Big Data Analysis on the Enterprises' Business Activity Under the COVID-19 Conditions

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Abstract

The COVID-19 pandemic and related quarantine measures have a negative impact on the enterprises' business activity. Achieving the expected results largely depends on the completeness and objectivity of Data Analysis, because in the conditions of COVID-19, the business environment is characterized by an increased level of uncertainty and risk, as well as non-standard changes in activity conditions. That is why, in the modern realities of crisis phenomena in the economy, existing restrictions on consumer and economic activity, as well as uncertainty about the further development of events, an important and urgent issue is Data Analysis, the search for reserves, new opportunities for the formation of competitive advantages, increasing the efficiency of business processes and competitiveness enterprises.

The application of Big Data Analysis today is becoming the basis of effective decision-making because the impact of the COVID-19 pandemic requires new approaches to analysing loosely structured data that do not have a long history (databases) for forecasting.

In the article, there was analyzed the impact of COVID-19 on the enterprises' business activity and conducting business in general and proposed an economic-mathematical model for calculating the integral indicator of the business activity of an enterprise that continues to work under COVID-19 conditions. The results of the Big Data Analysis on the enterprises' business activity under the COVID-19 conditions showed a real need to implement internal changes in the business. It is well-founded that the COVID-19 pandemic makes it necessary to make changes in the activities of business entities, in particular by using measures to increase business activity. Separately, the research considers the prospects of digitalization of the enterprises' activities under COVID-19 conditions and also characterizes the expected consequences of such innovations.

Keywords

Big Data Analysis, enterprises' business activity, integral indicator, model, COVID-19, digitalization

1. Introduction

The pandemic crisis of 2020 changed the conditions of doing business for all business entities. Many of them had to give up further activity due to the inability to adapt their activities and proactively respond to changes in the business environment.

The COVID-19 pandemic and related quarantine measures have a negative impact on the enterprises' business activity. The problems of preserving business activity, jobs, and competitive advantages, ensuring profitability, financial stability and competitiveness have become acute for enterprises. That is why, in the modern realities of crisis phenomena in the economy, existing restrictions on consumer and economic activity, as well as uncertainty about the further development of events, an important and urgent issue is the search for reserves, new opportunities for the formation of competitive advantages, increasing the efficiency of business processes and the competitiveness of

enterprises on domestic and foreign markets. Searching for ways to develop business under COVID-19 conditions is relevant today.

Big Data Analysis is used in various spheres. Also, it can be used in the research of economic phenomena and processes. Financial crises, which are an integral part of the modern economy, require new approaches to analysis. This also applies to the financial crisis provoked by the COVID-19 pandemic, because the causes of it are completely different, which it requires a detailed Data Analysis and forecasting prospects for overcoming the negative consequences of this crisis.

Big Data Analysis mostly includes Linear regression, Logistic regression, Classification and Regression Trees, K-Nearest Neighbors, K-Means Clustering, Neural Network, which cannot be implemented without the use of Data Mining methods. Data science in the field of finance is mostly used in cases when performing financial stress modeling, Financial fraud modeling, Stock market prediction and Quantitative modeling, and Auditing [14]. Increasingly, these methods are used in economics. In particular, Liubov Chagovets, Svitlana Prokopovych, and Viktor Kholod investigate regional economic development by applying Data science methods [4]. Financial markets also produce significant amounts of data, so the use of Big Data Analysis methods to process them is especially relevant today [38, 39].

The application of Big Data Analysis today requires improvement and refinement of practical aspects of implementation because in most cases the traditional approach dominates [1].

2. Theoretical approaches to managing the enterprise's business activity under the COVID-19 conditions

The COVID-19 pandemic has changed not only the conditions of doing business, expressed through quarantine restrictions but also the approaches of enterprises to the organization of their activities. The approaches to managing business activity have undergone special changes because under COVID-19 conditions it is not so easy to increase market share, increase sales volumes or enter new sales markets – the methods used until 2020 are no longer effective – it is necessary to change the enterprise's activity to a new level of development, in particular, to maximally digitize the processes of product realization and market promotion of the enterprise.

Big Data Analysis is used in various spheres, also it can be used in the research of economic phenomena and processes [31, 37, 38, 39, 40]. L. Einav and J. Levin [7] interpret the application of Big Data Analysis in economics as a data revolution in economic analysis. The methods of Big Data Analysis are thoroughly described in the works of L. Bychkovska-Lipinska, Y. Bolubash, V. Lytvyn, N. Shakhovska, V. Vysotska, O. Veres, [22, 31]. Features of Big Data and prospects of its impact on life, work, and thinking are revealed by V. Mayer-Schonberger and K. Cukier [24]. Using SMART Big Data, analytics, and metrics to make better decisions and improve performance is proposed by B. Marr [23]. Big Data Dimensional Analysis is thoroughly researched by V. Gadepally and J. Kepner [9]. Technologies based on Big Data Analysis are used by V. Vysotska, V. Lytvyn, V. Danylyk, S. Vyshemyrska, M. Luchkevych, and I. Lurie [42] for detecting items with the biggest weight. Usage of the game theory in the conditions of uncertainty is proposed by the authors [17], etc.

