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Towards Financing System of Integrated Enterprise Development in the Time of COVID-19 Outbreak

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Abstract: The development of an enterprise under current conditions requires an integrated approach and an appropriate financing system. The purpose of this study is to justify the replication model of financing the integrated enterprise development. The research methodology suggests that each enterprise has its own development "genome", which makes it possible to apply the replication of its directions based on a justified financing system of such an integration. The proposed replication model is augmented by regression analysis, which made it possible to carry out scenario forecasting of alternative options for the company's development. The conduction of the study is based on 16 textile enterprises. The formed map of the integrated enterprise development enabled the determination of their points to replicate resources in four directions (environmental and economic, innovative, informational, and organizational). The interaction of companies on the basis of strengths diffusion (exchange of potential) with the application of financial netting is considered an alternative to replication. The research proved that an alternative option can solely be recommended for developed companies and requires the identification and minimization of risks. The strong link between the level of integrated and overall development of companies was acknowledged. Asymmetry of business development in the context of a replication model of its integration enables the achievement of high results while minimizing financial resources. Enterprises implementing the replication model of integration considerably improve their prospects and increase overall development performance. The application of the replication model of financing integration under the crisis and the COVID-19 pandemic fosters efficient use of financial resources and the overall enterprise development.

Keywords: enterprise development; financial indicators; financing system; COVID-19; model; potential exchange; regression; replication

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1. Introduction

With the growing globalization of enterprise networking, the relationship between enterprises operating in a single economic space is becoming particularly important for their functioning and development. The availability of domestic financial resources alone does not guarantee success for a company, and modelling relationships with a wide range of stakeholders is an integral part of doing business (Di Maddaloni and Davis 2017).

Each enterprise possesses the development potential due to internal and external sources. The internal ones are implemented by increasing the efficiency of the assets

available to the enterprise, improving productivity, and introducing product innovations. However, under the crisis conditions, enterprises have to operate mainly amidst a decline in sales due to a decrease in demand and purchasing power (Li et al. 2021). Product innovations typically require large capital investments in manufacturing technology, which is also currently scarce (Casadei and Iammarino 2021). Enhancement of operational efficiency, i.e., improving product quality while reducing costs, is also an unlikely source of growth, due to rising raw material costs for many businesses (Mallinguh et al. 2020). Given the negative impact of the COVID-19 pandemic, businesses found themselves in a new operating environment with many challenges to transforming their usual development. Problems with the supply of imported raw materials and products resulting from restrictions during the spread of coronavirus infection give rise to the localization of chains in a small number of companies, while most enterprises are dependent on imports to a certain extent (Bontempi and Coccia 2021). The pandemic has increased the risk of growing productivity gaps between companies. Enterprises that have not yet recovered will lag behind their competitors who have managed to faster adapt their business models and development processes to new conditions. This requires new, well-grounded approaches to creating interactions with relatively limited financial resources (Verbeke and Yuan 2021). By pooling efforts and implementing common projects or business processes, companies form the ground for integrated development, which requires a sound financing system (Obrenovic et al. 2020). In this regard, there is a need to improve the methods of justifying financial needs and tools to improve the enterprise performance, as well as to form the directions for the practical implementation of financial mechanisms for the integrated enterprise development. The motivational factor of this study is the identification of new opportunities that enterprises may have in times of crisis. The study aims to fill the research gap in the context of substantiating the directions of financial support for the integrated enterprise development through the process of elaboration of an effective methodological toolkit. All the above-mentioned considerations determined the purpose of this study, which is to create a replication model for justifying the financing system of the integrated enterprise development.

The contribution of this study is the development and testing of a replication model for financing the integrated development of enterprises. Its application for companies with a low development level contributes to accelerating development and achieving rates that exceed indicators of more developed companies. An alternative option of forming a financing system based on the potential exchange can solely be recommended for developed companies and requires the identification and minimization of risks. The study compared the effectiveness of the replication model and companies' interaction based on the strength diffusion with the application of financial netting in the context of the COVID-19 crisis. A comparative analysis of the obtained results pursuant to two approaches is aimed at identifying the advantages or limitations of the replication model in the context of increasing the overall enterprise development. The research proves that companies, which implement integrated development based on a replication model, can be way ahead of those using traditional business development in the context of the COVID-19 pandemic. Enterprises implementing the replication model of integrated development financing can considerably increase their prospects, as well as the general effectiveness of their development. Companies focused on integrated development based on a replication approach can use their financial resources more efficiently while significantly improving the overall level of business development under the COVID-19 crisis.

The structure of the article comprises a literature review, a description of the applied methodology, the research results, their discussion, and conclusions. The literature review gave an opportunity to define the integrated enterprise development as a comprehensive interaction of internal and external determinants of the companies' efficiency providing for optimal coordination, synchronization, and coherence of financing the relationships above. In addition, a scientific gap was identified in the context of substantiating financial needs and tools to increase performance, as well as to create directions for the practical

implementation of financial mechanisms for integrated enterprise development. The corresponding research hypotheses were formed. The Methodology section describes the stages and components of the proposed toolkit. The Results demonstrate the approbation of the developed methodological approach exemplified by the textile companies. The Discussion highlights the advantages and limitations of the study, and the practical application of the proposed methodology, in comparison with the results of other scientists. The final section of the article is Conclusions, which is formed on the basis of the obtained results and characterizes the contribution of the study, its limitations, and its prospects.

2. Literature Review

In the current circumstances, financing the integrated development of a company is often associated with the network interaction of companies, which characterize inter-organizational relations between enterprises. They can be grouped as follows:

- Vertical relationships involving suppliers, intermediaries, and customers (Wang et al. 2021);
- Horizontal relationships formed on the basis of competitors, cooperators, and all kinds of associations and business networks (Dźwigoł 2019; Mazzarol et al. 2018);
- Relationships in rigid integration structures based on the hierarchy between the parent company and its subsidiaries (Cuervo-Cazurra et al. 2019; Lee et al. 2019);
- Personal relationships remain outside economic interests, between owners or managers of enterprises (Amoako-Gyampah et al. 2019).

The development of the financial system is based on a platform of inter-organizational relations that go through such stages: the selection of partners, the definition of purposes and constraints, the creation of value and support of cooperation at the appropriate level. Meanwhile, there is a completely different view, according to which the formation of such relations is considered in terms of enterprise management, which is aimed at efficiency and business development. Here, relationships are regarded as assets that, if properly managed, can be used to achieve significant business performance, provided that the principles of systems are respected and that their own goals and strategies in relationship management are clearly defined (Zhou et al. 2018; Garg and Sharma 2020). In the process of integrated development, the operating environment of an enterprise is defined as a set of objects that directly or indirectly influence it but are not related to its structure (Wang et al. 2018).

In modern conditions, the success of the enterprise operation depends on the external environment and leaves a mark on the search for new models of the relations management between business entities. In management theory, there are two approaches known for building relationships between an enterprise and its environment: traditional and dynamic. The traditional approach creates a simple model of relations and identifies the enterprise with its owners, who, therefore, gain dominant influence on its activities. From this position, the interests of the owners are to maximize the enterprise's profit (Raykov 2017). The rest of the relationship of the enterprise (with other entities) mainly relies on market transactions on a contractual basis. This model of a monolithic organization structure is formed by the aforementioned types of relations, and the enterprise itself has clearly defined boundaries and is a source of income through efficient selection and allocation of resources. Meanwhile, enterprise relationships are limited to bi-directionality (Frynas et al. 2017; Lee et al. 2020).

