Capital structure of enterprises as a factor of ensuring financial stability

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Abstract

The aim of the study is to develop a methodological approach to assess the impact on the financial stability of enterprises of the processes of formation and use of intellectual capital in the structure of total capital. Systematic, monographic, analysis and synthesis, induction and deduction, the method of financial ratios, cluster analysis, regression analysis, factor analysis. The work is characterized by the content and highlights the key factors of the concept of "financial stability of the enterprise." Using cluster analysis, groups of machine-building enterprises of the Kharkiv region were formed depending on the structure and efficiency of capital use. A methodological approach has been created for empirical studies of the influence of intellectual capital on the results of activities of machine-building enterprises of the Kharkiv region for the selected clusters. It has been established that there is a positive relationship between the processes of functioning of intellectual capital and the financial results of enterprises; the impact of the efficiency of using intellectual capital on asset turnover is not unidirectional, but the contribution of the efficiency of using the components of intellectual capital in obtaining these results differs for enterprise clusters; individual components of intellectual capital without the presence of the rest are not significant. The factors of the influence of intellectual capital on the identified clusters of engineering enterprises are identified, which will reveal the reserves of effective reproduction of intellectual capital on the selected groups of enterprises. The practical significance of the results is that their use will allow enterprises reasonably structure in both total and intellectual capital, increase the effective use of material, financial and intellectual components. Methodical recommendations contained in the study, providing a comprehensive approach to management of capital structure formation and identification of potential areas for optimization.

Key Words: Financial Stability, Capital Structure, Intellectual Capital, Financial Stability of the Enterprise

Introduction

The effective functioning of Ukrainian enterprises today is complicated by the high level of stochasticity and unpredictability on the part of the external environment, as well as the influence of internal factors, which leads to the emergence and development of the crisis in their activities. All this leads to low financial stability, the quality of their financial results. Thus, the share of unprofitable enterprises in their total number remains stably high - 26.1% in 2018, 28.2% in the 1st quarter and 25.6% in the 2nd quarter of 2019, while the total volume of net losses of business entities in the economy in 2018 reached UAH 290,897.5 million (Ukraine State Statistics Service, 2019). At the same time, the number of bankruptcy cases pending amounted to 24426, of which 14450 cases were completed by conducting of which the claim (statement) was satisfied for 9713 cases (Ukraine Judiciary, 2019).

The quality of the financial condition of the enterprise from the point of view of a long-term perspective is connected, first of all, with the capital structure. Therefore, in modern conditions of the crisis external environment, financial stability management should be based on an analysis of the state and structure of the assets and capital of the enterprise. On the other hand, the knowledge economy actualizes the task of enhancing the process of asset formation and improving the capital structure of enterprises, taking into account the intellectual component; ensuring the continuity of the process of innovation; reorientation of investment flows; an increase in the share of the value created by intellectual capital. The solution to these problems requires an analysis of the impact of capital structure, taking into account the intellectual component on the financial stability of the enterprise, which determines the relevance of the study.

Literature review

The problems of optimizing the capital structure and its impact on the financial condition of the enterprise are the subject of active research by scientists.

Theories of the capital structure began to appear in literature in the middle of the twentieth century, but, in the opinion of R. Braille and S. Meyers, "there is still no universally recognized theory of capital structure" (Brealey, Myers, & Allen, 2014). As a result, there are many approaches to its definition, but they can be divided into two groups: static ones that determine the optimal capital structure by maximizing the current valuation of assets, and dynamic ones that allow the deviation from the target capital structure at a particular point in time.

Analysis of existing directions of studying the theories on capital made it possible to generalize them in table 1.

Table 1. *Theories of the enterprises' capital structure*

Type of theory	Theory	Author	Optimality criterion
Static	Traditional theory	Gordon M.	the state, when weighted capital value is minimal and aggregate company value is maximal
	Theory of indifference	Modiglini F., Miller M., Hamada R.	The mechanism of market value formation correlates with capital structure.
	Trade-off theory	Miller M., DeAngelo H., Masiulis R., Corner D.	Optimal capital structure is determined by the point of the compromise of an enterprise, when weighted capital value is minimal.
Dynamic	The signaling theory	Ross S., Myers S., Maijluf N. Miller M., Rock K., Welch I.	Possible options for optimizing the structure are determined in accordance with the behavior of managers.
	Asymmetry information theories	Bellalah M., Bouy C	An enterprise determines the priority of the criteria of capital structure optimization independently, considering target capital structure
	Agency costs theory	Eisenhardt K., Jensen M.	The increase of the specific weight of borrowed capital causes the increase of weighted capital value, which leads to the decrease of the market value of an enterprise.
	The theory of corporate control	Harris M., Raviv A., Schultz R.	Capital structure may be used by its management in order to block hostile takeovers.
	Behavioral theories: - The theory of hierarchy - The theory of the adjustment to the market - Dynamic trade-off theory	Myers S., Maijluf N., Donaldson G. Merton H., Baker M., Wurgler J. Migel A., Pindado H., Flannery M., Rengan K.	Minimization of the costs and risks of financing The usage of the possibilities of the current market situation and keeping balance between justice and market price The maximization of the speed of capital structure adjustment to its optimality

