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ENTERPRISES' INNOVATIVE ACTIVITY MANAGEMENT ORIENTED TO THEIR MARKET VALUE INCREASE*

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Abstract. The article proposes general approaches to the identification and reliable assessment of costs and intangible assets that arise in the enterprise during the commercialization of innovative implementations. It is proven that the investment attractiveness and market value of the enterprise depends on the correct assessment of the assets and costs of the enterprise of the innovative type of development. In order to assess the influence of the cost structure, which reflects the efficiency of innovative activity, on the resulting indicator of the growth rate of equity capital, the activities of 20 industrial enterprises of Ukraine for 2017-2021 were studied. The correlation analysis of the close relationship between these indicators (correlation coefficient 0.22) allowed to conclude that operating leverage does not have a significant impact on the rate of growth of the enterprise's capital. In turn, this indicates insufficient efficiency of the innovative cost management system of the selected enterprises. Another reason is the failure to take into account the amount of intellectual capital when evaluating the total capital, which reflects the formation of internally generated goodwill that appears during the innovative activity of business units. In order to improve the management of innovative activities of enterprises, it is proposed to differentiate innovations by stages of capitalization, which clarifies their identification as objects of managerial influence in the management system. It is concluded that it is necessary to take into account the chain effects from the introduction of a certain type of innovation on all indicators of the business entity's activity.

Keywords: innovative activity; innovation index; types of innovations; cost management of innovative activity; capital growth rate; operating leverage; market value of enterprise

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JEL Classifications: C51, M21, O30, O32, K12

1. Introduction

The transformation of the world economy and its transition to the information paradigm is characterized by the decisive of innovative activity to ensure the competitiveness of enterprises. The capital investment in innovative technologies that define the fourth stage of the industrial revolution (Industry 4.0), such as additive manufacturing, artificial intelligence, large databases, cloud technologies, and the "internet of things" (Ibarra et

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al., 2018; Dalenogare et al., 2018; Bai et al., 2020; Yermachenko et al., 2023; Hrab & Minculete, 2023) could enable the growth of competitiveness and sustainable development of economic systems in general, both at the countries level, as well as sustainable business growth at the level of individual companies (Müller et al., 2021; Chen, 2022; Tugui et al, 2022).

Thus, the development of modern economic systems of any hierarchical level is based on the constant desire of business entities to obtain competitive advantages for the realization of the chosen strategic goal. The basis of such advantages is the organization of a permanent system process of innovative activity on the enterprise, as the core source of obtaining additional profit, due to the possession of a unique innovative product. Such an organization approach increases both the competitiveness of enterprises and their market value. A certain correlation between the index of innovative activity and the competitiveness of national economies is observed (using the example of countries of the V 4 group) (Ivanová & Žárská, 2023).

We should agree with the opinion of (Kabát et al., 2020) that the globalization of the world space, on the one hand, is the driving force for increasing the innovative level of national economies and creating a favourable environment for expanding technological cooperation between countries, and on the other hand, it poses a threat to the flow of qualified labour to countries with higher wages. Such trends have a negative impact on the innovative potential and innovative capabilities of labour donor countries, which subsequently negatively affects the level of competitiveness of market entities. At the same time, thanks to the direct cash flows from labour migrants to their own families, labour migration provides a revitalization of the business environment in donor countries.

An interesting experience in reducing the consequences of labour migration from the countries of the V4 group after unification of the labour market in the EU countries was the transfer of direct financial compensation to the mother countries. The volume of such compensation amounted to more than 70 billion US dollars in 2017 (Kabát et al., 2020).

In any form, receiving additional financial flows by the mother countries has a direct positive effect on GDP growth and improvement of the main economic indicators of development.

Sustainable growth of the economies of Eastern European countries, including the Slovak Republic, Ukraine and other countries, is impossible without an effective state investment policy that provides support for both public and private financing of innovatively active enterprises.

Of particular importance for determining the directions and objects of investment is the approach to understanding the “locomotive” innovative ability of the industry and the range of connections of the investment object with other economic entities. Analysing the economy of Ukraine, it should be noted the prospects for the development of the construction industry and the electric power industry, which are one of the key sectors of the post-war period of revival of the country's economy (Labunska et al., 2023). In Slovakia, such industries may include the automotive, electrical, mechanical and chemical industries (Stefko et al., 2019).

Note that the basis for determining the feasibility of investing in innovative transformations at both the micro- and meso-level is the implementation of organizational transformations of business entities and the involvement of enterprises in integration interaction (Pilipenko & Litvinenko, 2017; Labunska et al., 2022).

Nowadays, innovative activity is the basis of increasing the efficiency of the enterprise management system, a guarantee of its competitive advantages and sustainable development Pysmak et al. (2021). It is the innovative ability, together with the general indicators of the book value of assets and expected operating profit in the long term, that is the basis for assessing the market value of a business entity. Therefore, the market value of the enterprise can be considered as an integral indicator of its economic capabilities, which takes into account all the resources available to the subject of entrepreneurial activity and certifies the prospects of its development.

The results of the study by Binh et al. (2020) showed that intangible assets of enterprises, which are the basis and at the same time the result of innovative activities of companies, have a positive impact on increasing the efficiency of enterprises and increasing their market value. At the same time, there is no general approach to assessing the value of intangible resources as objects of management influence, especially those that cannot be accurately identified in the accounting and financial statements of a business entity as intangible assets.

Methodological aspects of identifying and assessing intangible resources are the subject of many studies (Hellman, 2022; Ievdokymov et al., 2020; Arianpoor, 2021).

One should agree with the opinion Timotius (2023) that the rapidly changing business climate and increasing competition require companies to elaborate the right strategy for growing and maintaining their business. This also applies to the organization and effective functioning of the cost management system's innovation activity.

Koilo (2022) noted that in the conditions of globalization, the process of creating value, including the value of the results of innovative activities, becomes more complex and causes huge risks for companies, partners, and customers. Therefore, the identification and evaluation of innovations as a product of innovative activity needs clarification, because it is the basis of the creation of an effective system of managing innovative activity.

2. Theoretical background

Due to the modern conditions of the growing importance of innovativeness of development, the priority role in the process of enterprise activity has shifted from material to immaterial factors of production. At the highest level of abstraction, innovation is a dual phenomenon, the elimination of the existing and the creation of something new. Due to this, innovation (I) brings to life the phenomenon of economic growth (ER) through the mechanism of competition (K). Schematically, such a movement can be represented as follows:

$$I \Rightarrow K \Rightarrow EP \quad (1)$$

Innovative changes create the internal energy of economic growth in the economic system. At the same time, such changes disrupt the achieved balance and equilibrium, but they create the basis for economic growth and the transition of the system to a new qualitative state. In this sense, the generalized task of effective management of innovative activities is to ensure the balance of the new state of the economic system.