In circumstances when the internal and external environment of the organization are not dynamic, a temporary static system of internal and inter-organizational relations is emerging (including suppliers and clients), which for a short period ensures the continuity and consistency of the enterprise's business processes and the corresponding level of financing (Arena et al. 2017). On the other hand, the basic content of such relations is the unilateral use of external stakeholders in the supply of material and financial and human resources to harmonize the enterprise's internal strategy. In other words, such relations reflect a concentration-based structure, with a monolithic entrepreneurial organizational structure at the center. It is clearly separated from stakeholders by its external environment (Pervan et al. 2018).

Another approach, which forms the modern financing model of integrated development, is based on expanding the influence of the environment on the enterprise's purposes and economic performance. The essence of such a model is realized in terms of double responsibility—to the owners and other subjects of the enterprise's operating environment. According to this dynamic approach, the model of organizing and financing the development of interest relationships is considerably different from the previous one (Davies and Chambers 2018).

It should be taken into consideration that the purposes of other entities may not always coincide with those of the originator of the integrated relationship itself, but sometimes can be opposite. Despite this, other actors have a significant influence on the enterprise operation, and, therefore, a purely financial relationship with them will not always be successful (and in some cases will have negative consequences) (Sutduean et al. 2019). In the dynamic model, relationships are being reoriented from centric (directed inward of the enterprise) to relations oriented to the external environment. A shift in the vector of relations facilitates a reorientation in the exchange from tangible to intangible assets, as well as a shift in the classic hierarchical organizational structures (by partially replacing vertical linkages with horizontal ones) to more flexible and dynamic business networks (Williams 2018). A dynamic, network-oriented enterprise relationship model of interest assumes a continual opportunity to expand the structure. However, it is always necessary in such a model to promote the dynamic growth of key competencies at the expense of existing and new participants in order to guard against disintegration processes and increase stakeholder interest (Shin and Park 2017).

Given the crisis caused by the COVID-19 pandemic, financing company development requires a specific approach to risk management (Obrenovic et al. 2020), risk mitigation based on financial transactions using FINTECH under the COVID-19 crisis (Vasenska et al. 2021), digital data aggregation, analysis, and infrastructure in the context of innovative technology-based financial services (Ionescu 2020). There are studies based on the implementation of the traditional Cost-Benefit and Total Cost of Ownership analyses, which provide the developed cost and income functions, the calculated Benefit/Cost ratio, as well as determine the efficiency source of a FINTECH company in comparison with a traditional bank (Popova 2021). The validity of the regulatory approach to the assessment and management of the enterprise's production and financial risk stems from the following:

- The method of financial and economic ratios, which forms the basis of the regulatory approach, allows to correctly reflect risk estimates in the enterprise model (Liang et al. 2018);
- The use of standards of financial and economic coefficients corresponding to the market practice of the enterprise makes it possible to form a homogeneous system of model constraints, in which some of the variables are also related by balance ratios (Ketteni and Kottaridi 2019).

At the current stage of economic development, studies of the synergistic effect as a result of the integration of certain components of the enterprise's operation process have gained considerable popularity (Ho et al. 2019). However, nevertheless, scientific guidelines in this area of research are multidirectional and multifaceted. The issue of developing a comprehensive methodological toolkit for assessing the effectiveness of financing the integrated enterprise development, taking into consideration the specifics of its operation, remains a pressing issue.

Since the management of integrated enterprise development involves the choice of an effective business model, it should be considered as an engineering process. Given the complexity of strategic decision-making, the purpose of this study is to develop a methodological approach to define the optimal network business model of an enterprise, taking into account the possibilities of its integrated functioning.

In this study, the integrated development of an enterprise is considered as a set of ways for the interaction of internal and external determinants of the effectiveness of companies' performance, ensuring optimal coordination, synchronization, and coherence of financing relationships, taking into consideration economic, innovation, information, and organizational guidelines.

This study is aimed at developing a methodological approach to the justification of the financing system of integrated enterprise development based on identifying alternative options for interactions between companies. At the same time, the effectiveness of the financing system is based on determining the level of synergistic effect resulting from the integration of its identified concentration directions on the basis of the established system of enterprise performance indicators. Based on the literature review and the resulting objective, the study identified the following hypotheses:

Hypotheses 1 (H1). *The highest level of development is achieved when companies interact based on strength diffusion (exchange of potential) with the application of financial netting.*

Hypotheses 2 (H2). *The highest level of development is achieved when companies are integrated using financial replication.*

3. Materials and Methods

The methodology of this study is based on the authors' approach to creating a financing system of the integrated enterprise development based on both a replication model and a regression analysis. At the same time, the study compares two approaches to financing integrated development based on the exchange of potential and the replication model in order to confirm the resulting hypotheses. In general, the research process helps to identify the following stages.

The first stage is the sampling of enterprises. The conduction of the study is based on 16 textile enterprises from the European Union. Consideration of these companies is based on the assumption that the textile industry is one of the largest industries, providing goods to the consumer and material markets in various sectors of the economy, thus giving a major boost to the development of retail and wholesale trade. The current situation regarding the epidemic has proved that industries are literally vital to protecting citizens. The spread of the COVID-19 pandemic resulted in considerable world trade disturbances in the target markets of the textile industry, complicated market conditions in both domestic and foreign markets, logistics of export–import operations, competitiveness in target markets for light industry goods, and so forth. Therefore, textile companies require a thorough analysis of funding opportunities for their development based on the identification of dominant factors of influence in their environment and the development of alternative options in the context of integration. The key criteria for the selection of these enterprises were an existence history of more than five years, an average number of employees of 50–250 people, and a volume of annual proceeds from product sales of €10–50 million. Since calculations required information that is not available in the public financial statements, these companies were asked to participate in the research. Fifty requests were sent out, but precisely 16 companies expressed interest in participating in the study. Their geographical distribution is the following: Czech Republic, Germany, Italy, Croatia, France, Spain, Portugal, Hungary, Switzerland, Belgium, Bulgaria, Austria, Lithuania, Greece, and Croatia. When conducting the study, we used data from international financial statements, as well as indicators provided by companies at the research request. At the same time, no difficulties arose in comparing the data obtained and there was no impact on the credibility of the research results. At the same time, the wish of the company's top management not to disclose information about the companies in exchange for providing commercial information was taken into consideration. For convenience, company names are encrypted (A, B, C, etc.).

The second stage is to diagnose the development level of the studied companies.