In modern conditions of the knowledge economy, management of the capital structure, taking into account the intellectual component, is a basic element of the strategy for the functioning and development of the enterprise. The objective need for optimizing the capital structure of Ukrainian enterprises is primarily due to the transition to a new (information) model of the economic organization of society. Much

research, both theoretical and empirical, has been undertaken on intellectual capital in recent years as the dominant form in modern firms (Bayburina & Golovko, 2008, Di'ez, Ochoa, Prieto & Santidria'n, 2010, Gruian, 2011, Kamath, 2008, Laing, Dunn & Hughes-Lucas, 2010, Latif, Shoukat & Aslam, 2012). The model of solution for the problem of the enterprise's optimal capital structure on the base of the hierarchy analysis method was investigated in a study (Zhuravleva & Latysheva, 2014) (Fig.1).
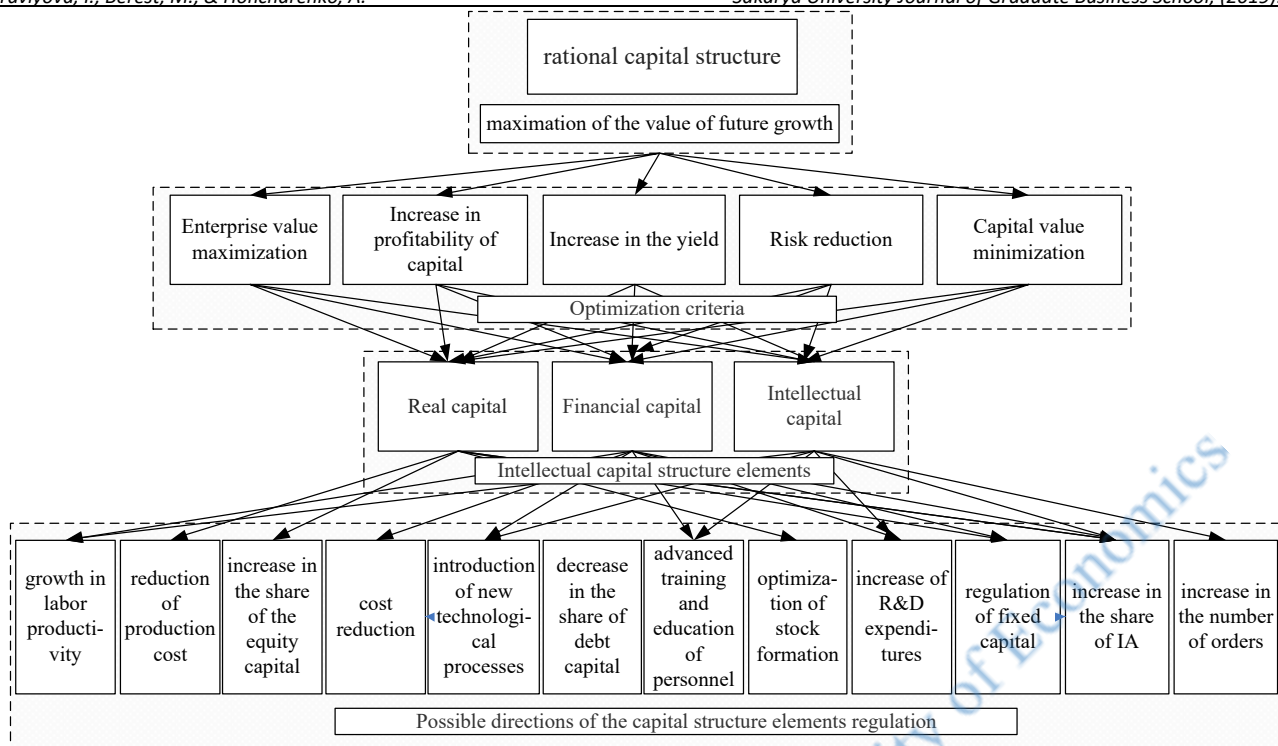
Figure 1. *The hierarchical model for the assessment of logically possible directions of the enterprise's optimal capital structure formation (Zhuravleva, I. V. & Latysheva, I. L., 2014).*

Some studies have confirmed the assumption that there is a correlation between the level of VAIC companies, disclosed in the annual report, and indicators of the financial condition (Papmehl, 2004). In a study (Shiu, 2006), it was shown that companies whose Value Added Intellectual Coefficient (VAIC ™) coefficient developed by A. Pulic (Pulic, 2000) are at a relatively high level are prone to reduce the quantity and quality of information about intellectual property and intangible assets. The works of D. Volkov (Volkov & Garanina, 2007), T. Garanina (Garanina, 2008) tested hypotheses about the impact on the market value of a company of the fundamental value of the capital structure, taking into account both tangible and intangible assets in a sample of 1000 Russian companies. In a study by A. Lukyanov and S. Pokhilko (Lukyanova & Pokhilko, 2010), hypotheses on the influence of VAIC elements on the market value of a company were tested on a sample of Russian banks. Similar studies by western scientists have also confirmed the positive impact of VAIC on the financial stability of foreign companies (Shiu, 2006) . At the same time, it is necessary to note the small number of works of Ukrainian scientists devoted to applied research in the field of empirical analysis of the impact of the capital structure of enterprises, taking into account intellectual capital on their financial performance. This is explained, in particular, by a

certain lag in the development of post-industrial economic structure in Ukraine, to the lack of developed practices for managing VAIC at domestic enterprises.