Achieving a bifurcation point in the development of the enterprise's economic system becomes the basis for reaching a new level of competitiveness and generates an additional increase in the value of the enterprise's assets over their recognized valuation. All this leads to an increase in the market value of the enterprise as a business unit. Thus, effective management of innovation activities involves influencing the internal factors of the enterprise and indirectly the external environment in order to ensure dynamic development and increase the investment attractiveness of the enterprise by achieving an increase in its value. Thus, the increase in the market value of an enterprise is the most important criterion for the effectiveness of a management system at any level.

The methodological aspects of assessing the market value of enterprises and the importance of factors in the forming process are discussed in the research of Boiarko et al. (2023), Habib (2022), Aouadi & Marsat (2023), Palomino-Tamayo et al. (2020).

To carry out a comparative analysis of the innovativeness of the national economies of Slovakia and Ukraine in 2021 (before the war in Ukraine), Figure 1 visualizes the results of the comparison of indicators according to the following ratings:

- The Global Innovation Index (GII) WIPO, 2022), formed by the World Intellectual Property Organization, is an annual assessment of the innovation climate of countries based on 80 indicators, divided into 7 groups;
- The Global Competitiveness Index (GCI), which is formed based on research by the World Bank (2022) shows the general level of competitiveness of the countries. This index is calculated based on 98 indicators, divided into 12 groups of factors, one of which is the evaluation of innovative capacity;
- Bloomberg Innovation Index (Bloomberg Innovation Index, VII? 2021)– an assessment of the level of innovative development of 60 countries based on indicators grouped into 7 groups: research and

development, productivity, the added value of production, the concentration of high-tech companies, the concentration of researchers, efficiency of higher education and patent activity;

- The Summary Innovation Index (SII) is an indicator of the level of innovative development of European countries, which is formed within the framework of the European Innovation Scoreboard project (2022) and includes four categories of indicators (Framework conditions, Investments, Innovative activity, and Impact), within 3 groups of allocated indicators. (32 in total);
- The Global Talent Competitiveness Index (GTCI) (2022), is a ranking of the European Institute of Business Management INSEAD, which assesses the prospects for the formation of a high intellectual level of employees in the country due to a quality system of only 6 main groups of criteria: opportunities, talent attraction, talent development, index talent retention, global knowledge, technical skills.

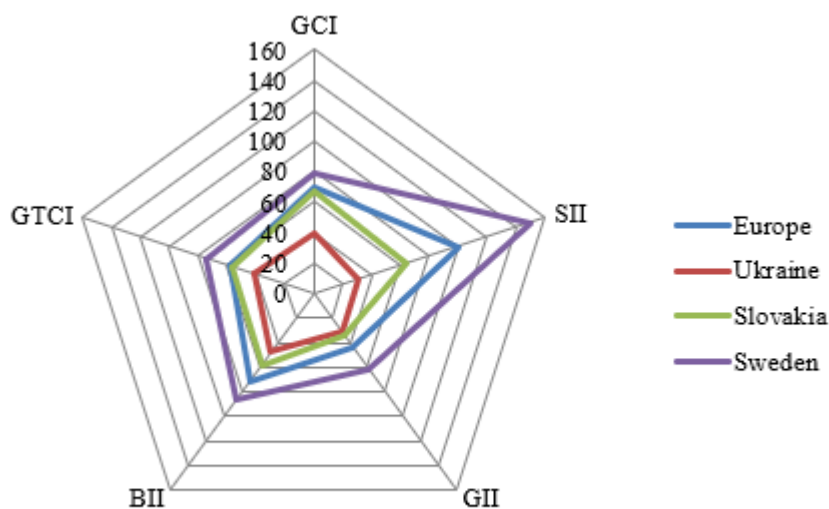


Figure 1. Comparison of the level of innovative capacity of Ukraine, Slovakia, and European countries accordingly that the main world indexes of innovativeness of national economies

Source: own processing based on the database of The Bloomberg innovation index (2021), The Global Talent Competitiveness Index (2022), The World Bank (2022), European innovation scoreboard (2022), Global Innovation Index (2022)

Comparing the rating indicators of innovativeness of the national economies of the Slovak Republic and Ukraine, it should be noted that Ukraine lags in most rating indices. This is due to the backwardness of the Ukrainian economy at the level of enterprises implementing various types of innovative transformations, Figure 2 and Figure 3.

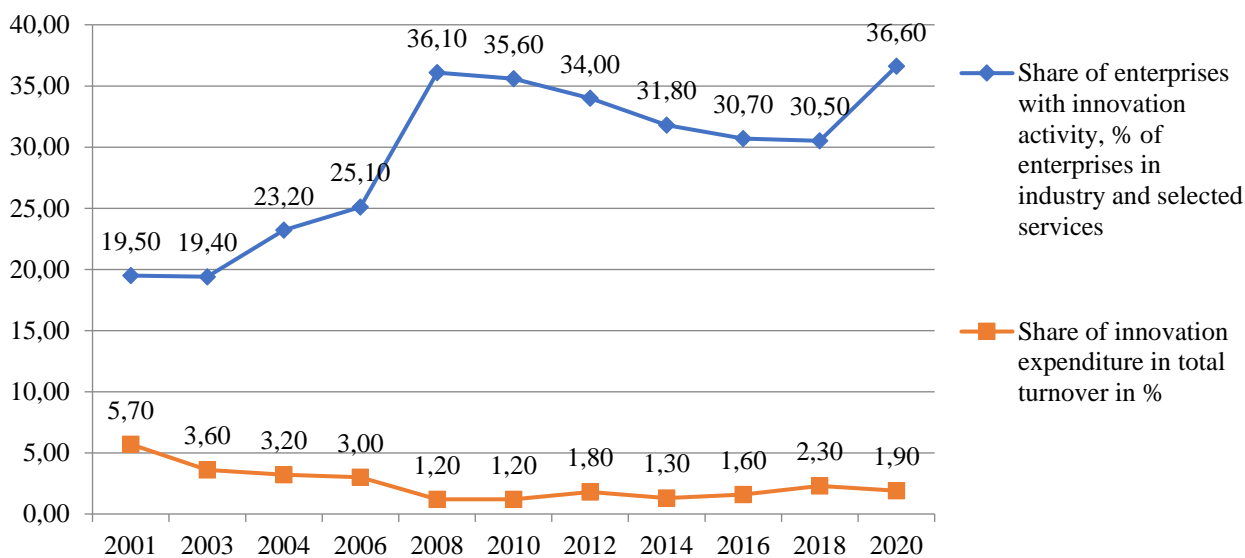


Figure 2. Main indicators of innovative activity in Slovakia

Source: own processing based on the database Statistical Office of the Slovak Republic (2021)