During the second stage, a standardized matrix of parameters for indicators was highlighted. These indicators were standardized owing to the fact that they differ and cannot be compared. Accordingly, the matrix X was replaced by the matrix Z. The values of the components of the Z-matrix were calculated in accordance with the formula above (1):

$$Z_{ij} = \frac{x_{ij} - \overline{x_j}}{\sigma_j} \quad (1)$$

where $\overline{x_j}$ is the quadratic mean value of the j-th indicator, and σ_j is the average deviation of the j-th indicator. In order to calculate these characteristics, Formula (2) was used:

$$\sigma_j = \left[\frac{1}{m}\sum\left(x_{ij} - \overline{x_j}\right)^2\right]^{1/2} \quad (2)$$

At this stage, a "benchmark" was formed by differentiating the values of the observation matrix indicators. At the same time, all indicators were distributed according to the categories "stimulants" and "de-stimulants". Their distribution into two groups was based on determining the degree of their influence on enterprise efficiency. Indicators that were characterized by a positive impact were considered stimulants. On the other hand, indicators causing a negative effect on the enterprise activities were considered de-stimulants (Andrusiv et al. 2020). If a company seeks to increase the value of a certain indicator, that is, its maximization is a positive effect, then this indicator can be considered a stimulant, and if an increase in a certain indicator characterizes a decrease in the general efficiency of the enterprise, that is, it requires minimization of its value, then this indicator is a de-stimulant. Based on this distribution, a control point (P0) was formed with the following parameters: $Z_{01}, \ldots, Z_{02}, \ldots, Z_{0m}$, which were obtained using Formulas (3) and (4):

$$Z_{0j} = maxZ_{ij}, \text{ if } j \in J \quad (3)$$

$$Z_{0j} = minZ_{ij}, \text{ if } j \notin J \ (j = J, \ldots, m) \quad (4)$$

where J is a set of incentive indicators, and Z_{ij} is the standardized value of the j-th index for the i-th year.

The Euclidean distance calculation was also carried out. The calculation of the distance between single points and the point P0, which forms the control point, was carried out in accordance with Formula (5).

$$C_{i0} = \left[\sum_{j=1}^{n}\left(Z_{ij} - Z_{0j}\right)^2\right]^{1/2} \quad (5)$$

In the obtained distance values, the initial values used to calculate the integral indicator were presented.

The calculation of the integral indicator of the development level of enterprises was made in accordance with Formula (6).

$$D_i = 1 - \frac{C_{i0}}{C_0} \quad (6)$$

where,

$$C_0 = \overline{C_0} + 2{\cdot}\sigma_0 \quad (7)$$

$$\overline{C_0} = \frac{1}{n}\sum_{i=1}^{n} C_{i0} \quad (8)$$

$$\sigma_0 = \left[\frac{1}{n}\sum_{i=1}^{n}\left(C_{i0} - \overline{C_0}\right)^2\right]^{1/2} \quad (9)$$

D_i is an integral indicator of the level of development of enterprises. Its logic is that it is a taxonomic indicator that demonstrates the effectiveness of the transformation of a set of indicators over a certain period. This study assumes that the financial side in the context of development cannot be determined, for example, by a simple comparison of growth of indicators for the period but requires taking into account the changes made in the period under study, as a process of business development. The higher the value of the indicator D_i, the higher the development level of the enterprise (Sergiienko et al. 2020).

The study suggests a diagnosis of the overall development level and integrated enterprise development. A system of key indicators, which is given in Table 1, was used in order to assess the level of the general development of the studied companies. It displays the financial performance of the company with due regard for the diversified areas of business functioning. The indicators included in Table 2 were used to assess the level of integrated development. The proposed indicators are the baseline for integral indicators in four areas of company development (economic, innovative, informational, and organizational).

Table 1. Initial data for calculating the development level of the enterprise (fragment, company A).

Indicator	2016	2017	2018	2019	2020	Mean	Standard Deviation
Current asset turnover, times	1.83	1.79	1.71	1.49	1.44	1.65	0.18
Stock turnover, times	1.53	1.57	1.49	1.45	1.31	1.47	0.10
Accounts receivable turnover, times	63.21	23.49	62.87	8.88	8.01	33.29	27.84
Cash ratio	0.22	0.38	0.57	0.10	0.19	0.29	0.19
Quick ratio	0.33	0.64	0.69	1.10	0.96	0.74	0.30
Current ratio	4.36	3.42	4.45	5.95	5.62	4.76	1.03
Autonomy ratio	0.97	0.97	1.01	1.05	0.97	0.99	0.03
Leverage ratio	0.24	0.24	0.19	0.14	0.18	0.20	0.04
Maneuverability ratio of own funds	0.34	0.35	0.41	0.42	0.37	0.38	0.03
Product profitability	6.12	29.09	25.36	15.72	15.27	18.31	9.09
Return on production	7.39	31.71	27.20	15.85	16.22	19.67	9.73
Return on assets	2.69	12.44	11.58	6.45	6.95	8.02	4.01
Labor profitability	5.10	5.76	4.54	4.84	4.59	4.97	0.50
Financial productivity	7.54	40.65	45.61	33.08	16.71	28.72	16.12
Arming workers with intangible assets	0.01	0.08	1.05	3.70	3.80	1.73	1.89
Beaver ratio	−0.51	0.09	0.01	−0.51	−0.50	−0.28	0.30
Financial leverage	0.20	0.20	0.16	0.12	0.13	0.16	0.04
Liability coverage ratio	4.36	3.42	4.45	5.95	5.35	4.71	0.98
Drift ratio	0.68	0.73	0.77	0.68	0.69	0.71	0.04
Suitability ratio	0.49	0.44	0.40	0.49	0.49	0.46	0.04
Return on assets	9.29	12.44	14.47	8.34	8.59	10.63	2.71
VAIC	0.00	1.49	0.64	0.00	0.14	0.46	0.64
Integrated indicator	0.52	0.41	0.53	0.71	0.84	0.60	0.17
Tobin's q	0.12	0.21	0.20	0.16	0.18	0.17	0.03

Source: Formed by the authors based on enterprise materials.

Table 2. Matrix of the integrated development of the company "3M".

Level	Economic (EL)	Innovation (InnL)	Information (InfL)	Organizational (OL)
Micro	Indicator of production capacities integration (PCI)	Indicator of technological integration (TI)	Information integration indicator (InI)	Indicator of management flexibility (MF)
Meso	Level of production diversification (PD)	Indicator of scientific integration (SI)	Indicator of the marketing activities efficiency (MAE)	Business activity indicator (BA)
Macro	Market integration indicator (MI)	Consumer tolerance indicator (CT)	Target market integration indicator (TMI)	Maneuverability indicator of the integrated structure (MIS)

Source: Authors' elaboration.

The source data for the calculations were provided by the studied companies. Key indicators were calculated based on the financial statements. Given the large amount of initial data for determining the development level of 16 enterprises, they are partially shown in Table 1.

The third stage is modeling the integrated enterprise development компаний (Integrated Development Indicator—IDI) based on the replication approach. This study proposes the authors' vision of the financing system of integrated enterprise development, which is ensured through mutually beneficial cooperation between them. At the same time, the most effective areas of business development, which become paired points of contact, should be taken into consideration. It is also necessary to take into account the levels of possible integration, which are displayed in Table 2. The "3M" matrix takes into

account the key areas of integrated development at three levels (micro, meso, and macro), expressed through the indicator system. The proposed approach to assess the level of integrated development suggests that companies require interaction at three levels. The micro-level implies the self-integration of the company, meaning that the financing system is focused on the internal business development processes. The meso-level constitutes a layer of indication of the business readiness (its capabilities) to integrate with other entities, such as competing companies, government agencies, educational establishments, research institutes, public organizations, foundations, and others. The macro-level involves the evaluation of indicators that demonstrate the development potential at the national level providing the opportunity to integrate with other actors in the context of target markets at the national or international levels.

To develop a map of integrated development, the indicators in four areas should be determined. They are the mean of normalized development indicators in the context of micro-, meso-, and macro-levels. The above-mentioned can be shown as follows:

$$EL = (PCI + PD + MI)/3 \tag{10}$$

$$InnL = (TI + SI + CT)/3 \tag{11}$$

$$InfL = (Inl + MAE + TMI)/3 \tag{12}$$

$$OL = (MF + BA + MIS)/3 \tag{13}$$

The generated matrix can be expanded and contain more indicators characterizing business integration. This study provides an example of a matrix based on a minimum set of indicators.

