID-19 increases or, on the contrary, decreases, the threats may differ and therefore, the flexibility of the model allows this to be taken into account and can be changed. This is the major limitation of the study. We cannot talk about the future impact of COVID-19 and what new threats will affect the corporate security of the engineering enterprise in the future.

In the end, it should be noted that the global pandemic has undoubtedly affected e-commerce, giving it a significant advantage over offline commerce. It can be stated that today, the global nature of COVID-19 and its impact on e-commerce can strengthen international cooperation and further develop
procurement and supply policies on the Internet. The pandemic has shown that e-commerce can be an important tool or solution for consumers, as well as support small businesses and, by increasing the competitiveness of the economy, be an economic engine for both domestic growth and international trade. Social distance and significant limitations have highlighted the importance of digital technology in general around the world. It is in this direction that one should move on and conduct subsequent future research.

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