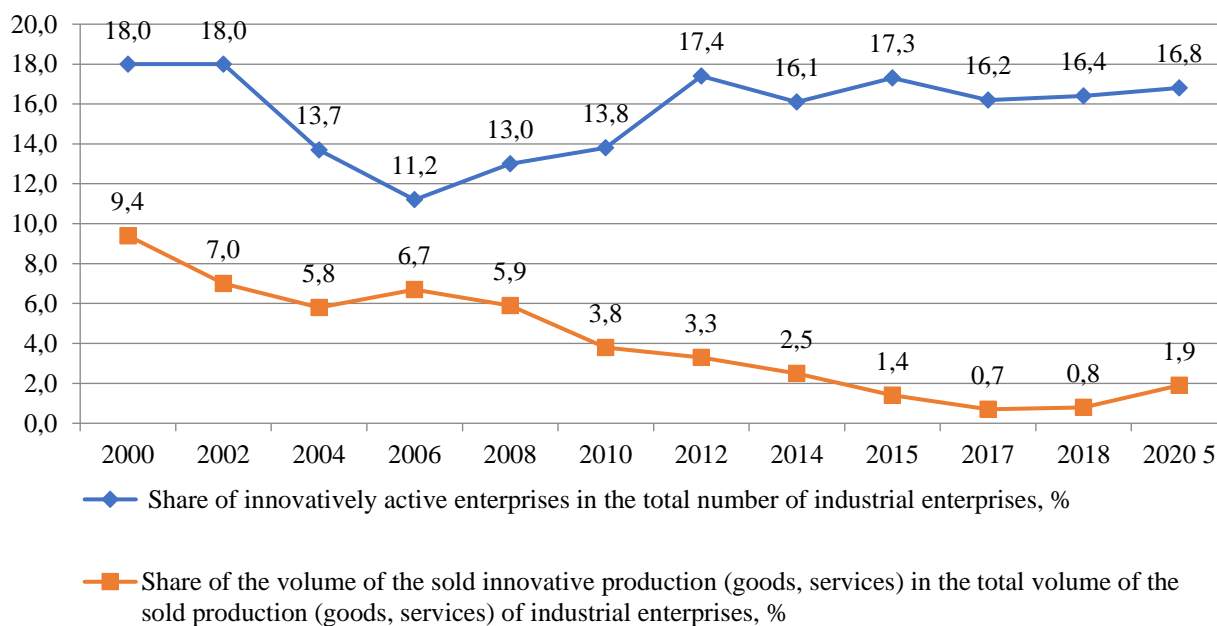


Figure 3. Main indicators of innovative activity in Ukraine

Source: own processing based on the database of the State Statistics Service of Ukraine (2021)

Thus, the level of innovative activity of economic entities forms the overall growth of the competitiveness of the national economic system and directly affects the investment attractiveness of individual enterprises in the country.

The analysis of trends in the sources of financing innovative activities of Ukrainian enterprises in recent years (2000-2019) allows us to conclude that the company's funds remain the main source of financing their innovative activities, Figure 4. Therefore, the effectiveness of cost management aimed at ensuring innovative activities in the general management system of the enterprise economic activity is the primary task of the business entity.

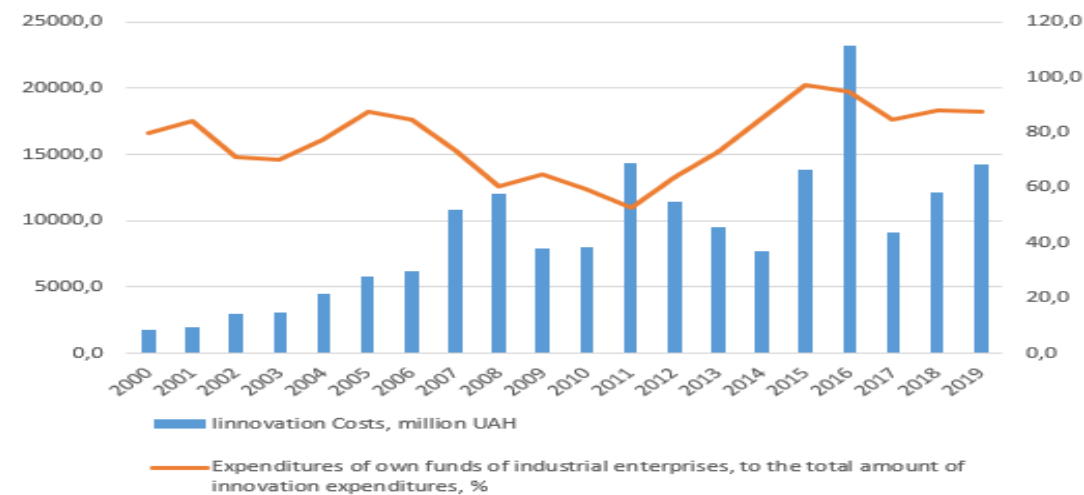


Figure 4. The main directions of investment in the innovative activities of Ukrainian industrial enterprises (2000-2019) *

Source: own processing based on the database of the State Statistics Service of Ukraine (The latest publicly available data in Ukraine due that martial law)

Thus, the main attention should be focused on the cost management system used to generate innovative resources and create an innovative product, taking into account the characteristics of costs at each stage of production innovation. The cost management for innovative products must be carried out in strict accordance with the innovation life cycle, which includes the following stages: 1) idea (stage of production of the latest knowledge and development of "ideological innovation") - not a product form; 2) idea (stage of research work - product form); 3) product (scientific and production cycle, development and implementation) - product form.

That is, if an enterprise generates innovations on its own, it usually go from one to three stages during its implementation. In order to identify the results of innovative transformations and improve the efficiency of cost management for their implementation, it is proposed to highlight the following types of innovations:

- ideological innovation - in the form of an information intangible component, which can be expressed more precisely through the use of the enterprise's intellectual capital in the presence of intellectual potential and resources for its implementation. The intangibility lies in the fact that the idea cannot yet be sold and does not have an unambiguous value estimate - specialists only have primary information, which suggests the possibility of an innovation in a particular area of the enterprise. At this stage, it is even impossible to predict its success or failure;
- investments in innovative developments, which are included in the composition of costs - the company believes that the idea, already expressed in the form of a new approach, product, development, method, etc., is worth trying to implement, and calculates its cost. At this stage, the innovation can already be attributed to a certain classification group;
- capitalized innovation in the form of assets – expenses incurred at the previous stage brought profit (income) to the enterprise, or increased the value of other assets. The innovation has been successfully implemented and is now included in the company's assets (tangible or intangible) and can be reflected as an accounting object.

Schematically, the production process of development and implementation of innovations, with a distinction between their product and non-product forms, is presented in Figure 5.