The Shannon–Wiener index was used to determine the Integrated Development Indicator (IDI) according to the following formula:

$$\text{IDI} = \frac{-1}{\log N} \sum_{n=1}^{N} p_n \cdot \log(p_n), \tag{14}$$

where IDI is an indicator of the level of business development integration; N is the total number of indicators included in the diagnostics system; p_n is the share of the n-th indicator in this system.

Given the asymmetry of development, there is an opportunity to raise it through synergetic effect. In order to determine the number of resources to be exchanged, a replication step is suggested, calculated as follows:

$$RS = \left| \left(I^k_{max1} - I^k_{min2} \right) - \left(I^j_{max2} - I^j_{min1} \right) \right| \tag{15}$$

where RS is the replication step; I^k_{max1} is the maximum indicator of the first integrated enterprise in the k-м the most effective development direction; I^k_{min2} is the minimum indicator of the second integrated enterprise in the k-м the least effective development direction; I^j_{max2} is the maximum indicator of the second integrated enterprise in the j-м the most effective direction of development; I^j_{min1} is the minimum indicator of the first integrated enterprise in the least effective direction of development.

During the replication process, the integrated indicator is determined based on the addition to the replication step, that is:

$$II^k_1 = I^k_{max} - RS \tag{16}$$

$$II^k_2 = I^k_{min} + RS \tag{17}$$

$$II^j_2 = I^j_{max} - RS \tag{18}$$

$$II^j_1 = I^j_{min} + RS \tag{19}$$

where, II_1^k, II_2^k, II_2^j, II_1^j are paired integrated indicators of the 1st and 2nd enterprises by the points of convergence (k and J) of their development.

Therefore, the replication step takes into consideration the possibilities of integration at certain points of convergence between companies (k and J). In its turn, this takes into account the fact that the company is not motivated to integrate more outward than to accept. This contributes to balancing the processes of integrated development and the possibilities of effective asymmetries transformation. The replication approach is shown schematically in Figure 1.

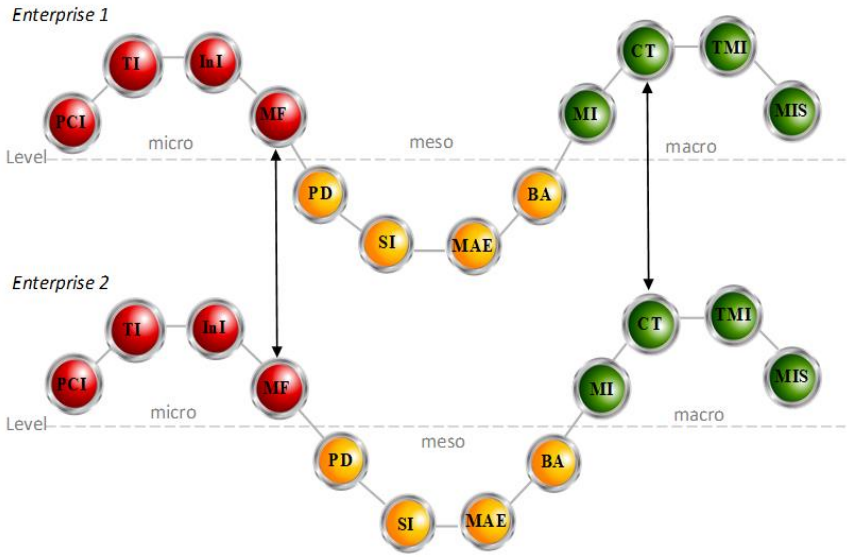

Figure 1. Pair replication of the integrated enterprise development. Note: PCI—Indicator of Production Capacities Integration; TI—Indicator of Technological Integration; InI—Information integration indicator; MF—Indicator of Management Flexibility; PD—Level of Production Diversification; SI—Indicator of Scientific Integration; MAE—Indicator of the Marketing Activities Efficiency; BA—Business Activity Indicator; MI—Market Integration Indicator; CT—Consumer Tolerance Indicator; TMI—Target Market Integration Indicator; MIS—Maneuverability Indicator of the Integrated Structure. Source: Formed by the authors.

The fourth stage is modelling the integrated enterprise development based on the potential exchange. Since today it is widely believed that integration involves obtaining or providing access to the potential of an integrated company, this study also considers an approach to increasing the development level based on the exchange of companies' potentials, namely, their full integration:

$$II_{1,2}^k = \sqrt{{I_{max1}^k}^2 + {I_{min2}^k}^2} \tag{20}$$

$$II_{1,2}^j = \sqrt{{I_{max2}^j}^2 + {I_{min1}^j}^2} \tag{21}$$

where $II_{1,2}^k$ and $II_{1,2}^j$ are paired integrated indicators for the respective points of convergence (k and J) in development.

The initial data for the third and fourth stages are given in Table 3.

Table 3. Initial data for calculating the integrated development level of the studied enterprises.

Company	PCI	TI	InI	MF	PD	SI	MAE	BA	MI	CT	TMI	MIS	IDI
A	0.071	0.0177	0.8619	0.9734	0.2839	0.4766	0.0811	0.9654	0.1724	0.0101	0.9532	0.2636	0.849
B	0.0203	0.2839	0.0008	0.6416	0.2332	0.0406	0.2129	0.9532	0.0608	0.872	0.0091	0.2941	0.911
C	0.2251	0.0913	0.5678	0.9227	0.4259	0.1825	0.071	0.872	0.0101	0.0203	0.7402	0.1217	1.020
D	0.9025	0.0986	0.3245	0.003	0.8472	0.1217	0.0304	0.0811	0.2129	0.0051	0.8315	0.142	0.884
E	0.0507	0.1268	0.7504	0.9329	0.0304	0.4563	0.071	0.9227	0.1825	0.0071	0.4867	0.071	0.927
F	0.6012	0.4311	0.5323	0.0438	0.7891	0.2943	0.0501	0.1753	0.1628	0.0063	0.5886	0.1065	1.216
G	0.144	0.2808	0.1753	0.5197	0.0125	0.1315	0.025	0.3816	0.0376	0.1932	0.5385	0.1816	1.266
H	0.2147	0.0564	0.5698	0.3507	0.263	0.1127	0.5385	0.0438	0.0063	0.0105	0.0751	0.4571	1.159
I	0.0019	0.5573	0.2004	0.0002	0.0501	0.5511	0.0188	0.0751	0.0877	0.1315	0.5135	0.0031	0.905
J	0.2632	0.0438	0.0136	0.4634	0.2818	0.5698	0.0313	0.0438	0.0044	0.5761	0.1127	0.3006	1.117
K	0.0677	0.0748	0.8226	0.9291	0.271	0.4549	0.0774	0.5591	0.1645	0.3797	0.9097	0.2516	1.182
L	0.9097	0.1862	0.271	0.0194	0.8033	0.2032	0.0387	0.2226	0.2807	0.0087	0.8323	0.0581	1.008
M	0.0746	0.8716	0.5364	0.0862	0.4023	0.8237	0.067	0.1724	0.0096	0.1149	0.6992	0.0192	1.001
N	0.0029	0.2182	0.3065	0.8524	0.0766	0.1149	0.0287	0.8429	0.1341	0.0048	0.7854	0.2011	0.944
O	0.7088	0.0671	0.8812	0.0479	0.067	0.431	0.8716	0.0287	0.4597	0.0067	0.067	0.1724	0.935
P	0.0231	0.2479	0.3239	0.8925	0.2661	0.2429	0.0463	0.8901	0.0694	0.0104	0.8682	0.3355	1.031

Note: PCI—Indicator of Production Capacities Integration; TI—Indicator of Technological Integration; InI—Information integration indicator; MF—Indicator of Management Flexibility; PD—Level of Production Diversification; SI—Indicator of Scientific Integration; MAE—Indicator of the Marketing Activities Efficiency; BA—Business Activity Indicator; MI—Market Integration Indicator; CT—Consumer Tolerance Indicator; TMI—Target Market Integration Indicator; MIS—Maneuverability Indicator of the Integrated Structure. Source: formed by the authors based on enterprise materials.