Data sources are diverse, poorly structured, or unstructured, and this makes it difficult to analyze data both in normal business conditions and in extraordinary conditions, which characterize the business environment in the context of the COVID-19 pandemic. So the use of Big Data information technology is a priority for data analysis during financial crises [31, 37, 39].

One of the biggest problems is the lack of a clear classification of Big Data Analysis methods and an unambiguous approach to their implementation. Their presence would greatly facilitate the choice of an optimal and efficient algorithm for analyzing these data depending on their structure. Taking into account the data sets that need to be analyzed to make effective decisions in a crisis, Big Data Analysis is the tool that will qualitatively identify the main parameters of the phenomena and processes to be analyzed. Large amounts of input data require a clear understanding of the criteria for limiting the data set and forming a sample of the study – time series.

In 2020-2021, the scientists' attention was drawn to the new conditions of conducting business activities and the justification of the necessary directions of changes for further effective management. The consequences of the COVID-19 epidemic and quarantine measures for the leading sectors of the

Ukrainian economy are thoroughly analyzed by the authors [5] based on interviews with owners and top managers of Ukrainian enterprises. I. Fedulova, M. Dzhulai [8]. Z. M. Andrushkevych, V. M. Nyanko, and O. V. Sitarchuk consider digitization as an effective tool of the company's communication policy during the COVID-19 pandemic [3]. Priorities of enterprises in new economic conditions are analyzed by O. O. Kots, I. I. Laschyk, and I. V. Koval [19]. O. M. Orlova analyzes the risks of enterprises in the conditions of the COVID-19 pandemic [27]. The personnel policy of the enterprise in the conditions of the challenges of the COVID-19 pandemic is characterized by O. I. Honchar and L. I. Muravska [10]. Features of enterprise management in the context of new challenges caused by the COVID-19 pandemic are described by O. I. Hryniuk [13], and management methods – by H. V. Zhosan, N. V. Kyrychenko [43]. The impact of COVID-19 pandemic on enterprises activities and economic development investigate authors [11]. The impact of the COVID-19 pandemic on the problems of ensuring the economic security of enterprises is revealed by O. V. Olshanskyi and M. D. Kramchaninova [26], and on the functioning and development of enterprises – by N. S. Skopenko and I. V. Yevseeva-Severina [33], R. M. Skupskyi and Ye. P. Hnatenko [34]. Ways to ensure the competitiveness of the enterprise in the conditions of the COVID-19 pandemic are proposed by V. V. Tkachenko [35]. O. O. Khandiy offers directions for state policy to support enterprises during the COVID-19 pandemic [18].

Business activity in the COVID-19 conditions has undergone the greatest changes because in order to maintain market positions, enterprises had to quickly and innovatively change the management of their business activity. In particular, N. O. Kukharska, E. M. Zabarna, and N. O. Zadorozhniuk study modern trends in the economic transformation [20]. "Business activity reflects the level of efficiency in the use of material, labor, financial and other resources and, at the same time, characterizes the quality of management, as well as the possibilities of potential development of the enterprise, which characterizes its financial competitiveness" [2].

The issues of managing the enterprise's business activity are relevant, however, taking into account the change in business conditions due to the COVID-19 pandemic, they require further thorough research.

3. Data analysis on the enterprises' business activity and the peculiarities of entrepreneurial activity under the COVID-19 conditions