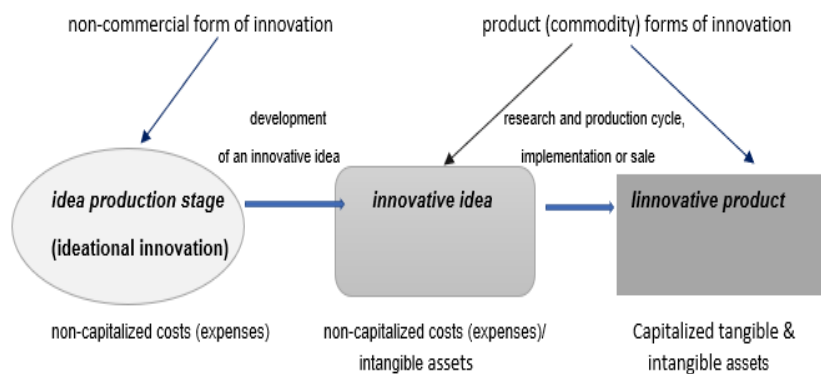


Figure 5. The process of development and capitalization of innovations

Source: developed by the authors

The enterprise can reject the innovation in the second stage if its implementation becomes economically inefficient. The process of identifying an innovation with a particular type of asset is not so critical, meaning that an unambiguous decision on its adoption on the balance sheet of the enterprise is more dependent on the convenience of accounting. In practice, it is possible to forecast such an option, when a recognized innovation is used, and brings income, but is not allocated to a separate type of asset. Then the costs of its implementation are distributed among other articles, and formally it seems to not exist, being between the I and II stages.

According to the authors "ideological innovation" is not an asset of the enterprise, since it is not yet presented in material form (it does not have a clear argumentation and expression), but the enterprise already bears the costs associated with its development. In the future, the "ideological innovation" may be assigned to a group of assets or expenses, depending on the effectiveness of its practical implementation, or may not be singled out at all (in case that its predicted efficiency is too low).

This approach means that the enterprise has already begun to spend tangible and/or intangible resources on the research (theory, strategy, individual event, etc.), without yet obtaining a clear result, but the failure of this innovation is already becoming clear, and a decision is made to abandon such an idea. The money and efforts spent, without any benefit, actually saved the enterprise from even greater losses in the future - in case the wrong model of behavior was accepted.

3. Aim and methodology

The main goal of the study was to determine the cost structure impacting level on the business unit's market attractiveness and to justify approaches to the creation of an effective cost management system of innovatively active enterprises based on the decoupling of the costs of innovative activity on the assets and costs and further improvement of their identification and evaluation methods.

The conceptual study basis of the impact of the efficiency of the asset management system of innovatively active enterprises on the rate of capital growth exists in the hypothesis that there is a certain relationship between the indicator that characterizes the structure of costs and the rate of growth of total capital. At the same time, the authors believe that it is the operating leverage, (2) indicator that determines the level of compliance of the organizational structure of an enterprise with the innovative needs and demands of the market:

$$OL = \frac{MR}{OP} \tag{2}$$

where *OL* – operating leverage;
MR– marginal revenue ;
OP – operating profit.

This position regarding the proposed indicator comes from the fact that the operating leverage reflects the elasticity of changes in profit, in case of expansion or reduction of the scope of the enterprise's activity and is

formed as a result of certain managerial decisions in the management system regarding the organization of the production process taking into account the market positions and competitiveness of the business entity. The increase in the value of the operating leverage, which indicates the growth of conditionally constant costs in the general cost structure of the enterprise, is justified only in the case of the expansion of the sales market, which indicates the growth of the enterprise's competitiveness. In the case of a decrease in market control, the operating leverage reflects a multiplicative decrease in profit and a possible entry of the business unit into the loss zone. Thus, this indicator is a signal of mutual agreement of all management subsystems of the enterprise.

Limitations in such indicators implementation are, first of all, the need to take into account a part of the resource of the enterprise, which cannot be recognized as an asset in the financial accounting and reporting of the enterprise, because it cannot be clearly and reliably evaluated in a monetary measure and are not assets of the enterprise or recognized expenses.

When determining the rate of capital growth, the study takes into account the authorized capital, all types of additional capital and retained earnings (uncovered loss) of the enterprise for the corresponding period.

According to the author's understanding, the indicator of the retained profit (uncovered loss) should be adjusted by the number of opportunities lost by the company under the influence of "refusing" the investment in other types of innovative transformations, (3). It can be formed as a balance sheet profit, reduced by the "cost of capital investment in innovative activity". The "cost of capital investment" is proposed to be the sum of capital investment multiplied by the profitability of an individual economic entity.

$$AC = TC - (I * ROE) \tag{3}$$

where AC - adjusted capital;

TC – total capital;

I – investments.

During the research, the following methods of analysis and synthesis were used to solve the scientific problem: comparative analysis, rating, and correlation analysis. Results are visualized using charts and graphs.

4. Results and discussion

Given the significant differences in the organization of corporate governance and the mechanism of decision-making on the management of innovative processes, the set of researched Ukrainian enterprises is formed from enterprises that are public and private joint-stock companies by organizational and legal form. Financial, statistical, and internal management reporting became the information sources of the research for the selected enterprises in 2017-2021 years, which are published on the official websites of enterprises. (Appendix A, Table 1 A, Table 1).

An array of data to be included in the model for assessing the relationship between the rate of capital growth (RCG) of enterprises (Y) and the measure of operational leverage (OL)- (X) is given in Table 1.

Table1. Input data for regression modeling

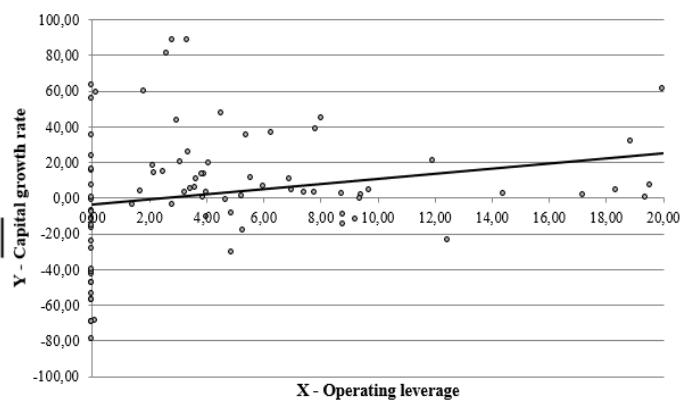
the rate of capital growth RCG	operation al leverage OL	the rate of capital growth RCG	operation al leverage OL	the rate of capital growth RCG	operation al leverage OL	the rate of capital growth RCG	operation al leverage OL	the rate of capital growth RCG	operation al leverage OL
15.03	0.00	63.31	0.00	7.05	0.00	4.58	18.33	14.81	2.48
-7.29	0.00	25,32	3.37	-1.11	0.00	-3.81	1.41	-40.31	0.00
20.52	11.92	10.92	5.57	-10.45	4.01	88.47	yf2.82	-47.73	0.00
-54.08	0.00	3.09	7.81	13.65	2.15	47.15	4.53	0.43	0.00
-14.97	8.79	10.62	6.92	59.90	1.82	-69.56	0.00	-57.48	0.00
23.52	0.00	1.46	9.41	3.99	1.71	-15.61	0.00	80.98	2.60
-11.34	0.00	13,16	3.85	-4.01	2.80	-47.61	0.00	-24.08	0.00