The fifth stage is a comparison of the results obtained for two approaches to integrated development. This stage provides for the analysis of the results obtained according to the replication approach and the potential exchange, as well as their comparative characteristics in relation to the development level at the initial stage (2020).

The sixth stage is to determine the mutual relation between the integrated development of enterprises and its general level. The classic analysis of variance, which helps to form a regression model based on the equation, was used at this stage.

The seventh stage is modelling the development level of the studied enterprises. On the basis of the obtained regression equation, the indicators of the development level of the studied enterprises are modelled. The degree of integrated development influence on its general level has been determined.

4. Results

Based on the performance indicators of the studied enterprises, the level of their development as of 2020 was determined. At the same time, the average value of the development level of the studied textile enterprises was highlighted. There is no general trend in development for the enterprises studied. However, at the same time, we can observe an important feature, which is a decrease in the development level for most companies in 2020. This is primarily due to the COVID-19 pandemic, which has considerably influenced productivity, as a key indicator of the textile companies' performance resulting from lockdown and quarantine restrictions. There was also observed a significant decline in the financial performance of the surveyed companies, which substantially reduced their development level in the last year. The lack of a clear trend and the presence of uncertainty reveal the need for companies to join their forces in order to survive in today's environment and get out of the crisis.

By determining the average indicators of integration in four areas of company development (economic, innovation, informational, and organizational), the most successful ones are highlighted. The results are shown in Table 4 in the form of the integrated development map of the studied enterprises.

Table 4. Map of the integrated development of the studied enterprises.

Company	Economic	Innovation	Information	Organizational
A	0.176	0.168	0.632	0.734
B	0.105	0.399	0.074	0.630
C	0.220	0.098	0.460	0.639
D	0.654	0.075	0.395	0.075
E	0.088	0.197	0.436	0.642
F	0.518	0.244	0.390	0.109
G	0.065	0.202	0.246	0.361
H	0.161	0.060	0.394	0.284
I	0.047	0.413	0.244	0.026
J	0.183	0.397	0.053	0.269
K	0.168	0.303	0.603	0.580
L	0.665	0.133	0.381	0.100
M	0.162	0.603	0.434	0.093
N	0.071	0.113	0.374	0.632
O	0.412	0.168	0.607	0.083
P	0.120	0.167	0.413	0.706

Source: Formed by the authors.

The majority of companies have the highest level of integration in 2020 in information and organizational areas. This is quite natural during the pandemic. The economic aspects are successfully integrated in companies D, F, and L.

Since companies can integrate their development only by having common points of contact both in the direction of development and its level (micro, meso, and macro), replication pairs were formed (Figure 2).

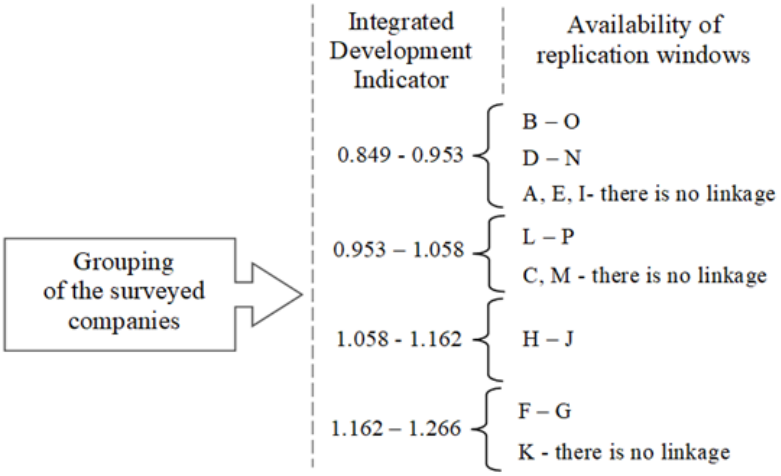

Figure 2. Grouping of the surveyed companies according to paired replication of integrated development. Source: Formed by the authors.

Of the total number of studied enterprises, those for which integration with existing enterprises is not appropriate were identified; therefore, they are excluded from the replication model. These are companies A, C, E, I, K, M. The reason for this is that different groups have different levels of development and there are no replication windows in the context of possible integration. For example, companies A and I, although classified in the same group according to the criterion of development level, have different development outcomes in areas that do not allow for the identification of points of convergence for replication.

For companies in the development of which windows for replication were identified, the proportional distribution of indicators and replication of indicators were carried out according to its specific steps for each pair (Table 5).

Table 5. Share distribution of indicators of the studied enterprises and their replication in the context of integrated development.

Company	PCI	TI	InI	MF	PD	SI	MAE	BA	MI	CT	TMI	MIS	IDI
A	0.014	0.003	0.168	0.190	0.055	0.093	0.016	0.188	0.034	0.002	0.186	0.051	0.823
B	0.006	0.078	0.025	0.177	0.064	0.011	0.059	0.239	0.017	0.241	0.003	0.081	0.802
C	0.053	0.021	0.134	0.217	0.100	0.043	0.017	0.205	0.002	0.005	0.174	0.029	0.822
D	0.239	0.027	0.090	0.013	0.235	0.034	0.008	0.023	0.059	0.001	0.231	0.039	0.779
E	0.012	0.031	0.184	0.228	0.007	0.112	0.017	0.226	0.045	0.002	0.119	0.017	0.793
F	0.159	0.114	0.141	0.029	0.191	0.078	0.013	0.046	0.043	0.002	0.156	0.028	0.873
G	0.055	0.107	0.067	0.181	0.022	0.050	0.010	0.146	0.014	0.074	0.205	0.069	0.890
H	0.080	0.021	0.208	0.130	0.097	0.042	0.200	0.016	0.002	0.007	0.028	0.169	0.833
I	0.001	0.254	0.091	0.000	0.023	0.252	0.009	0.034	0.040	0.060	0.234	0.001	0.729
J	0.097	0.016	0.008	0.171	0.104	0.211	0.012	0.016	0.002	0.210	0.042	0.111	0.818
K	0.014	0.015	0.166	0.187	0.055	0.092	0.016	0.113	0.033	0.077	0.183	0.051	0.883
L	0.212	0.049	0.071	0.030	0.210	0.053	0.010	0.058	0.073	0.002	0.217	0.015	0.831
M	0.019	0.225	0.138	0.022	0.104	0.212	0.017	0.044	0.002	0.030	0.180	0.005	0.804
N	0.013	0.061	0.086	0.227	0.021	0.032	0.008	0.236	0.038	0.001	0.220	0.056	0.794
O	0.186	0.018	0.207	0.013	0.018	0.113	0.229	0.032	0.121	0.002	0.018	0.045	0.808
P	0.031	0.059	0.077	0.186	0.063	0.058	0.011	0.211	0.016	0.002	0.206	0.080	0.849

Note: PCI—Indicator of Production Capacities Integration; TI—Indicator of Technological Integration; InI—Information integration indicator; MF—Indicator of Management Flexibility; PD—Level of Production Diversification; SI—Indicator of Scientific Integration; MAE—Indicator of the Marketing Activities Efficiency; BA—Business Activity Indicator; MI—Market Integration Indicator; CT—Consumer Tolerance Indicator; TMI—Target Market Integration Indicator; MIS—Maneuverability Indicator of the Integrated Structure. Source: Formed by the authors.