Methods

In the process of studying the structure of capital, the following methods were used: the systematic, monographic, analysis and synthesis, induction and deduction, the method of financial ratios, cluster analysis, regression, factor analysis.

Results and discussion

One of the most important conditions for the effective functioning of the enterprise and the basis of a stable financial condition is the support of its financial stability. The definition of the concept of "financial stability" is an actual subject of research by scientists. Analysis and generalization of literary sources on the problems of financial management and crisis management of an enterprise (Blank, 2004, Bazilinsjka, 2009, Vakhovych, 2013, Shkoljnyk, Bojarko & Dejneka et al., 2016, Yasinovskaya, 2016) made it possible to identify key characteristics that determine the level of financial stability of an enterprise (Fig. 2).
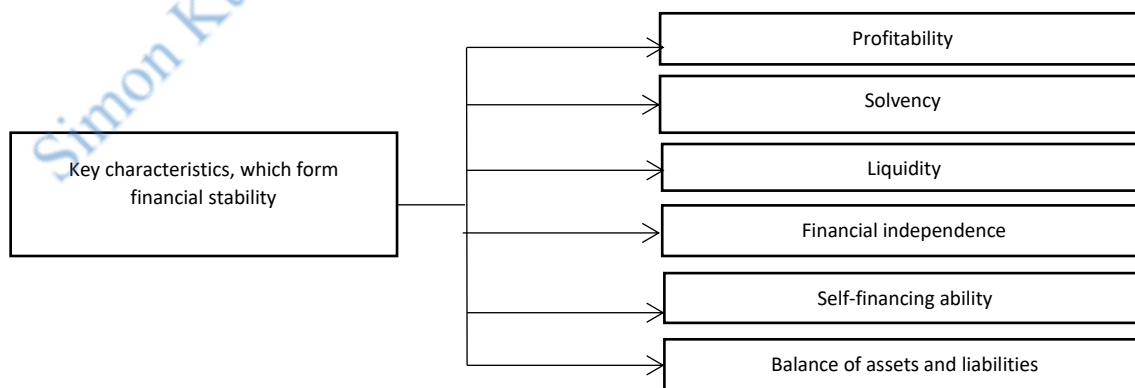

Figure 2. *Characteristics that determine the level of financial stability of the enterprise*

Thus, the financial stability of the enterprise should be understood as the state of the financial resources of the enterprise in which rational disposal of them is a guarantee of financial independence, solvency, stable profitability and, as a result, ensuring the process of expanded reproduction. The main signs of financial stability of enterprises is the stable growth of the balance sheet currency, a sufficient level of liquidity, solvency and reliability of the enterprise, a significant share of its own sources of financing of the enterprise, income stability and asset quality, the ability of the enterprise to expand its activities (Papmehl, 2004) . Management of financial stability as a characteristic of the financial condition of an enterprise that has a generalizing and integrated character, according to the authors, should be based on an analysis of the capital structure.

The theoretical basis for the analysis of capital structure, taking into account the intellectual component, is the synthesis of two approaches of the theory of intellectual capital. The first is based on a resource approach and considers intellectual capital as a set of specific resources that require special management approaches (Bontis, 2003). The second is based on the cost approach and understands by intellectual capital the source of growth in the value of a business entity, the driver of the return on material resources (Stuart, 2007). Thanks to the resource approach, the components of VAIC can be identified and described. Based on the cost approach, measure the effectiveness of its use.

The developed methodological approach for analyzing the impact on the financial stability of enterprises of the processes of formation and use of intellectual capital in the structure of total capital includes the following stages: problem statement, allocation of homogeneous groups of enterprises based on cluster analysis, selection of dependent variable influence models, assessment of VAIC enterprises, preliminary selection and final the formation of a system of indicators of influence models, modeling the impact of intellectual capital on f financial result of enterprises, quality assessment models and analyze the simulation results, factor analysis of the

impact of capital structure based on the intellectual component of the financial results of enterprises.

The methodology for assessing intellectual capital and its components is reflected in detail in (Zhuravleva, 2016, Zhuravleva, 2007). Let us dwell on the most important stages of the methodological approach to the analysis of the factors of the influence of intellectual capital on the financial results of enterprises. Assessing the financial stability of an enterprise as a complex object of management is multidimensional, therefore, before proceeding to its modeling and research, it is advisable to identify homogeneous groups of enterprises by the method of cluster analysis.