-35,26	0.00	4.29	9.72	2.99	7.42	-28.46	0.00	-69.72	0.00
59.06	0.13	0.59	19.39	-23.32	12.43	-69.06	0.11	-88.15	0.00
10.58	3.67	1.98	17,19	60.96	19.99	-1.06	4.68	3.03	4.02
-42.74	0.00	2.63	14.41	-7.83	0.00	3.27	3.25	-12.18	9.21
43.17	2.99	7,12	19.54	88.77	3.32	4.75	3.44	-0.15	9.38
-9.52	8.79	-16.76	0.00	-8.50	4.90	17.91	2.12	0.65	5.23
4.67	7.00	38.85	7.81	-18.52	5.26	0.11	3.87	-30.73	4.87
36.68	6.26	-57.06	0.00	6.14	6.01	20.42	3.10	6.02	3.61
-41.37	0.00	31.48	18.85	44.96	8.03	19.13	4.08	-11.83	0.00
13.39	3.92	35,27	5.40	2.51	8.76	15.69	0.00	55.79	0.00

The results of the regression analysis are presented in Figure 6

RESULTS

<i>Regression statistics</i>	
R	0,223
R-square	0,050
Normalized R-square	0,038
Standard error	34,055
Observations	85,000



Dispersion analysis

	df	SS	MS	F	Significance F
Regression	1	5016,630	5016,630	4,326	0,041
Residual	83	96260,364	1159,763		
Total	84	101276,994			

	Coefficients	Standard error	t-statistics	P-value	bottom 95%	top 95%
Y-intercept	-3,691	4,874	-0,757	0,451	-13,386	6,003
X	1,462	0,703	2,080	0,041	0,064	2,861

Figure 6. The results of the correlation analysis of the influence of the indicator of operating leverage on the rate of growth of capital of enterprises

Source: own calculations

The obtained results testify to the existing, but very low coefficient of influence of operating leverage on the rate of growth of the enterprise's capital. (R=0.223)

$$Y = 1,462 * X - 3,691$$

The obtained negative results of the analysis, in the opinion of the author, have multiple causal origins.

Firstly, the operating leverage that developed in the previous period characterizes the ratio of marginal income and net profit. The average value of the calculated indicator by industries was: 5.9251 (mechanical engineering), 1.6699 (metallurgy), and 2.6278 (chemical industry). The cost structure that has been developed in the enterprise has a significant impact on the operational leverage; the absolute majority of analyzed enterprises are characterized by the prevailing variable costs: according to management reporting data, only 13.58% of enterprises have a share of variable costs in the structure of cost of sold products less than 75%. This means an insufficient investment in the production of the non-cash assets, and focusing on spending on product marketing and organizational innovations, which are weaker in adding market value to the entity.

Secondly, operational leverage is significant, but not decisive in the characteristics of innovative business opportunities of the enterprise Labunska et al. (2023).

Thirdly, in order to clarify the evaluation of the results of innovative activity, it is necessary to take into account the intangible component that shapes the intellectual capital of the enterprise depending on the type and stage of capitalization of innovations carried out by the enterprise.

The innovative activity of the enterprise produces intangible resources, which are either an independent result of innovative transformations or a concomitant product of the material form of the results of innovations. The formation of any type of intangible resources, including intellectual resources, which determines the effectiveness of the management system in accordance with the strategic goals of the enterprise, leads to the growth of the competitive position of the enterprise and generates internal goodwill.

Identification and assessment of such intangible resources when developing approaches to determining managerial influence is difficult due to the impossibility of reliably defining them in accounting and including them in full as assets.

In most studies, three main approaches to the valuation of intangible assets are distinguished: cost, income and market approaches (Binh et al. 2020; Pastor et al., 2017; Salamudin et al., 2010).

In order to form an effective cost management system of innovative activities, depending on the type of innovative changes, the cost approach was chosen in the study. The authors take the position that the most grounded on a strategic and operational management level is a cost-generated factors model, the main developers of which are Scherer & Ross (1990), Cooper & Kaplan (1999). This model allows a rough assessment of the set of costs that are aimed at ensuring the functional and structural manifestations of the general system of cost management and its subsystem of cost management of innovative activities.

The structural component of costs in both strategic and operational management should play a decisive role since it highlights the dependence of current and future costs of the enterprise on the effectiveness of their previous (or planned for the future) usage, reflected by their structural component. In addition, the considered approach makes it possible to take into account the conceptual principles of building a system of cost management of innovative activities by structurally distinguishing costs according to the determined priority functional manifestations of the system. At the same time, the total costs in system functioning should be equal to the total costs of the structural subsystems accumulated by the cost centers.

Within this approach, the direction of cost evaluation and recognition should be singled out, which is based on the generalization of all types of costs, including alternative ones. It takes into account both the losses of the enterprise from unused opportunities and the formation of costs based on an alternative, and not valid, accounting system-recognized, assessment of consumed resources. The usage of this approach is considered quite reasonable; specifically, in the system of cost management of innovative activity within the framework of decision-making regarding the implementation of an innovative project at the enterprise, first of all at the stages of the life cycle of innovation, which are determined by development and stabilization. Meanwhile, it was noted that the processes of information diffusion which define innovation itself, accelerate the dynamic changes in

the internal environment of the enterprise. On the other hand, such processes themselves are a product of accelerating dynamic changes in the external environment, formed under the influence of an increase in the volume of information flow about a certain innovation in the middle of the macro system.

The approach to determining costs, taking into account the actual market value of the resource spent adjusted by the lost chances variable, makes it possible to estimate the real amount of profit from the commercialization of the selected innovative project. However, in the case when the actual (accounting) value exceeds the market value of the consumed resource, we believe that it is appropriate from the point of view of the company to use the actual value formed in the financial accounting system. This value is a reflection of the actual cost of the resource due to its untimely use, or a wrong decision on the size of the safety stock in the enterprise management system.

Another acute problem arises when determining the corrective factor in the case of the reasonable existence of a significant (longer than the term of the total capital turnover of the enterprise) term of capitalization of the assets of the enterprise. Such a correction factor must reflect:

- firstly, the impact of inflationary depreciation of the actual value of assets ;
- secondly, the increase in the price of resources, which is associated with the costs of storage, insurance, losses due to natural damage ;
- thirdly, take into account the rate of total return on capital of the enterprise or the average annual deposit rate of capital placement, in case the indicated indicators exceed the average planned rate of return on expenses of the period.