The COVID-19 pandemic has changed the business environment for all market participants. And even in a situation where the enterprise works effectively, has not lost its market positions, and does not have significant violations in its financial state, it still has difficulties in organizing its business activity, because it is exposed to the general influence of the external environment. Quarantine restrictions and the lockdown provoked a number of problems in the enterprises' activities (**Figure 1**).
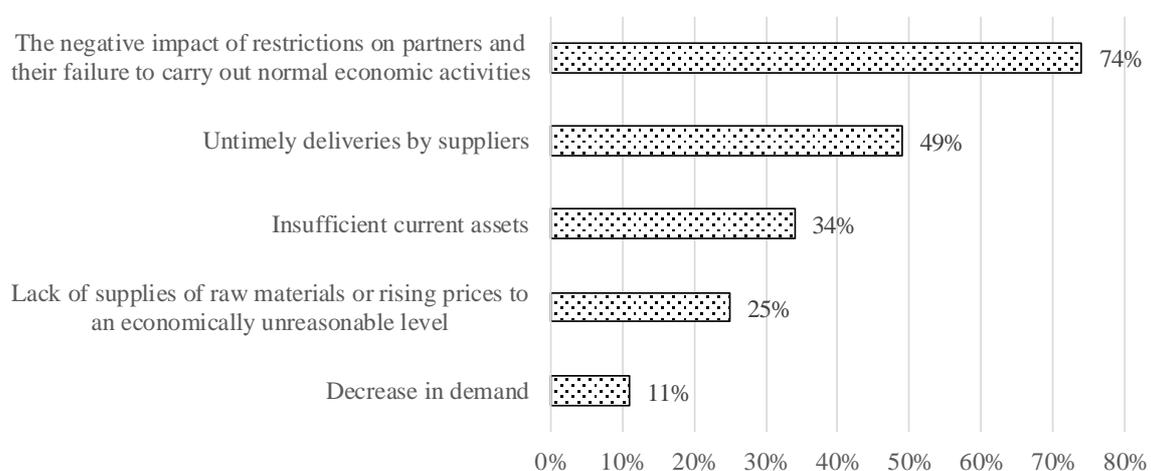

Figure 1: The main problems of enterprises during the COVID-19 pandemic
Source: [29]

The biggest problem (74% of cases) for enterprises was the disruption of existing economic relations, which made it impossible to work effectively even if quarantine restrictions do not have a significant impact on a specific subject. In 49% of cases, late delivery occurred, which also negatively affected the enterprise's business activity and its ability to conduct business effectively. 34% of respondents felt a lack of current assets to maintain business activity at the pre-quarantine level, while 25% of the surveyed enterprises could not provide themselves with raw materials for operational activities. A decrease in demand was noted by only 11% because in a situation where there is no opportunity to cooperate with partners, provide production processes with raw materials, and deliver finished products in a timely manner, the issue of demand for products becomes less relevant because the company is not able to satisfy it.

In addition to the fact that the business environment created a number of problems in conducting business, there was a real need to implement internal changes in the business. Systematized information about the main changes in business during the COVID-19 pandemic is shown in **Figure 2**.
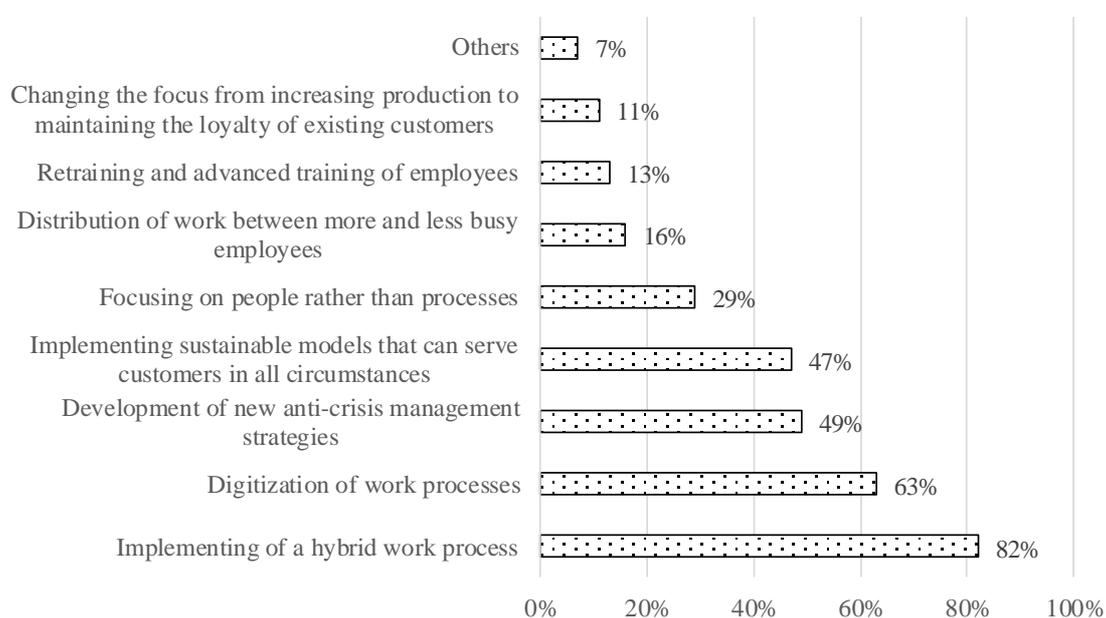

Figure 2: Major changes in business during the COVID-19 pandemic
Source: [15]

We can conclude that almost all enterprises had to make changes in their activities, because it is no longer possible to work as before the COVID-19 pandemic. 82% of enterprises changed the work process by applying a hybrid approach to the fulfillment of their duties by employees, which in 63% of cases of all surveyed enterprises was able to do so thanks to the digitization of individual processes. In fact, the digitalization of processes, and the formation of the possibility of their execution in the online and remote format allowed most enterprises to overcome the negative consequences of the COVID-19 pandemic and adapt to the regime of quarantine restrictions. However, enterprises will need more than one year to recover their lost potential (**Figure 3**).