The cluster analysis method is a multidimensional statistical procedure, which consists in collecting data containing information about a sample of objects and distributing objects into relatively homogeneous groups (Pistunov, Antonyuk & Turchaninov, 2008) . The main goal of the analysis is to single out such homogeneous subsets in the initial multidimensional data so that the objects within the groups are similar in a certain sense to each other, and the objects from different groups are not similar. By "similarity" is meant the proximity of objects in a multidimensional space of features (Kravets & Kuznetsov, 2010).

Clustering is carried out according to the financial statements of 13 engineering enterprises of the Kharkiv region. The grouping of enterprises was carried out according to the following indicators:

Margin of Financial Safety (Kfs) - an indicator that determines the share of long-term sources of financing in the total capital of the enterprise;

Return on Assets (ROA) - characterizes the level of the capital efficiency of the enterprise. The calculations are implemented using the STATISTICA software product.

The initial data for the clustering, calculated for the machine-building enterprises of the Kharkov region for 2018, are presented in Table 2.

Table 2. *Indicators of the formation and capital efficiency of machine-building enterprises of the Kharkiv region*

Enterprise	Symbol	Kfs	ROA
LLC NPO "Vertical"	C1	0.618	0.158
PAO "Kharkiv Machine Building Plant "SVET SHAKHTYORA"	C2	0.499	0.069
State scientific production enterprise "Kommunar Corporation"	C3	0.750	0.206
SE Plant Electrotyazhmash	C4	0.150	0.190
PAO Research Electrical Assembly Plant	C5	0.707	0.490
PAO "Electromashina"	C6	0.373	1.121
PAO Kharkov Electrical Engineering Plant "Ukrelectromash"	C7	-0.120	0.013
PAO Kharkiv machinebuilding plant "PLINFA"	C8	0.764	0.164
PAO FRUNZE plant	C9	0.789	0.298
PAO Scientific-Production Enterprise TEPLOAUTOMAT	C10	0.685	0.340
PAO "Forez"	C11	0.375	0.128
PAO Kharkiv Tractor Plant	C12	0.767	0.112
LLC Agency of Complex Solutions "SYSTEM"	C13	0.453	0.044

The advantage of cluster analysis is that it makes it possible to separate objects according to a number of signs. Cluster analysis algorithms can be divided into hierarchical and non-hierarchical. Hierarchical agglomerative procedures consist of the sequential unification (separation) of groups of

elements, first the nearest (distant), and then more and more distant (close) from each other. First, the clustering is carried out by the agglomerative method of tree clustering. The Ward method is selected as the rule of hierarchical clustering. In Fig. 3 shows a vertical tree diagram obtained from the clustering of machine-building enterprises in the Kharkiv region.
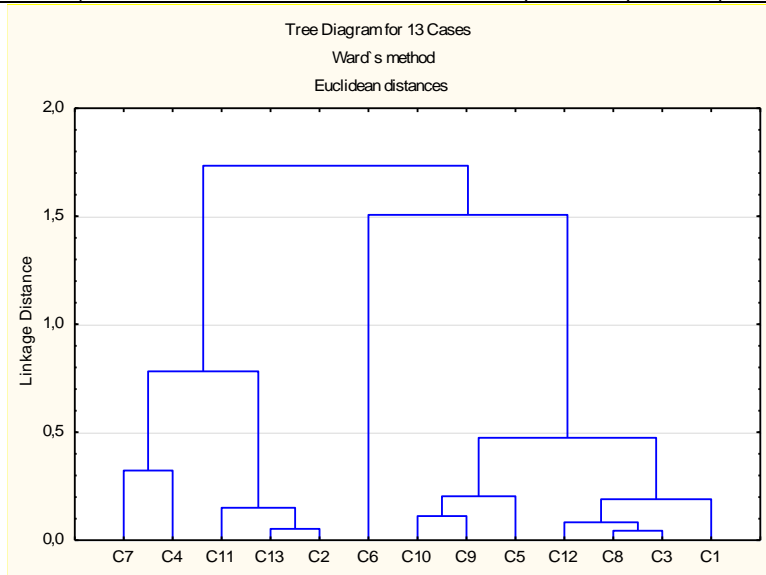
Figure 3. *Cluster analysis vertical tree diagram*

It can be seen that the enterprises were divided into 5 separate groups, each of which has special characteristics of the structure and efficiency of capital use. For a more accurate interpretation of the results, it is advisable to use the k-means method using the Euclidean metric. According to the results of cluster analysis using the k-means method, five groups of enterprises were also identified (Fig. 4).