Thus, the total costs in the system should be determined by the formula (4):

$$B_t = \left\{ B_f ; \sum_{i=1}^n K_i \cdot R_i \right\} , \quad (4)$$

where B_f - costs estimated in the cost management system for the purpose of exercising managerial influence in a certain period;
 K_i - adjustment factor for the clarification of the actual value of the capitalized resource used in the period;
 R_i - the accounting value of the consumed resource;
 In_f - the actual costs of the enterprise reflected in the accounting system for a certain period.

The proposed approach to the refined determination of the actual cost of the period based on the distinction between actual (accounting) and actual (economic) costs makes it possible to make reasonable decisions in the system of management of enterprise costs.

Should be noted that to shape a managerial impact, the innovations of the enterprise are determined according to the following characteristics:

- the sensitivity to the conditions of the external environment and the level of influence on the external environment;
- the reaction of the internal enterprise environment to the changes;
- the purpose, form, and significance of implementation;
- the method and process of implementation.

Understanding the classification characteristics of certain innovative changes determines a unique set of tools for its implementation in each enterprise.

Based on the cost analysis that precedes the real implementation of innovations, it is proposed to distinguish the following classification groups:

1. By the type of innovation for the market (by the level of novelty, by the depth of the introduced changes).

2. According to the life cycle (by the level of diffusivity, the degree of renewal of the final product, the stage of commercialization).

3. According to the level of security requirements (the need to protect a new idea).

This determination makes it possible to develop a multi-vector representation of the array of innovation features $x_1, 2, \dots, n$. The combination of three classification feature is considered the most reasonable (Fig. 7.). The form of elements x_{xyz} will appear in the following way:

axis 0X ("Oslo Guide"): 1 – product, 2 – process, 3 – marketing, 4 – organizational innovation;

axis 0 Y (by stage of capitalization): 1 – ideological innovation, 2 – capitalized innovation in the form of expenses, 3 – capitalized innovation in the form of assets;

axis 0 Z (by factors of origin): 1 – endogenous, 2 – exogenous innovation.

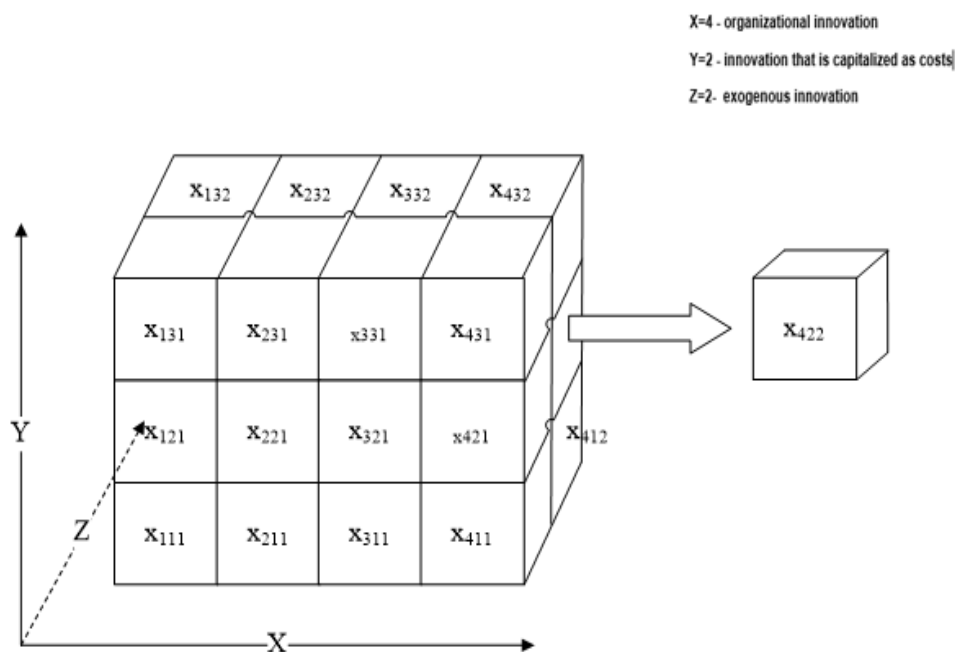


Figure 7. Classification of innovations by groups of features in order to clarify the costs of their implementation
 Source: developed by the authors

The proposed form of presentation of classification features has a significant limitation - the investigated object (innovation) cannot acquire more than one feature within the group. For example, a certain organizational innovation, capitalized in the form of costs, is exogenous, that is, environmental factors had a significant influence on its emergence ($z = 2$), although it is quite possible that there were also internal factors, but they did not turn out to be as important as external ones, and therefore are not taken into account. However, if the enterprise implements several innovations, another innovation (the next object of classification) can be endogenous organizational, capitalized in the form of costs.

The developed approach to the classification of innovations will allow not only to distinguish diverse groups of features but also to align them to the requirements of building a unique and effective system of cost management of innovative activities of the enterprise. The introduction of a new kind - "ideological innovation" - can expand the list of objects for accounting of the innovative costs, in turn, will contribute to a more reliable assessment of the innovation potential in order to determine the prospects for changing its competitiveness.

5. Conclusions

The obtained research results made it possible to draw the following conclusions.

- 1) The method of recognizing and evaluating the results of innovative activities should be improved to determine the final impact of innovative transformations on the enterprise market value. Such clarification can be achieved by adding internally generated goodwill to capitalized intangible assets and accounting for the amount of intellectual capital arising as a result of the innovative activity of business entities as part of total capital.
- 2) The cost management system of the innovative activity of the enterprise must be built based on determining the characteristics of innovative transformations and taking into account the stages of capitalization of the results of innovative activities.
- 3) To build an effective management system of innovative activity, it is necessary to consider not only its cyclic nature but also the chain effects that are inherent in the process of introducing innovations. The chain effect is explained by the fact that the separate innovation provokes and causes innovations in other parts of the economic system.
- 4) In the case of systematic and consistent implementation of innovations, the economic efficiency of innovative activities is multiplied, and vice versa - the implementation of innovative processes on an episodic basis eliminates the positive effect of innovations and has a destructive effect on the managed subsystem of the enterprise's innovative activity management system.