So, if in July 2020, experts claimed that it would take 1-2 years to restore the potential lost by enterprises during the COVID-19 pandemic, then in April 2021, experts changed their opinion and worsened the forecast by 2-3 years. And the main reason for this is the worsening of the epidemiological situation, and new patterns of the disease, which make it impossible to return the activity of economic entities to the previous regime.

The enterprises' business activity under the COVID-19 conditions has also been changed (**Figure 4**).
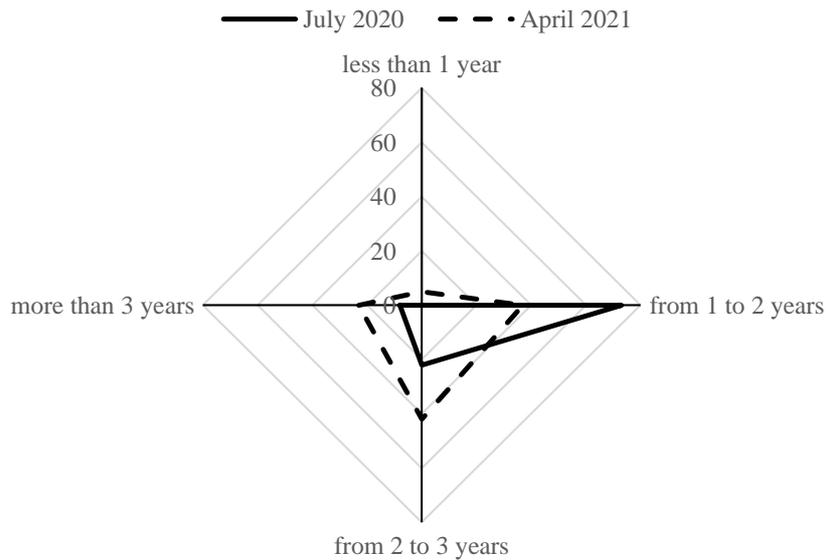
Figure 3: Time needed to recover lost potential during the COVID-19 pandemic
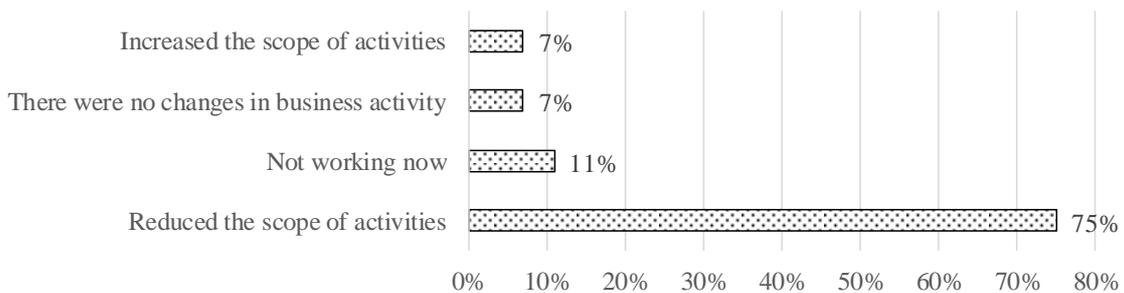Source: [15]

Figure 4: Changes in the enterprises' business activity under the COVID-19 conditions
Source: [15]

75% of enterprises under the COVID-19 conditions were forced to reduce the scope of their activities, and 11% – to stop their activities. Of course, there were those market participants who received significant benefits from the COVID-19 pandemic, which allowed them to increase the volume of their activities, but it was only 7% of them.

Consequently, in the context of the COVID-19 pandemic, enterprises have to change their ways of doing business, adjust their production processes and adapt to changes. That is why the business activity of most of them is undergoing changes and determines the need for digitalization.

4. Economic-mathematical modeling for calculating the integral indicator of the enterprise's business activity

The necessary condition for improving the level of an enterprise's business activity is the increase of all coefficients by which it is evaluated. However, in real life, especially under COVID-19 conditions, it is rare to achieve such positive dynamics. Therefore, we recommend using the economic-mathematical model for calculating the integral indicator of the enterprise's business activity.