	Members of Cluster Number 2 (Spreadsheet1) and Distances from Respective Cluster Center Cluster contains 3 cases	
	Distance	
C2	0,040879	
C11	0,058266	
C13	0,026784	

	Members of Cluster Number 1 (Spreadsheet1) and Distances from Respective Cluster Center Cluster contains 1 cases	
	Distance	
C6	0,00	

	Members of Cluster Number 3 (Spreadsheet1) and Distances from Respective Cluster Center Cluster contains 2 cases	
	Distance	
C4	0,114115	
C7	0,114115	

	Members of Cluster Number 4 (Spreadsheet1) and Distances from Respective Cluster Center Cluster contains 3 cases	
	Distance	
C5	0,082129	
C9	0,070535	
C10	0,039164	

	Members of Cluster Number 5 (Spreadsheet1) and Distances from Respective Cluster Center Cluster contains 4 cases	
	Distance	
C1	0,075748	
C3	0,036980	
C8	0,027885	
C12	0,045225	

Figure 4. *The composition of the clusters obtained by the method of k-means*

The economic interpretation of the existing clusters and the list of enterprises that form their composition are presented in Table. 3.

Table 3. *Results of cluster analysis*

Number of cluster	Enterprises in the cluster	Characteristics of cluster enterprises
1	PAO "Electromashina"	The maximum level of capital efficiency, the average level of financial stability
2	PAO "Kharkiv Machine-Building Plant "SVET SHAKHTYORA", PAO "Forez", LLC Agency of Complex Solutions "SYSTEM"	The lowest level of capital efficiency, average level of financial stability
3	SE Plant Electrotyazhmash, PAO Kharkov Electrical Engineering Plant "Ukrelectromash"	Low level of capital efficiency, low level of financial stability
4	PAO Research Electrical Assembly Plant, PAO FRUNZE plant, PAO Scientific-Production Enterprise TEPLOAUTOMAT	Average level of capital efficiency, high level of financial stability
5	LLC NPO "Vertical", State scientific production enterprise "Kommunar Corporation", PAO Kharkiv machinebuilding plant "PLINFA", PAO Kharkiv Tractor Plant	Low level of capital efficiency, high level of financial stability

So, PAO "Electromashina", the enterprise with the highest level of capital efficiency, fell into the first cluster, while the share of long-term liabilities, which ensures financial stability, is at an average level.

The second cluster was formed by PAO "Kharkiv Machine-Building Plant "SVET SHAKHTYORA", PAO "Forez" and LLC Agency of Complex Solutions "SYSTEM", which demonstrate a low level of capital efficiency among the enterprises studied, with an average share of long-term financing sources in the capital structure.

The third cluster contains two enterprises with a low level of financial stability. Their capital was formed mainly due to current liabilities, while the efficiency of capital use is also low (SE Plant Electrotyazhmash and PAO Kharkov Electrical Engineering Plant "Ukrelectromash").

The fourth cluster includes enterprises that have a high level of financial stability, while their capital efficiency is also quite high. These are enterprises that have the most stable financial condition among those studied, namely PAO Research Electrical Assembly Plant, PAO FRUNZE plant and PAO Scientific-Production Enterprise TEPLOAUTOMAT.

The fifth cluster was formed by LLC NPO "Vertical", State scientific production enterprise "Kommunar Corporation", PAO Kharkiv Machine-Building plant "PLINFA" and PAO Kharkiv Tractor Plant"- enterprises with a rather high share of long-term liabilities in the capital structure, but the return of assets is low.

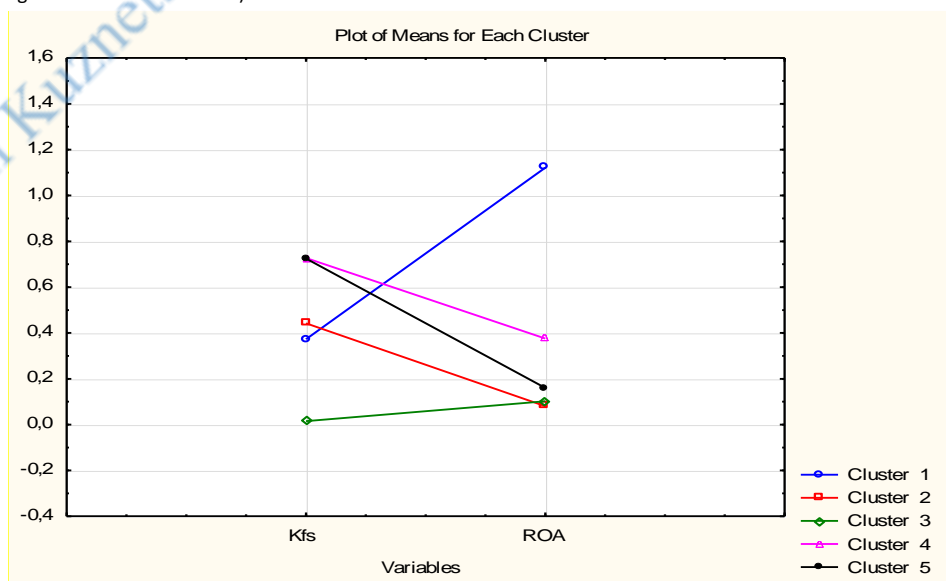A graphical interpretation of the clustering results is shown in Fig. 5.

