FACTORS OF INFLUENCE OF FINANCIAL INDICATORS ON THE SIZE OF INTELLECTUAL CAPITAL OF COMPANIES

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DOI: 10.24412/3453-9875-2021-77-3-29-38

Abstract

The increasing role of intellectual capital in achieving sustainable competitiveness of large companies determines the importance of assessing intellectual capital and studying the factors of influence of various indicators on the growth of human, client, and process capital. In the modern scientific literature, the theoretical aspects of the assessment of intellectual capital are sufficiently disclosed, but there is a lack of empirical research on the relationship of the size of the intellectual capital with the features of the financial architecture.

The purpose of this study is to research the relationship between the various characteristics of large Russian companies in the real sector of the economy and the size of their intellectual capital. The factors used are the affiliation of companies to various types of business, the presence of state ownership, the structure of sources of financing, the size of economic profit.

This study was conducted by examining the public financial statements of 120 large Russian companies. As a research method, the apparatus of categorical analysis is used, finding the Yule connection measure, which is an analogue of the correlation coefficient for non-numeric data. The study revealed that about half of Russian companies demonstrate a negative contribution of intellectual capital to the cost. Hypotheses about the connection between the existence of state ownership and the size of economic profit with the level of intellectual capital were confirmed.

In the discussion part of the article, the mechanisms of expert evaluation of intellectual capital are discussed, a methodology for evaluating individual components of human, process and client capital is proposed. The results of calculating the level of intellectual capital for some Russian companies based on the proposed methodology are presented. As a direction for further research, it is proposed to build a regression model of the dependence of the size of intellectual capital on the factors of the financial architecture of companies.

Key words: Intellectual capital, information disclosure, human capital, structural capital, client capital.

Introduction

In the 21st century, in connection with the transition of the world economy to the post-industrial stage, the role of intellectual capital is significantly increasing. In general, post-industrial society is characterized by a significant increase in the role of knowledge as a key factor of power, intellectual labor, acceleration of the dynamics of social and organizational processes [1], globalization and informatization of society and the economy.

In turn, the Economy of the 21st century is characterized by globalization, digitalization of all processes of production and supply of products to the market [2].

If in the industrial economy performance and punctuality acted as key advantages of the employee, then in the post-industrial one, these are the ability to express and defend their opinion, independence and creativity [3]. In addition, emotional intelligence, that is, the ability to communicate, interact effectively with other employees and work in a team, is considered an essential factor.

The main distinguishing feature of the post-industrial culture of labor will be the desire and ability of a person to find meaning in his own life and work. Here it can be said about the major aspects of organizations and employees on internal spiritual priorities and social responsibility. The availability of free time and the ability to manage time and place of work become essential to the employee. Remote methods of organizing activities come to the fore.

Globalization and informatization of the world economic system increase the opportunities for part-time and full-time employment. New forms of remote work, simultaneous work in different companies and even fields of activity, volunteer labor, entrepreneurial family and individual labor appear. Workers seek independence from a particular employer and, in general, they are seeking personal autonomy and independence.

Large organizations transfer a number of functions to contractors, many of which are small firms. Organizations are increasingly resorting not to the usual forms of full-time employment, but rather to temporary contracts and part-time employment. As a result, "the center and periphery" are obtained. There is a differentiation between "self-programmed high-performance" labor and "ordinary replaceable" labor.

In the post-industrial society, the tasks and types of vocational training are changing. The development of a package approach to employment requires flexibility, versatility from the individual. The role of continuing education and training in the course of professional activity is strengthened.

According to (M. Castels), the role of the creative class in post-industrial society is growing. Creative class refers to the class of workers and owners - creators of knowledge and active users of information. The role of the creative class is revealed in the works of Russian authors [4].

Recently, the concept of "intellectual capital" has been widely used in world economic literature. Introduced by Gelbert in the 70s of the 20th century [11], this term has not yet been fully established. Instead similar terms are often being used - "intangible assets", "intellectual potential", "knowledge assets", etc. Intellectual capital is knowledge, information, experience, organizational capabilities and information channels that can be used to create wealth [7], [12]. There is the concept of not only the intellectual capital of society as a whole, but also the intellectual capital of the company, the region [9] and the city [10]. Our focus is on the intellectual capital of the company. Following the proposed approach, it can be defined as knowledge that can be converted into value, in other words, it is the sum of everything that workers know and possess, and what forms the organization's competitiveness. Intellectual capital is difficult to accurately identify and even more difficult to use effectively.