The comparative analysis of models for forecasting and decision-making under the COVID-19 conditions was done by N. I. Nedashkivska and S. O. Lupanenko [25], O. H. Puhachova [28]. The main task of these researches was to find ways to reduce the impact of the consequences of COVID-19 in various spheres of life and business. O. D. Vovchak, I. Ya. Kulynyak, L. I. Halkiv, O. P. Savitska, and

Yu. H. Bondarenko propose to model the impact of the COVID-19 pandemic on the enterprises' activities [41], using a linear multivariate regression model for this needs. V. A. Hrosul and N. Yu. Balatska propose a model for assessing the possibilities of an enterprise's development under the COVID-2019 conditions [12], proposing to focus attention on communications with the client, but not forming an economic-mathematical model for any of the alternative vectors of the enterprise's development.

The necessity of using multi-criteria models for forecasting phenomena and processes is proved by B. V. Durnyak and M. M. Klyap [6], I. Z. Savras [30], L. V. Tsybriy [36], I. A. Shubenkova, S. K. Petrova, P. I. Bidyuk [32] and H. V. Ivanets, M. P. Bukin, O. M. Ihnatiev [16], that is why we chose a multifactor model for the economic-mathematical modeling of the level of enterprise's business activity under the COVID-19 conditions.

Since all the coefficients with which the enterprise's business activity is evaluated are dimensionless quantities and need to be maximized, the function of calculating the integral indicator of the enterprise's business activity can be presented in the form:

$$f = (Rcapital, Rreceivables, Rinventory, Rpayables, Csustainability) \rightarrow \max \quad , \qquad (1)$$

where Rcapital – capital turnover ratio, Rreceivables – receivables turnover ratio, Rinventory – inventory turnover ratio, Rpayables – payables turnover ratio, Csustainability– coefficient of economic growth sustainability.

Based on a sample of 100 enterprises, Ye. Kushnir [21] offers a scientific and methodical approach to calculating the integral indicator of business activity. In particular, the author formed a matrix of advantages of indicators of business activity. Using the approach of the author [21], we similarly formed a matrix of advantages of business activity indicators based on Big Data Analysis of 150 Ukrainian enterprises that continued to work under the COVID-19 conditions (Table 1).

Table 1

Matrix of advantages of business activity indicators based on Big Data Analysis of 150 Ukrainian enterprises that continued to work under the COVID-19 conditions

	Rcapital	Rreceivables	Rinventory	Rpayables	Csustainability
Rcapital	–			1	
Rreceivables	1	–	1		
Rinventory	1		–	1	
Rpayables		1		–	
Csustainability	1	1	1	1	–

The next step is to calculate the weighting coefficients for the economic-mathematical model for calculating the integral indicator of the enterprise's business activity that continued to work under the COVID-19 conditions. The calculation of the number of dominance relations in the matrix will be determined by the formula:

$$\Pi n_i = \sum_{i=1}^{n} \sum_{j=1}^{n} a_{ij}, \qquad (2)$$

where $\sum_{i=1}^{n} \sum_{j=1}^{n} a_{ij}$ – the sum of the dominance relations of the indicator in the i-th row relative to other indicators in the j-th column.

The weighting coefficients (W_k) of the relative indicators are calculated according to the formula:

$$W_k = \frac{\sum \Pi n_i}{\sum_{i=1}^{k} \sum \Pi n_i}, \qquad (3)$$

where $\sum \Pi n_i$ – the sum of advantages by the components of the relative indicator on the i-th row; $\sum_{i=1}^{k} \sum \Pi n_i$ – the sum of the advantages of the components of the entire set of relative indicators.

The results of the calculation of the weighting coefficients for the economic-mathematical model for calculating the integral indicator of the enterprise's business activity that continued to work under the COVID-19 conditions are presented in Table 2.

As we can see by analyzing the weighting coefficients, the coefficient of economic growth sustainability has the greatest influence on the integral indicator of the enterprise's business activity, the

receivables turnover ratio and inventory turnover ratio are in second place, and the capital turnover ratio and payables turnover ratio have the smallest weighting influence on the integral indicator of the enterprise's business activity.