Figure 5. *Graph the averages for each cluster*

The clusters that were allocated according to the structure and efficiency of the use of total capital were analyzed by the components of intellectual capital calculated by the A. Pulic method (Pulic, 2000). As a result, clusters 4 and 5 were combined and four clusters were formed taking into account the intellectual component of total capital. Cluster 1 enterprises have a high VAIC of intellectual capital. The second cluster includes enterprises with average indicators of intellectual capital, but only for some of its components. That is, this group of enterprises has unbalanced availability. intellectual capital. In the third cluster, enterprises with the lowest level of intellectual capital were combined. The fourth cluster was formed by enterprises with an average level of intellectual capital.

To determine the impact of intellectual capital on the results of enterprises as dependent variables, we selected indicators calculated using the Return on Assets Methods method. This group of methods is based on the assumption that the return on tangible assets within the industry is relatively constant, therefore, the difference in the return on assets of various companies can be explained by the presence of their specific intangible assets.

These indicators should be characteristics of the profitability and intensity of use of the assets of the objects of study. Because the dependent variables were used such indicators of enterprise efficiency: Asset turnover ratio (ATO), which characterizes the efficiency of asset use in terms of sales, return on investment (ROI), which allows you to get an idea about the effectiveness of investing in the main activity of the enterprise

management; return on assets (ROA), which is designed to measure the efficiency of the use of assets of the enterprise, regardless of the sources of financing of these assets.

As independent variables, human capital efficiency (H), structural capital efficiency (S), consumer capital efficiency (C), intellectual capital value, value added by intellectual capital (VAIC) calculated according to (Pulic, 2019).

The use of regression analysis by the method of successive exclusion with all indicators of the level of efficiency of the components of intellectual capital as independent variables, as well as ROA, ROI, ATO are indicators of the financial performance of enterprises as dependent variables, the models presented in three clusters of machine-building enterprises of the Kharkov region were obtained, presented in Tables 6-8. Models have characteristics that prove their adequacy, significance and feasibility in practice.

The selection of input characteristics that are significant for the regression models by the Forward Selection in STATISTICA made it possible to reduce the number of independent variables in order to reduce the dimension of the model, not only to remove from it all the insignificant signs that do not carry information useful for analysis, and simplify the model, but also to eliminate redundant features.

Table 6 presents the models of the influence of intellectual capital on the return on assets of enterprise clusters, as well as characteristics that prove the adequacy, significance and possibility of applying the models in practice.

Table 6. *Description of the obtained models of the influence of VAIC on the return on assets of machine-building enterprises of the Kharkiv region*

Cluster	Model	Determination factor	Fisher ratio	Fisher Tabular Ratio
1	ROA = -0.05+0.08 VAIC+0.07 H	0.627	21.21	19.46
4	Insignificant model	0.139	4.33	249.63
3	Insignificant model	0.064	231.13	253.35
4	ROA = -0.1+0.04 VAIC+0.127 C	0.799	59.59	19.46

An analysis of the variables included in the model allowed us to conclude that all the independent variables that remained after applying the Forward Selection method act as stimulators of return on assets since they entered the model with a plus sign. But the composition of independent variables with clusters depending on intellectual capital is different. For example, in the first cluster of enterprises with a high level of intellectual capital and its balance in terms of components, the profitability of assets is affected by VAIC, the efficiency of use of human capital. And in a group with an average level of VAIC functioning, only the efficiency of using consumer capital affects the return on assets.

Models of the impact of intellectual capital on return on investment are presented in the Table. 7. As a result of the selection of significant input

features by the Forward Selection method, it was revealed that VAIC affects the return on investment only in a cluster of enterprises with a high level of intellectual capital, where all its components form a balanced system with excellent functioning (cluster 1).

Such a component of intellectual capital as human capital either does not affect (cluster 1, 4) the return on investment or does not contribute to the growth of this indicator (cluster 2). Another component of intellectual capital, structural capital, also has a negative impact on return on investment. Consumer capital positively affects the return on investment only in clusters 1, 2 and 4.

Table 7. *Description of the obtained models of the influence of intellectual capital on the return on investment of machine-building enterprises of the Kharkiv region*

Cluster	Model	Determination factor	Fisher ratio	Fisher Tabular Ratio
1	ROI = 0.55+2.38 C-2.42 S+0.32VAIC	0.717	24.53	8.62
2	ROI = 1.41+3.53 C-0.34 H	0.679	27.52	19.46
3	Insignificant model	0.219	8.71	250.23
4	ROI = -0.17+0.7 C+0.4 VAIC	0.96	1563.4	19.49
5	ROI = 0.55+2.38 C-2.42 S+0.32VAIC	0.717	24.53	8.62

In the table. 8 presents the results of a regression analysis of the impact of intellectual capital on asset turnover.

Only enterprises of clusters 1 and 4, the use of such a component of intellectual capital as consumer capital has a significant positive effect on asset turnover. Only enterprises of cluster 4, only VAIC affects asset turnover. It should also be noted that the impact on the asset turnover of such a component of intellectual capital as human capital, or negative. Therefore, we will analyze in more detail the turnover of funds advanced in human capital.