The resulting indicators were transformed back from percentages to coefficients. Thus, the results of integrated development for each of the enterprises were obtained (Table 6).

Table 6. Results of integrated development of companies under the replication model.

Company	PCI	TI	InI	MF	PD	SI	MAE	BA	MI	CT	TMI	MIS	IDI
A	0.071	0.018	0.862	0.973	0.284	0.477	0.081	0.965	0.172	0.010	0.953	0.264	0.849
B	0.020	0.284	0.089	0.642	0.233	0.041	0.213	0.865	0.061	0.872	0.009	0.294	1.028
C	0.225	0.091	0.568	0.923	0.426	0.183	0.071	0.872	0.010	0.020	0.740	0.122	1.020
D	0.860	0.099	0.325	0.046	0.847	0.122	0.030	0.081	0.213	0.005	0.832	0.142	0.949
E	0.051	0.127	0.750	0.933	0.030	0.456	0.071	0.923	0.183	0.007	0.487	0.071	0.927
F	0.601	0.431	0.532	0.109	0.724	0.294	0.050	0.175	0.163	0.006	0.589	0.107	1.277
G	0.144	0.281	0.175	0.475	0.058	0.132	0.025	0.382	0.038	0.193	0.539	0.182	1.316
H	0.215	0.056	0.562	0.351	0.263	0.113	0.539	0.044	0.006	0.019	0.075	0.457	1.171
I	0.002	0.557	0.200	0.000	0.050	0.551	0.019	0.075	0.088	0.132	0.514	0.003	0.905
J	0.263	0.044	0.022	0.463	0.282	0.570	0.031	0.044	0.004	0.568	0.113	0.301	1.128
K	0.068	0.075	0.823	0.929	0.271	0.455	0.077	0.559	0.165	0.380	0.910	0.252	1.182
L	0.813	0.186	0.271	0.116	0.803	0.203	0.039	0.223	0.281	0.009	0.832	0.058	1.111
M	0.075	0.872	0.536	0.086	0.402	0.824	0.067	0.172	0.010	0.115	0.699	0.019	1.001
N	0.045	0.218	0.307	0.810	0.077	0.115	0.029	0.843	0.134	0.005	0.785	0.201	1.007
O	0.709	0.067	0.788	0.048	0.067	0.431	0.872	0.122	0.460	0.007	0.067	0.172	1.028
P	0.129	0.248	0.324	0.786	0.266	0.243	0.046	0.890	0.069	0.010	0.868	0.336	1.138

Note: PCI—Indicator of Production Capacities Integration; TI—Indicator of Technological Integration; InI—Information integration indicator; MF—Indicator of Management Flexibility; PD—Level of Production Diversification; SI—Indicator of Scientific Integration; MAE—Indicator of the Marketing Activities Efficiency; BA—Business Activity Indicator; MI—Market Integration Indicator; CT—Consumer Tolerance Indicator; TMI—Target Market Integration Indicator; MIS—Maneuverability Indicator of the Integrated Structure. Source: Formed by the authors.

For all companies integrated under the replication model, an increase in the level of integrated development can be observed. This confirms the applicability and effectiveness of the replication model. Company G has the highest level of efficiency, with a 4% increase in development efficiency compared to the 2020 baseline. However, the largest increase in development efficiency is observed in companies B (12%), L (10%), and P (10%). The slowest increase is observed for H and J—1%, although they were in the group with an average development level. This indicates that the replication model allows for integration by even low-growth companies, while achieving a breakthrough that exceed those of more advanced companies.

This study also considers the approach to integrating companies through the exchange of their potentials, the results of which are shown in Table 7. The integration was carried out taking into consideration the identified windows for the resources exchange.

Table 7. Results of integrated enterprise development according to the potential exchange.

Company	PCI	TI	InI	MF	PD	SI	MAE	BA	MI	CT	TMI	MIS	IDI
A	0.071	0.0177	0.8619	0.9734	0.2839	0.4766	0.0811	0.9654	0.1724	0.0101	0.9532	0.2636	0.849
B	0.0203	0.2839	0.8812	0.6416	0.2332	0.0406	0.2129	0.9536	0.0608	0.872	0.0091	0.2941	0.954
C	0.2251	0.0913	0.5678	0.9227	0.4259	0.1825	0.071	0.872	0.0101	0.0203	0.7402	0.1217	1.020
D	0.9025	0.0986	0.3245	0.8524	0.8472	0.1217	0.0304	0.0811	0.2129	0.0051	0.8315	0.142	0.932
E	0.0507	0.1268	0.7504	0.9329	0.0304	0.4563	0.071	0.9227	0.1825	0.0071	0.4867	0.071	0.927
F	0.6012	0.4311	0.5323	0.5215	0.7892	0.2943	0.0501	0.1753	0.1628	0.0063	0.5886	0.1065	1.297
G	0.144	0.2808	0.1753	0.5215	0.7892	0.1315	0.025	0.3816	0.0376	0.1932	0.5385	0.1816	1.319
H	0.2147	0.0564	0.5702	0.3507	0.263	0.1127	0.5385	0.0438	0.0063	0.5762	0.0751	0.4571	1.268
I	0.0019	0.5573	0.2004	0.0002	0.0501	0.5511	0.0188	0.0751	0.0877	0.1315	0.5135	0.0031	0.905
J	0.2632	0.0438	0.5702	0.4634	0.2818	0.5698	0.0313	0.0438	0.0044	0.5762	0.1127	0.3006	1.222
K	0.0677	0.0748	0.8226	0.9291	0.271	0.4549	0.0774	0.5591	0.1645	0.3797	0.9097	0.2516	1.182
L	0.91	0.1862	0.271	0.8927	0.8033	0.2032	0.0387	0.2226	0.2807	0.0087	0.8323	0.0581	1.018
M	0.0746	0.8716	0.5364	0.0862	0.4023	0.8237	0.067	0.1724	0.0096	0.1149	0.6992	0.0192	1.001
N	0.9025	0.2182	0.3065	0.8524	0.0766	0.1149	0.0287	0.8429	0.1341	0.0048	0.7854	0.2011	0.975
O	0.7088	0.0671	0.8812	0.0479	0.067	0.431	0.8716	0.9536	0.4597	0.0067	0.067	0.1724	0.912
P	0.91	0.2479	0.3239	0.8927	0.2661	0.2429	0.0463	0.8901	0.0694	0.0104	0.8682	0.3355	1.031

Note: PCI—Indicator of Production Capacities Integration; TI—Indicator of Technological Integration; InI—Information integration indicator; MF—Indicator of Management Flexibility; PD—Level of Production Diversification; SI—Indicator of Scientific Integration; MAE—Indicator of the Marketing Activities Efficiency; BA—Business Activity Indicator; MI—Market Integration Indicator; CT—Consumer Tolerance Indicator; TMI—Target Market Integration Indicator; MIS—Maneuverability Indicator of the Integrated Structure. Source: Formed by the authors.