As a result, we get the economic-mathematical model for calculating the integral indicator of the enterprise's business activity that continued to work under the COVID-19 conditions:

Table 2
Weighting coefficients for the economic-mathematical model for calculating the integral indicator of the enterprise's business activity that continued to work under the COVID-19 conditions

Indicator	Πn_i	W_k
Rcapital	1	0,1
Rreceivables	2	0,2
Rinventory	2	0,2
Rpayables	1	0,1
Csustainability	4	0,4
Total	10	1

$$I_{BusinessActivity} = 0,1 \cdot R\text{capital} + 0,2 \cdot R\text{receivables} + 0,2 \cdot R\text{inventory} + \qquad (4)$$
$$+0,1 \cdot R\text{payables} + 0,4 \cdot C\text{sustainability}.$$

The integral indicator of the enterprise's business activity has its shortcomings because it does not take into account qualitative indicators and external factors of influence on business activity, however, having information about the value and dynamics of this integral indicator, the management of the enterprise during decision-making can take into account the indicated shortcomings and additionally consider the influence of external factors and individual qualitative indicators.

5. Measures to increase the enterprise's business activity that continued to work under the COVID-19 conditions

In order to successfully conduct business, it is absolutely necessary for the enterprise to have an active market position and direct its efforts to increase the market share, expand the range of consumers, and sales volumes. A high level of business activity allows the enterprise to achieve strategic goals. Business activity is not an isolated characteristic; therefore, it is achieved exclusively thanks to complex and systematic management. It is also worth noting that business activity is closely related to the investment attractiveness of the enterprise, but business conditions have changed under the COVID-19 pandemic, which requires a proactive approach to doing business.

The negative impact of the COVID-19 pandemic has been felt by all business entities, therefore, in order to improve business activity, it is necessary to take into account this impact and take measures that will reduce it.

The main changes in the enterprises' activities due to the impact of COVID-19 are
- the need to transfer some employees to remote work;
- the need to change the work schedule of employees;
- difficulties with recruiting employees to work;
- increase in expenses;
- lack of financial resources, in particular for financing basic expenses.

The directions of the COVID-19 pandemic's impact on the enterprise's business activity are shown in **Figure 5**.

As we can see, the enterprise's activity under the COVID-19 conditions is characterized by a reduction in sales volumes (only an increase of product prices gives an increase in net income), a decrease in competitive positions and minor problems in the financial state (first of all, unprofitable activities). In order to increase business activity, the enterprise needs to improve its activities, in particular, more widely use digital tools, modernize marketing activities with the formation of a

dominant online line of its implementation, as well as strengthen market positions by expanding the range of consumers and sales markets.
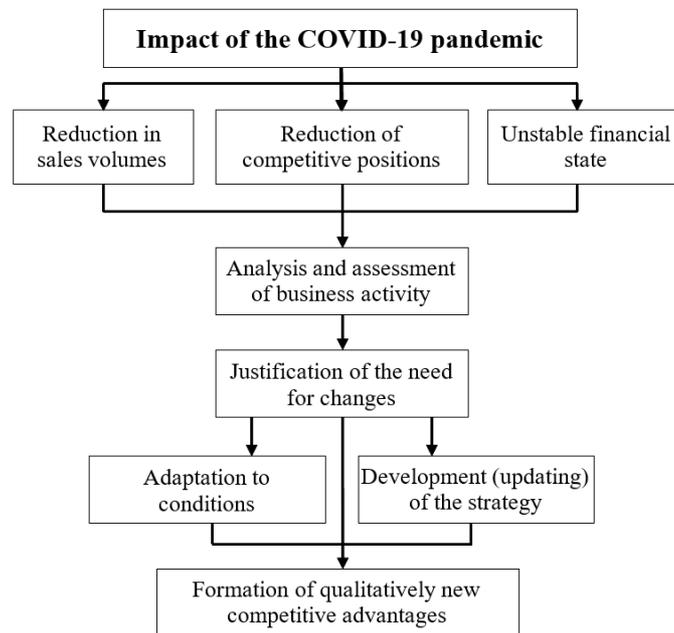

Figure 5: Directions of the COVID-19 pandemic's impact on the enterprise's business activity

An increase in the enterprise's business activity can be achieved thanks to the implementation of a number of measures, which are presented in general in **Figure 6**.
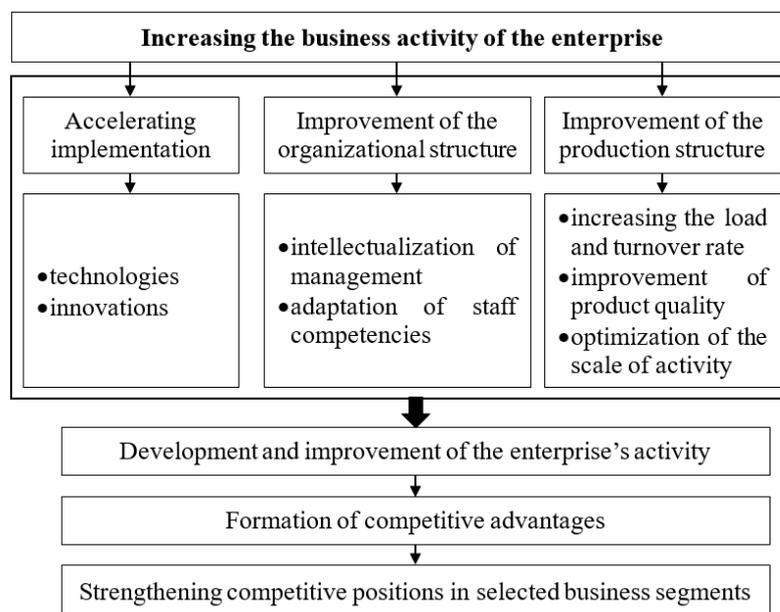