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Appendix A

Table 1 A. Indicators of companies' performance for regression modeling, 2017-2021, UAH

No	Year	Total capital (TC)	Net profit	ROE	Investments (I)	Adjusted capital (AC)	Income
Company 1	2017-2020	data not available					
	2021	5 316 479	-486 412	-0,09	648 009	5 375 766	8 225 588
Company 2	2017	545 712	-62 460	-0,11	62 394	552 853	872 153
	2018	668 688	36 537	0,05	43 249	666 325	1 132 614
	2019	231 942	-479 950	-2,07	35 764	305 947	1 341 269
	2020	262 811	28 418	0,11	24 673	260 143	1 214 610
	2021	317 521	-68 241	-0,21	17 661	321 317	1 283 066
Company 3	2017	-3 340 489	-287 748	0,09	14 023	-3 341 697	434 617
	2018	-2 255 298	1 068 125	-0,47	193 873	-2 163 478	231 191
	2019	1 172 586	333 514	0,28	195 824	1 116 889	137 583
	2020	1 235 167	58 552	0,05	2 006	1 235 072	669 448
	2021	data not available					
Company 4	2017	74 232	-72 347	-0,97	15 940	89 767	611 030
	2018	134 544	59 240	0,44	13 682	128 520	638 958
	2019	113 337	-20 425	-0,18	16 354	116 284	966 871
	2020	123 645	10 828	0,09	22 058	121 713	980 198
	2021	data not available					
Company 5	2017	678 018	203 061	0,30	5 060	676 503	713 342
	2018	396 017	-81 380	-0,21	3 136	396 661	623 612
	2019	465 190	71 798	0,15	99 979	449 759	770 259
	2020	750 429	191 826	0,26	62 267	734 512	431 986
	2021	data not available					
Company 6	2017	409 223	95 769	0,23	21 675	404 150	894 583
	2018	453 600	64 883	0,14	37 198	448 279	1 074 933
	2019	462 859	29 765	0,06	10 973	462 153	970 004
	2020	513 200	69 136	0,13	14 694	511 220	1 086 774
	2021	518 797	29 517	0,06	2 076	518 679	1 224 175
Company 7	2017	398 575	50 955	0,13	62 464	390 589	519 383
	2018	409 148	10 633	0,03	69 309	407 347	571 227
	2019	409 825	728	0,00	33 166	409 766	504 941
	2020	418 292	8 487	0,02	20 669	417 873	512 690
	2021	431 712	13 445	0,03	91 993	428 847	654 237
Company 8	2017	61 447	2 149	0,03	188	61 440	211 067
	2018	51 060	-11 354	-0,22	363	51 141	272 866
	2019	71 040	19 980	0,28	119	71 007	359 055
	2020	30 453	-40 587	-1,33	30	30 493	156 939
	2021	40 093	-18 708	-0,47	0	40 093	171 084
Company 9	2017	117 790	22 842	0,19	30 346	111 905	421 811
	2018	119 938	481	0,00	36 946	119 790	327 538
	2019	118 517	168	0,00	39 873	118 460	215 433
	2020	106 275	1 907	0,02	10 694	106 083	147 746

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	2021	130 467	31 758	0,24	40 683	120 564	173 113
Company 10	2017	5 371 560	710 420	0,13	23 842	5 368 407	2 377 533
	2018	5 586 863	764 275	0,14	32 560	5 582 409	2 615 427
	2019	5 361 073	314 065	0,06	39 681	5 358 748	2 822 845
	2020	5 519 647	276 294	0,05	16 132	5 518 839	1 465 531
	2021	data not available					
Company 11	2017	17 374	-3 139	-0,18	1 230	17 596	200 377
	2018	29 683	12 680	0,43	3 184	28 323	325 905
	2019	19 296	-26 499	-1,37	4 958	26 105	353 048
	2020	49 229	-470	-0,01	5 255	49 279	429 733
	2021	48 324	23 051	0,48	6 778	45 091	716 438
Company 12	2017	34 880	10 406	0,30	429	34 752	164 767
	2018	43 830	10 161	0,23	29 958	36 885	186 037
	2019	54 104	10 274	0,19	3 355	53 467	289 177
	2020	54 845	741	0,01	2 697	54 809	111 670
	2021	57 469	2 624	0,05	3 263	57 320	174 872
Company 13	2017	81 870	-8 371	-0,10	4 184	82 298	199 074
	2018	158 254	28 009	0,18	17 798	155 104	382 184
	2019	233 420	79 605	0,34	15 182	228 242	752 937
	2020	56 863	-89 807	-1,58	7 983	69 471	179 263
	2021	data not available					
Company 14	2017	128 066	-24 973	-0,20	1 769	128 411	156 124
	2018	66 044	-62 548	-0,95	1 305	67 280	163 741
	2019	40 815	-25 701	-0,63	11 619	48 131	140 861
	2020	14 871	-31 481	-2,12	10	14 892	5 854
	2021	data not available					
Company 15	2017	4 983 341	395 446	0,08	149 346	4 971 490	4 396 033
	2018	5 174 326	637 950	0,12	328 583	5 133 815	5 668 691
	2019	5 402 964	670 516	0,12	205 772	5 377 427	6 655 129
	2020	6 394 389	1 438 061	0,22	239 933	6 340 429	6 475 932
	2021	6 355 380	407 827	0,06	124 238	6 347 408	4 719 198
Company 16	2017	120 227	6 605	0,05	1 342	120 153	134 114
	2018	143 177	5 660	0,04	1 038	143 136	130 377
	2019	165 578	-3 899	-0,02	583	165 592	105 556
	2020	190 229	13 821	0,07	1 545	190 117	110 184
	2021	data not available					
Company 17	2017	-4 390 912	-1 116 083	0,25	0	-4 390 912	905 322
	2018	-6 481 701	-2 157 985	0,33	14 765	-6 486 617	759 815
	2019	-6 458 973	165 353	-0,03	14 457	-6 458 603	851 381
	2020	-10 169 684	-3 709 503	0,36	4 460	-10 171 311	874 404
	2021	data not available					
Company 18	2017	14 583	10 254	0,70	57	14 543	50 520
	2018	11 014	-4 262	-0,39	70	11 041	25 354
	2019	456	-10 531	-23,09	125	3 343	33 235
	2020	396	-100	-0,25	0	396	40 139
	2021	data not available					
Company 19	2017	287 333	21 951	0,08	0	287 333	687 392
	2018	249 949	-21 881	-0,09	27 216	252 332	614 609
	2019	251 356	-26 226	-0,10	5 832	251 964	350 876
	2020	253 663	2 308	0,01	5 832	253 610	222 306
	2021	data not available					
Company 20	2017	-1 087 972	-196 553	0,18	28 635	-1 093 145	582 182
	2018	-1 029 829	61 600	-0,06	40 901	-1 027 382	705 437
	2019	-1 145 919	-99 337	0,09	35 096	-1 148 961	417 480
	2020	-510 829	53 880	-0,11	27 141	-507 966	259 809
	2021	data not available					

Source: Dates, which are published on the official websites of enterprises

Table 2 A. Indicators of companies' performance for regression modeling, 2017-2021