Table 8. *Description of the obtained models of the influence of intellectual capital on asset turnover of machine-building enterprises of the Kharkiv region*

Cluster	Model	Determination factor	Fisher ratio	Fisher Tabular Ratio
1	ATO = 0.81+2.65 C-0.26 H	0.736	41.82	19.46
2	Insignificant model	0.463	113.85	253.35
3	Insignificant model	0.169	6.33	250.23
4	ATO = 0.35+0.2 C-4.02 H+3.38 VAIC	0.719	21.36	8.63

Thus, for the first cluster of enterprises with a high level of intellectual capital for the growth of profitability (ROA) and asset turnover (ATO), return on investment (ROI), it is necessary to accumulate and increase the efficiency of use of consumer capital (determination factors 0.717-0.799), for the fourth cluster with In order to increase the return on assets, average intellectual capital needs to accumulate and increase the efficiency of intellectual capital as a whole (determination coefficients 0.679-0.719). Research on enterprises of clusters 2 and 3 showed that certain components of intellectual capital without the presence of others are not essential for influencing financial stability.

Further, in the study, in order to obtain an adequate model for the factor analysis of the influence of intellectual capital on the financial results of machine-building enterprises of the Kharkiv region, it was found necessary to analyze the correlation between the studied variables for enterprises of clusters 1 and 4. According to the results of constructing the correlation matrix in the models, the indicators presented in table 9 were left.

Table 9. *Indicators for conducting a factor analysis of the impact of intellectual capital on the financial results of enterprises*

Indicator	Legend
profit margin: per unit of output	z1
the intellectual value added factor of VAIC	z2
ratio of receivables and payables	z3
receivables turnover ratio	z4
turnover ratio of finished products	z5
financial dependency ratio	z6
return on equity;	z7
equity ratio,	z8
intellectual capital	z9
return on assets	z10
capital-labour ratio	z11
security of own capital per employee;.	z12.
security of borrowed capital per employee	z13
share of innovative products	z14
share of profit in income	z15
the share of employees with higher education in the total number of employees	z16
the share of employees who improved their qualifications in the total number of employees	z17
the proportion of workers who have acquired a new profession in the total number of employees	z18;
proportion of pensioners	z19
fate of Intangible assets in total assets	z20

return on investment in intangible assets	z21
profitability: R&D	z22
education, healthcare	z23
training costs, advanced training	z24
investment in informatization	z25
the amount of net profit per 1 UAH salary	z26

Intellectual capital has one of the leading places in the enterprise management system as one of the main tools for creating a financially sustainable enterprise. The existence and changes of a specific component of intellectual capital occur only in interaction with other capitals. The entire capital system of enterprises is objectively ordered, organized. The principles of this order is the process of exchange in open economic systems of matter, energy and information. In this case, there is both continuous self-organization of capital (complications and corresponding streamlining) and conscious regulation of capital organization (Komarov, 2000).

To analyze the factors influencing intellectual capital on financial stability, we selected actual indicators characterizing all the components of intellectual capital for clusters of enterprises 1 and 4, which, as a result of isolating the main components, and then the factors and their rotation using the Varimax Rotation method of the input indicators based on the use of the STATISTICA, they were divided into groups and formed certain aggregate factors.

The efficiency of using the intellectual capital of cluster 1 and 4 was determined by seven factors, 84.56% of the total dispersion was explained (Fig. 6).

Extraction: Principal components (Marked loadings are >,700000)