Figure 6: Directions and measures to increase the enterprise's business activity

The main directions of increasing business activity are increasing the efficiency of property use and the implementation of innovative technologies that will allow the digitization of certain areas of activity. It is also important to increase the competitiveness of products and search for new sales markets.

Enterprises should pay special attention to changes in the consumer behavior of buyers and offer to the market such types of products that are currently in high demand. Scientists note that today a

"consumer 4.0" is being formed, who uses online platforms in his work, increasingly orders and buys products online, uses digital services that he did not use before the COVID-19 pandemic for various reasons, including mistrust. Such changes lead to a reduction in time spent on purchasing products, and accordingly, there is an acceleration of product sales processes. In order to meet the new "velocity", it is necessary to modernize the methods of organizing the enterprise's activities, especially product sales. After all, consumer expectations are only growing, and in order to maintain and increase market positions, it is necessary to meet and satisfy them as quickly and accurately as possible. It is also extremely important to be able to distinguish between those changes and problems in the enterprise's activities that are caused by the COVID-19 pandemic (they are temporary) and those that are representing market change trends (they are inevitable and have a strategic meaning).

Since each enterprise under the of COVID-19 conditions has its own specific problems that need to be solved, there is no single correct way to change its activity. However, changes in marketing activities, in particular in the context of its digitalization, are today the basis of ensuring the competitiveness of the enterprise. After all, in today's conditions, marketing is aimed at maintaining the trust of buyers and business partners and involves close active communication, but in a new format. That is why it is important to develop and implement an updated program of marketing activities aimed at increasing the enterprise's business activity and strengthening its market position.

6. Digitization as a tool to improve the enterprise's business activity under the COVID-19 conditions

The spread of the use of digital technologies at various stages of business activity is a modern requirement and a provocation from COVID-19. The COVID-19 pandemic has made the issue of digitization a priority to ensure the enterprise's efficiency. Therefore, the transition to innovation and digitalization of business processes is the basis for improving the enterprise's business activity.

In the process of activities digitalization, the enterprise needs to solve the following tasks:
- improvement of the information policy with the aim of increasing competitive advantages in the market thanks to the increase of population awareness about the enterprise's products;
- optimization of information flows and communications;
- development of the existing technical and technological support for promising digitization processes.

Studies show that the costs for marketing activities digitization make up approximately 25% of the marketing budget. The main reason why it is advisable to digitize the enterprises' activities specifically in terms of marketing is that today traditional marketing tools have lost their effectiveness. People spend a significant amount of time using a smartphone, computer, or TV screen, so they do not pay attention to external advertising, but on the contrary, they readily respond to Internet advertising, that is, to online tools. There are many opportunities to digitize the enterprise's advertising activities, because the creation of Internet sites, promotion in social networks, lead generation, QR codes, and other ways of disseminating information about the enterprise's products are actively developing and gaining popularity today.

In particular, we can recommend enterprises activate SMM. This will make it possible to expand the range of customers, acquaint them with the range of products and prices and, as a result, increase sales volumes. In the context of the COVID-19 pandemic, websites, pages on social networks, updated content and the flow of consumer feedback are especially important for maintaining consumer confidence in the enterprise's activities in general and in its products in particular [3].

In fact, the quarantine restrictions provoked by the fight against the COVID-19 pandemic became an impetus for the activation of online trade, the creation of automated stores, product delivery (in particular, address delivery of small volumes of products), and robotization of production.

Such measures are relevant today. The main task of enterprise managers under the COVID-19 conditions is not so much to minimize losses and prevent bankruptcy but to use the crisis period to transform work, rethink development vectors and find opportunities to increase the enterprise's competitiveness.

According to the authors [35], the main way to attract customers under the COVID-19 conditions is effective marketing and impeccable reputation. Therefore, enterprises need to focus on measures that

will contribute to the "recognizability" of the brand and the growth of consumer loyalty to the enterprise's products, the improvement of product delivery, the development of online trade, as well as the improvement of the Internet site in order to improve the process of online ordering. It is also possible to reduce costs by reviewing sales costs in the part of advertising that is not relevant in the context of the COVID-19 pandemic.