For company G, integration, according to the exchange of potentials, contributed to an increase in development efficiency by 4%, that is, at the same level as in the replication model. For Company B, the efficiency growth was about 5%, which is almost 2.5 times lower than in the replication model. For company L, the improvement in development efficiency was only 1%, and for company P, the development level remained unchanged. At the same time, the increase in development efficiency for companies H and J was 9.5%, and the integrated development indicator decreased for company O by 2.5%. Therefore, it may be argued that the integration approach based on the potentials exchange is effective for companies with a high and medium development level. Furthermore, it requires identification and minimization of risks.

Figure 3 shows a comparison of the results for integrated companies according to the potential exchange approach and the replication model.

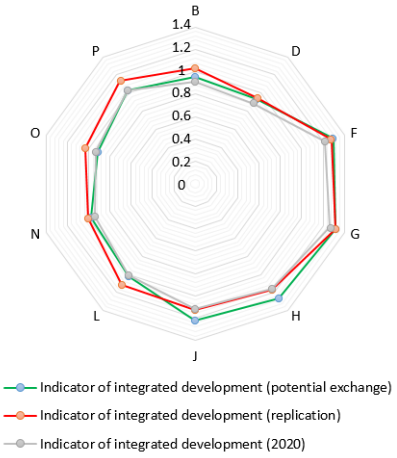

Figure 3. Indicators of integrated enterprise development according to the potential exchange approach and the replication model. Source: Formed by the authors.

When comparing the results obtained for the two considered approaches to the development integration, it should be noted that the replication model contributes to efficiency for all companies. The average development level for companies based on integration based on the exchange of potential is 4.2% and using the replication model—6.8%. Therefore, Hypothesis H2 can be accepted, since the highest development level is achieved by means of the replication model.

Under the potential exchange approach, there is a significant increase in efficiency for developed companies. However, at the same time, there are companies for which the level of development remains at the same level or, even worse, lags behind. Thus, Hypothesis H1 is not confirmed. Business integration through the potentials exchange has a very high degree of risk and can only be used by companies with a high development level, which, in the event of a threat, have the financial resources to prevent or recover them.

A regression analysis was carried out in order to determine the relationship between the integrated development of the companies under study and their development as a whole. Its results are graphically displayed in Table 8.

Table 8. Key indicators of regression analysis of the relationship between the integrated and general development of the studied enterprises.

Indicator	**df**	**SS**	**MS**	**F**	**F Sign**	
Regression	1	0.1478	0.1478	58.8341	0.0000	
Residual	14	0.0352	0.0025	-	-	
Total	15	0.1830	-	-	-	
Factor	**Coefficients**	**Standard error**	***t*-statistics**	***p*-value**	**Lower 95%**	**Higher 95%**
Y-intersection	−0.3813	0.1034	−3.6865	0.0024	−0.6031	−0.1595
Integrated development level	0.7703	0.1004	7.6703	0.0000	0.5549	0.9857

Source: Formed by the authors.

Based on the results of the analysis of variance, the regression equation was formed, which is graphically displayed in Figure 4.

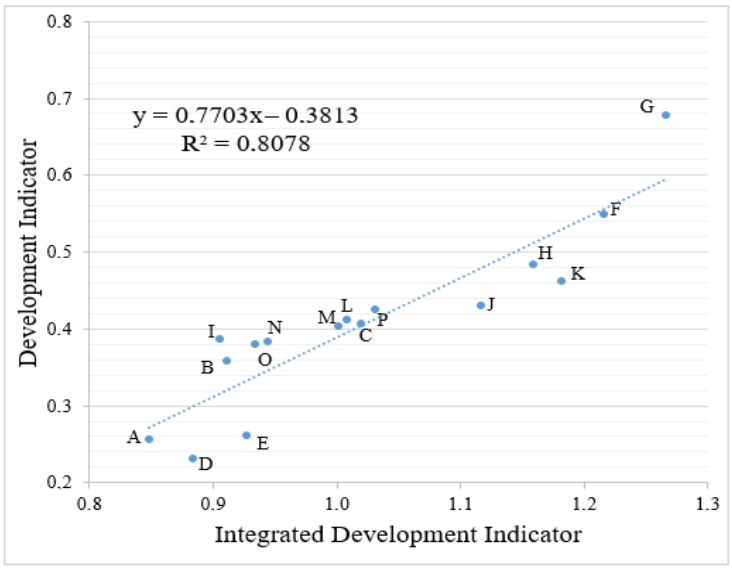

Figure 4. The relation between the level of integrated development and general development of the studied enterprises. Source: Formed by the authors.

There is a sufficiently high relationship between the integrated development and general development of the studied textile enterprises. This is confirmed by the determination coefficient, which is $R^2 = 0.81$. The resulting regression model is applicable since p-value ≤ 0.05. Moreover, the control points confirming the adequacy of this model are Ftabl < F (4.6 < 58.83), tobs = 7.67 exceeds tcrit = 2.15. Based on the obtained regression equation, the level of enterprise development as a result of their integration was modeled (Figure 5).

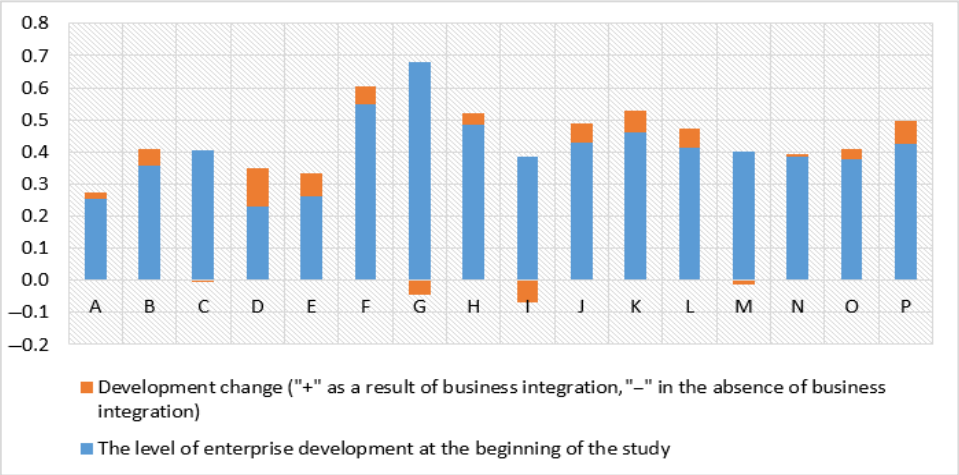

Figure 5. Modeled development indicators of the studied enterprises as a result of integration using a replication model. Source: Formed by the authors.

Thus, companies using the replication integration model expand their development opportunities and increase their efficiency. Among the companies that were eliminated and did not use integration, there are representatives who are expected to lag behind the integrated companies. Integrated development is particularly relevant and necessary for less developed enterprises, which can use it to make a big leap in synergy. In the context of the crisis and the COVID-19 pandemic, companies focused on integrated development trough a replication approach can use their financial resources more efficiently and at the same time significantly improve the overall level of enterprise development.