Variable	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7
z1	-0,936709	-0,203909	0,205705	0,066975	0,068056	0,009727	-0,063348
z2	0,303693	0,270809	-0,128996	0,099037	0,001567	-0,030272	0,844118
z3	-0,056465	-0,125607	0,280916	0,131179	0,097500	-0,855954	-0,051645
z4	0,160981	0,416905	0,243303	-0,121193	-0,431085	0,299808	0,319269
z5	0,386776	-0,039648	-0,476761	-0,000448	-0,098621	-0,659333	-0,056073
z6	0,371084	-0,299545	-0,427248	-0,228227	0,235857	0,105311	-0,462384
z7	-0,231864	-0,065867	0,772618	0,395207	-0,340192	-0,088953	0,070915
z8	0,512864	0,335361	-0,346524	-0,047093	-0,318665	-0,187094	0,430177
z9	-0,048408	0,233599	0,907920	-0,051678	0,148707	-0,245512	-0,045063
z10	-0,302458	-0,097945	0,820493	0,362542	-0,149604	-0,048110	0,148326
z11	0,073507	0,910555	0,093015	-0,043556	0,047638	0,146609	0,278798
z12.	0,080330	0,840726	0,312507	0,039236	0,027882	0,090734	0,333616
z13	0,147396	0,851698	-0,255942	-0,040951	-0,124210	-0,091257	0,300872
z14	0,151987	0,237261	0,638519	0,021979	0,218606	0,376137	-0,125573
z15	-0,940325	-0,162904	0,108231	0,056798	0,075692	0,013530	-0,098384
z16	-0,110353	0,326944	-0,007452	-0,018938	0,126005	-0,033900	0,832385
z17	-0,070465	0,047684	-0,056570	0,602112	0,208187	-0,277474	0,346070
z18	0,462139	0,066613	-0,181010	-0,297930	0,199940	0,253595	-0,463027
z19	-0,131776	-0,256206	-0,067554	-0,041359	0,308054	-0,494162	-0,712369
z20	-0,925240	0,101139	-0,142640	-0,063791	-0,135401	0,002515	0,065982
z21	0,135028	0,125879	0,151730	0,894621	0,037210	0,006677	0,067026
z22	0,009256	-0,020349	-0,050744	-0,058416	-0,884232	0,067635	0,016435
z23	0,102569	0,139693	0,842768	-0,134521	0,116712	0,245945	-0,055406
z24	-0,270029	-0,038968	0,072840	0,776877	-0,007953	-0,046995	0,007481
z25	0,069566	0,769228	0,308517	0,350646	0,024261	0,133534	-0,179035
z26	-0,337733	0,123201	0,424900	0,276004	-0,095119	0,411438	0,590066
Expl.Var	3,962369	3,754576	4,490506	2,481578	1,618093	2,195672	3,484170
Prp Totl	0,152399	0,144407	0,172712	0,095445	0,062234	0,084449	0,134007

Figure 6. *Characterization of the obtained factors of the influence of intellectual capital on the financial results of enterprises and the matrix of factor loads after rotation in clusters 1 and 4*

The first factor indicates the efficiency of using IC in combination with product profitability (z1), the share of profit in income (z15) with the share of intangible assets in the total assets (z20). Therefore, it can be defined as the level of capital efficiency. Significant factor loads connect the second factor with indicators of capital-labor ratio (z11), self-sufficiency (z12) and borrowed capital (z13) per employee, return on investment in informatization (z25), so it can be called the level of labor armament.

The third factor should be interpreted as the efficiency of innovative processes since the indicators that determine its content are: equity turnover ratio (z7), cost of investment (z9), share of innovative products (z14). The fourth factor is formed under the influence of the indicator of the share of employees who upgraded their qualifications (z17), profitability of training and continuing education costs (z21), profitability of investments in informatization (z24), which gives the right to interpret it as the level of profitability of the accumulation of competent capital. The fifth factor, formed on the basis of gross profit per 1 UAH of research and development costs (z22), can be defined as the profitability of research activities.

The efficiency of partnership and consumer capital is determined by the sixth factor, formed by the indicators of the ratio of receivables and payables (z3) and the turnover ratio of finished products (z5). The last, seventh, factor can be defined as VAIC (z2), the share of employees with higher education in the total number of employees (z16), the proportion of pensioners (negative value z19), gross profit for UAH 1 cost of labor costs (z26). In the crisis period, the factors that determined the efficiency of using VAIC enterprises of cluster 1 had different content. 7 factors of VAIC formation for 2009-2014 were identified. Explain 81.57% of the total variance. The most determining factor is formed by interchangeable z8, z12, z18, z20, z23. Moreover, the indicators of the equity capital turnover ratio, the share of intangible assets in the total volume, the profitability of personnel education expenses are combined with the opposite signs of the provision of own capital per 1 employee, and the fate of workers who have acquired a new profession. The increase in the turnover of equity in the crisis period led to a decrease in the provision of equity by 1 employee. Through increasing the share of intangible assets at the expense of equity capital, the availability of this type of capital per 1 employee also decreased.

The illuminated methodological approach and the results of empirical studies of the influence of the processes of formation and use of VAIC results of the activity of machine-building enterprises of the Kharkiv region for the selected clusters showed a positive relationship between the processes of functioning of the VAIC and the results of activities of economic entities, as well as the relationship of the components of IC, expressed in the mutual influence, the presence of a synergistic effect and the insignificance of the individual components of VAIC without the presence of others.

Conclusions

The study made it possible to generate a methodological approach to empirical studies of the influence of intellectual capital on the results of activities of machine-building enterprises of the Kharkiv region for the selected clusters. Therefore, it was possible to find out that there is a positive relationship between the processes of functioning of intellectual capital and the financial results of enterprises; the impact of the efficiency of using intellectual capital on asset turnover is not unidirectional, but the contribution of the efficiency of using the components of intellectual capital to obtain these results differs for enterprise clusters; individual components of intellectual capital without the presence of the rest are not significant.

The factors of the influence of intellectual capital on the selected clusters of enterprises are identified, which will reveal the reserves of the effective reproduction of intellectual capital on the selected groups of enterprises.

The prospect of further exploration will be to develop a system of mechanisms that will affect the effectiveness of the policy for the formation of intellectual capital of enterprises due to the balance and synergy from the effective use of the components of intellectual capital.

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