It is certain that the effectiveness of the implementation of measures to improve the enterprise's business activity will be largely determined by the correctness and velocity of their implementation, digital technologies, and innovations that will be used to digitize certain areas of activity under the COVID-19 conditions.

Summarizing the above, it is possible to generalize the measures recommended for the enterprise, which will contribute to the improvement of business activity under the COVID-19 conditions. Summary information is presented in Table 3.

Table 3
Recommended measures to improve the enterprise's business activity through activities digitalization and the expected risks of their implementation

#	Measures	Risks
1	Improve the information policy in order to increase competitive advantages in the market thanks to the increase of public awareness about the enterprise's products by optimizing information flows and communications	Exceeding the budget due to significant inflation rates. Lack of income due to state regulation of product prices.
2	Improve the existing technical and technological support of the enterprise in order to enable the digitization of some processes	Exceeding the budget due to unaccounted payments
3	Increase the efficiency of the property usage thanks to the implementation into the production of such types of products that are currently in high demand	Impossibility of purchasing equipment due to the lockdown. Difficulties in personnel training
4	Modernize marketing activity with the formation of a dominant online line of its implementation, namely: digitize advertising activity	–
5	Modernize the methods of organizing the enterprise's activities in general, and in matters of product sales in particular, in order to meet the expectations of consumers, namely to improve the website in order to improve the process of online ordering	Insufficient volume of online orders for the planned profit growth
6	Review sales costs in the part of advertising that is not relevant in the context of the COVID-19 pandemic	–
7	Increase the competitiveness of the products (quality, packaging, etc.), as well as consider opportunities and prospects for entering new sales markets	Difficulties in the activities internationalization. Impossibility of changing the products' packaging. Lack of buyers' interest in higher quality, but more expensive products

Each measure will be accompanied by a certain amount of expenses, will provide a certain amount of income in the future, and will also be implemented under the influence of certain risks. The common thing is a positive impact on the enterprise's business activity because all the recommended measures are aimed at improving the enterprise's market position.

In summary, we can say that thanks to the implementation of recommended measures to improve the enterprise's business activity, there will be an improvement in turnover ratios, an increase in financial results, and an exit from the loss zone. Such results of activity improvement are desirable for every enterprise, therefore it is advisable to make decisions about their implementation. Since the COVID-19 pandemic is making adjustments to the ability of enterprises to implement a set of measures, it is advisable, first of all, to implement those that require the least resources and time and the results of which are expected to have a positive impact on the enterprise's activities.

7. Conclusions

Searching for ways to develop business under the COVID-19 conditions is relevant today. That is why the research is devoted to improving the enterprises' business activity under the COVID-19 conditions. The basis for developing correct recommendations for business is a detailed analysis of data related to its activity, because the COVID-19 pandemic has caused non-standard and unexpected changes in all spheres of life.

In particular, the results of the Big Data Analysis on the enterprises' business activity under the COVID-19 conditions showed that there was a real need to implement internal changes in the business. 75% of enterprises under the COVID-19 conditions were forced to reduce their activities, and 11% – to stop their activities at all. Consequently, in the context of the COVID-19 pandemic, enterprises have to change their approaches to doing business, adjust their production processes, and adapt to changes. That is why the business activity of most of them will undergo changes.

The economic-mathematical model for calculating the integral indicator of the enterprise's business activity that continued to work under COVID-19 conditions is proposed in the article. It will allow to unify the approach to the identification and improvement of the level of the enterprise's business activity in an unstable business environment when it is impossible to achieve growth of all indicators of business activity.

Measures to increase the enterprise's business activity, which are relevant under the COVID-19 conditions, were proposed. In order to increase business activity, enterprises are recommended to use digital tools more widely, modernize marketing activities with the formation of a dominant online line of its implementation, as well as to strengthen market positions by expanding the range of consumers and product sales markets.

Separately, the research considers digitalization as a tool for improving the enterprise's business activity under the COVID-19 conditions. The transition of enterprises to innovation and digitization of business processes is the basis for improving their business activity.

Big Data Analysis is the basis of decision-making in the conditions of change. Considering the non-standard nature of doing business under the COVID-19 conditions, and the need for a thorough understanding of the situation and the factors affecting it, thanks to the application of innovative information approaches to Data Analysis, it is possible to act rationally and develop the business.

In further research, it is advisable to develop approaches to modeling the impact of the COVID-19 pandemic on various areas of life, including the economy, as well as to form recommendation systems that will simplify the lives of both individuals and business entities affected by the COVID-19 pandemic.

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