5. Discussion

The obtained results expand and complement previous studies in the context of horizontal relationships formed on the basis of competitors, cooperators, and various associations and entrepreneurial networks (Mazzarol et al. 2018; Dźwigoł 2019). The results in their methodological approach resemble studies in which relationships are conceptually regarded as assets that, if properly managed, can be used to achieve significant business performance, provided that the principles of systems are respected and their own goals and strategies in relationship management are clearly defined (Zhou et al. 2018; Garg and Sharma 2020). In the process of integrated development, the operating environment of an enterprise is defined as a set of objects that directly or indirectly influence it but are not related to its structure (Wang et al. 2018). The proposed replication is based on a model of a monolithic organization structure, which forms the demonstrated possibilities of interactions. At the same time, the enterprise itself has clearly defined boundaries and is a source of income through efficient selection and allocation of resources. Meanwhile, the relationship is limited to bi-directionality (Frynas et al. 2017; Lee et al. 2020).

Earlier researches have taken similar approaches to model formation, but compared to this study have a fragmented approach. For instance, there are results that concentrate on the mathematical component of a stochastic econometric model with extreme value theory procedures, which provides the sound basis needed for statistical testing on historical data and initial density forecasts (Makatjane and Tsoku 2022). Alternatively, the approach is

based entirely on the micro-level as a starting point for determining the equilibrium mechanism of the economy (Trinh 2022). A model of integration based on knowledge migration was also considered (Zahoor and Gerged 2021; Castellani et al. 2022), but the financial parameters of the proposed integration processes have not been sufficiently taken into account. The concept of e-business platforms that support the rapid prototyping of temporary networks of companies capable of producing personalized products in an Industry 4.0 environment is similar to the research carried out. It involves integrating the customer with a network of companies with sufficient production resources (Saniuk and Grabowska 2021).

The advantage of the proposed methodological approach is the replication model of integrated development. It provides an opportunity to focus the financing of the company's relations with other enterprises, with due regard for the development level of their members (Hindasah and Nuryakin 2020). Companies can also find common "points of convergence" that promote synergistic effects. Therefore, the company can minimize investment or business development costs and in doing so obtain the maximum possible effect (Lee and Shin 2018). The proposed integrated development approach can become an important tool in the processes of companies' adaptation of in the modern pandemic conditions and, consequently, increase flexibility to changes in their business environment (Bailey and Breslin 2021). Therefore, we cannot agree with the results of research that significantly focus on complete mergers of companies to survive in modern conditions, since our study emphasizes the integration of companies, rather than their incorporation.

Testing the proposed replication model as compared to the potential exchange approach proves the inability to meet the needs of the latter for companies of different levels. In its turn, this confirms that pooling the strengths of companies in modern conditions has a high financial risk. In an uncertain environment, there is a need for a financial system that ensures the balancing of the company and increases the speed at which the microenterprise can react to fluctuations in the external environment. This is especially applicable in quarantine restrictions and lockdown conditions, since many manufacturing companies lack information business development (Möhlmann and Geissinger 2018). However, it is possible to compensate for this disadvantage quickly on the basis of replication interaction with a company that has a highly efficient informational direction, but the production part suffers badly (Enkel et al. 2018). Therefore, these companies, using the identified points of contact, can significantly increase their development level. At the same time, it does not require full integration of enterprises, but only of certain areas that also need appropriate financing. Financing integrated development through a replication system implies minimal costs as there is an equally balanced simultaneous recovery of efficiency by the points of contact (Acosta et al. 2018).

The company development integration map proposed in the research can serve as an effective business navigator for finding partners. It also opens a field for an enterprise to identify its advantages and disadvantages in the market compared to competitors. In its turn, this provides an opportunity to prioritize them and transform a competitor into a business development partner (Battaglia et al. 2017; Parida and Wincent 2019). Consequently, the monolithic system of relationships provided in previous studies (Pervan et al. 2018) cannot function at its finest during the COVID-19 crisis. It acquires hybridity by expanding the core of relationships with business stakeholders as a platform for the external operational environment. The proposed approach can become an important tool for assessing the quality and effectiveness of these relationships. In practical terms, a company can simultaneously integrate its development with a large number of different enterprises that have their own specifics and may be outside the field of its functioning. This expands the framework of the study and requires multi-replication (Kijkasiwat et al. 2021). However, this research assumes that integration with such entities is not crucial, since it does not belong to the main form of its activity but represents only an auxiliary function (Tojeiro-Rivero and Moreno 2019).

6. Conclusions

The theoretical contribution of the study is the expansion of the focus of financial instruments for the companies' integration from the perspective of business development. The formed replication model of integrated development financing suggests that each enterprise has its own development "genome", which makes it possible to identify points of contact with other market entities. The formation of a financial system for integrated development based on four directions (economic, innovation, information, and organizational) gives an enterprise the opportunity not only to use the strong suit of the integrated company, but also to strengthen its weaker parts. The integrated development map of the studied companies is a navigational element of the proposed methodological approach. It provides an opportunity to identify points of financial convergence, not only taking into consideration the high-priority direction of development, but in terms of the integration level. The replication model makes it possible to justify the financing of the companies' interaction, which has the most significant impact on business development under a crisis.

The practical contribution of the study is the approbation of the replication model for financing the enterprise integrated development. The application of this model for companies with a low development level contributes to accelerating development and achieving rates that exceed indicators of more developed companies. An alternative option of forming a financing system based on the exchange of potential can solely be recommended for developed companies and requires the identification and minimization of risks. The study compared the effectiveness of the replication model and companies' interaction based on the strength diffusion with the application of financial netting in the context of the COVID-19 crisis. A comparative analysis of the obtained results pursuant to two approaches is aimed at identifying the advantages or limitations of the replication model in the context of increasing the overall enterprise development. The research proves that companies, which implement integrated development based on a replication model, can be way ahead of those using traditional business development in the context of the COVID-19 pandemic. Enterprises implementing the replication model of integrated development financing can considerably increase their prospects, as well as the general effectiveness of their development. Companies focused on integrated development based on a replication approach can use their financial resources more efficiently while significantly improving the overall level of business development under the COVID-19 crisis.

The limitation of the study results from the significant amount of data that is difficult to process manually. The demonstration of the integrated enterprise development using paired replications of its efficiency is rather simplified in this study since it involves interaction with one company. In practical terms, a company can simultaneously integrate its development with a large number of different enterprises that have their own specifics and may be outside the field of its functioning. This expands the framework of the study and requires multi-replication. However, this research assumes that integration with such entities is not crucial, since it does not belong to the main form of its activity, but represents only an auxiliary function. At the same time, the absence of the need for integrated development can also demonstrate the limitation. The grouping of the studied companies according to the paired replication of integrated development made it possible to identify companies for which integration with open enterprises is not advisable. This is due to the fact that they do not have financial points of contact for replication according to the proposed methodological approach.

In the future, the study can be expanded in the context of transforming the replication reimbursement percentage in financial terms. These supplementing factors can help to determine the financial benefits in monetary value. There is also an opportunity to explore a multi-integrated approach, that is, to study the simultaneous interaction not only with several companies, but also with other stakeholders. The study can be expanded in the context of the sample size of the surveyed companies, as well as the possibility to approbate the proposed approach in other industries. For this purpose, a corresponding software

product can be developed in order to facilitate calculations with the application of Big Data and visualization of the obtained results.

This study can be useful for those developing a corporate governance strategy and investment policy, as well as forming risk management in a company with a view to effective business development based on the integration of its activities.

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