No	Year	Variable costs,UAH	Marginal revenue, UAH	Operating profit,UAH	Operating leverage (coefficient)	Capital growth rate (coefficient)	Adjusted OL (coefficient)
Company 1	2017-2020	data not available					
	2021	5 682 400	2 543 188	-237 307	-10,72	15,03	0,00
Company 2	2017	547 230	324 923	-11 136	-29,18	-7,29	0,00
	2018	638 066	494 548	41 498	11,92	20,52	11,92
	2019	747 016	594 254	-423 953	-1,40	-54,08	0,00
	2020	710 649	503 961	57 327	8,79	-14,97	8,79
	2021	831 188	451 878	-144 979	-3,12	23,52	0,00
Company 3	2017	297 137	137 480	-188 517	-0,73	-11,34	0,00
	2018	135 901	95 290	-58 915	-1,62	-35,26	0,00
	2019	94 956	42 627	333 375	0,13	59,06	0,13
	2020	454 852	214 596	58 552	3,67	10,58	3,67
	2021	data not available					
Company 4	2017	420 080	190 950	-54 767	-3,49	-42,74	0,00
	2018	406 841	232 117	77 680	2,99	43,17	2,99
	2019	569 213	397 658	45 223	8,79	-9,52	8,79
	2020	565 870	414 329	59 166	7,00	4,67	7,00
	2021	data not available					
Company 5	2017	413 546	299 796	47 916	6,26	36,68	6,26
	2018	407 307	216 305	-6 924	-31,24	-41,37	0,00
	2019	443 353	326 906	83 413	3,92	13,39	3,92
	2020	293 130	138 856	-40 932	-3,39	63,31	0,00
	2021	data not available					
Company 6	2017	505 144	389 439	115 506	3,37	25,32	3,37
	2018	641 383	433 550	77 896	5,57	10,92	5,57
	2019	592 827	377 177	48 309	7,81	3,09	7,81
	2020	666 381	420 393	60 734	6,92	10,62	6,92
	2021	761 284	462 891	49 190	9,41	1,46	9,41
Company 7	2017	312 307	207 076	53 833	3,85	13,16	3,85
	2018	348 429	222 799	22 921	9,72	4,29	9,72
	2019	320 759	184 182	9 499	19,39	0,59	19,39
	2020	319 504	193 186	11 238	17,19	1,98	17,19
	2021	421 990	232 247	16 117	14,41	2,63	14,41
Company 8	2017	115 527	95 540	2 688	35,54	7,12	19,54
	2018	157 126	115 740	-9 936	-11,65	-16,76	0,00
	2019	193 329	165 726	21 211	7,81	38,85	7,81
	2020	85 043	71 896	-36 696	-1,96	-57,06	0,00
	2021	79 610	91 474	3 835	23,85	31,48	18,85
Company 9	2017	205 484	216 327	40 025	5,40	35,27	5,40
	2018	195 442	132 096	-27 721	-4,77	7,05	0,00
	2019	173 065	42 369	-97 176	-0,44	-1,11	0,00
	2020	69 155	78 591	19 608	4,01	-10,45	4,01
	2021	49 658	123 455	57 361	2,15	13,65	2,15
Company 10	2017	756 683	1 620 851	892 942	1,82	59,90	1,82
	2018	1 035 046	1 580 381	922 884	1,71	3,99	1,71
	2019	1 326 889	1 495 956	534 376	2,80	-4,01	2,80
	2020	854 581	610 950	82 324	7,42	2,99	7,42
	2021	data not available					
Company 11	2017	122 318	78 059	6 278	12,43	-23,32	12,43
	2018	222 862	103 043	2 577	39,99	60,96	19,99
	2019	207 330	145 718	-5 344	-27,27	-7,83	0,00
	2020	227 082	202 651	60 990	3,32	88,77	3,32
	2021	431 287	285 151	58 249	4,90	-8,50	4,90
Company 12	2017	98 404	66 363	12 614	5,26	-18,52	5,26
	2018	111 341	74 696	12 421	6,01	6,14	6,01
	2019	184 791	104 386	12 999	8,03	44,96	8,03
	2020	70 720	40 950	72	568,76	2,51	8,76
	2021	112 866	62 006	3 383	18,33	4,58	18,33
Company 13	2017	108 171	90 903	64 611	1,41	-3,81	1,41
	2018	196 532	185 652	65 839	2,82	88,47	2,82
	2019	450 562	302 375	66 813	4,53	47,15	4,53
	2020	178 267	996	-134 987	-0,01	-69,56	0,00
	2021	data not available					
Company 14	2017	97 498	58 626	-19 375	-3,03	-15,61	0,00

	2018	109 322	54 419	-57 659	-0,94	-47,61	0,00
	2019	89 377	51 484	-31 789	-1,62	-28,46	0,00
	2020	8 782	-2 928	-26 933	0,11	-69,06	0,11
	2021	data not available					
Company 15	2017	2 156 410	2 239 623	478 334	4,68	-1,06	4,68
	2018	2 837 910	2 830 781	872 329	3,25	3,27	3,25
	2019	3 246 780	3 408 349	991 151	3,44	4,75	3,44
	2020	2 937 213	3 538 719	1 668 607	2,12	17,91	2,12
	2021	2 273 464	2 445 735	632 041	3,87	0,11	3,87
Company 16	2017	82 375	51 739	16 712	3,10	20,42	3,10
	2018	86 125	44 253	10 858	4,08	19,13	4,08
	2019	74 278	31 278	-3 944	-7,93	15,69	0,00
	2020	76 462	33 722	13 575	2,48	14,81	2,48
	2021	data not available					
Company 17	2017	789 514	115 808	-308 603	-0,38	-40,31	0,00
	2018	646 660	113 155	-1 557 137	-0,07	-47,73	0,00
	2019	684 479	166 902	-184 030	-0,91	0,43	0,00
	2020	612 588	261 816	-1 803 601	-0,15	-57,48	0,00
	2021	data not available					
Company 18	2017	23 155	27 365	10 540	2,60	80,98	2,60
	2018	14 830	10 524	-6 134	-1,72	-24,08	0,00
	2019	21 533	11 702	-7 060	-1,66	-69,72	0,00
	2020	26 132	14 007	-2 243	-6,24	-88,15	0,00
	2021	data not available					
Company 19	2017	407 957	279 436	69 578	4,02	3,03	4,02
	2018	378 562	236 047	25 625	9,21	-12,18	9,21
	2019	214 950	135 926	14 496	9,38	-0,15	9,38
	2020	140 320	81 986	15 676	5,23	0,65	5,23
	2021	data not available					
Company 20	2017	317 363	264 820	54 392	4,87	-30,73	4,87
	2018	399 817	305 620	84 675	3,61	6,02	3,61
	2019	273 081	144 400	-116 563	-1,24	-11,83	0,00
	2020	179 218	80 591	-140 135	-0,58	55,79	0,00
	2021	data not available					

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