Modern companies are very different from companies of the past, primarily due to the new capital structure. Today, this capital is determined not by material reserves and fixed assets, but rather by information and knowledge (intellectual capital) [6]. The basis of the activity of a traditional company is a set of fixed assets that are owned by the owners of the company. These owners are responsible for their safety, and they hire employees to bring them into operation. A modern company is, above all, intellectual capital, which does not have a material form, and its certain part does not belong entirely to the owners, and is also considered the property of key employees [5].

In the works of foreign and Russian authors, intellectual capital is usually divided into 3 main parts - human, structural (organizational) and client capital [8].

- human capital is the part of intellectual capital that is directly related to man. These are knowledge, practical skills, creative and mental abilities of people, their moral values, a culture of labor. Human capital is important in innovation and in any renewal;

- organizational capital is the part of intellectual capital that is related to the organization as a whole. These are procedures, technologies, management systems, technical and software, organizational structure, patents, brands, organization culture and customer relations. Organizational capital is the organizational ability of a company to respond to market requirements. It is responsible for how human capital is used in organizational systems, transforming information. Organizational capital is more the property of the company, and it can be a relatively independent object of sale. It is not employee dependent;

- consumer capital or client capital is capital that is formed from stable relationships with customers and consumers. One of the main goals of forming consumer capital is to create a structure that allows the consumer to communicate productively with the company's staff.

Most of the works of foreign and Russian scientists are devoted to the topic of the influence of intellectual capital in general and its individual components on the efficiency of companies and its financial results.

In recent publications of foreign authors much attention is paid to description of directions and mechanisms of influence of various components of intellectual capital on business organization [13]. Much attention is also paid to building models of the influence of intellectual capital on the financial performance of companies [14]. Especially active are the models of influence of intellectual capital on efficiency of innovative activity of companies of various sectors of economy [15] and organizational structure of companies [10].

Models for assessing the influence of intellectual capital components on various aspects of financial activities of companies are the topic of many works by Russian authors, articles and reports at international conferences. The main focus is on the impact of intellectual capital on the investment and financial policies of companies [17], on the effectiveness of organizational changes [19], and the formation of innovative potential [20]. A sufficient number of works are devoted to describing the role of intellectual and human capital in various sectors of the economy [18] and the activities of specific divisions of companies [21].

The focus of this work is on methods of estimating intellectual capital based on financial statements and financial market data, as well as expert assessments of individual components of intellectual capital.

Methods of valuation of intellectual capital on the basis of financial indicators of the company became the subject of scientific discussion at the end of the 20th century [22], where empirical studies of quality of models of valuation of intellectual capital are particularly interesting [23]. The works of modern Russian and foreign scientists also present methods for estimating intellectual capital based on empirical models with the participation of financial results and market value of shares [24], [25], [26].

An approach based on the assessment of various non-financial factors affecting the efficiency of the use of intellectual capital has become widespread, along with the assessment of intellectual capital based on the results of their financial activities. The authors consider the possibility of evaluating intellectual capital through

such intangible factors as the moral values of employees, the image of the organization and the quality of information systems [27]. The approach of valuation of intellectual capital components based on the study of financial architecture and organizational structure of companies is also of big interest [28]. Corporate culture of companies is also considered as a significant factor of intellectual capital growth [16], [29].

Quite often, Russian and foreign scientists publish empirical studies on the intellectual capital of various sectors of the economy [30], [31], [32].

Methods

At the first stage of our research, a database was collected on financial indicators and values of the Tobin coefficient of 120 largest companies in Russia according to "Expert" rating agency (https://expert.ru/expert/2020/43/spetsdoklad/1/). The data was taken based on the public financial statements of companies for they year 2020.

The next stage of our research involved testing hypotheses about the relationship of different characteristics of companies with the value of intellectual capital, expressed in the Tobin coefficient.

When testing hypotheses, a categorical analysis method was used [36]. Analysis of hypotheses is carried out on the basis of construction of table of relationship of characteristics A and B.

a	в	a+в
c	d	c+d
a+c	b+d	n

where a is the number of respondents having both sign A and sign B at the same time, v - have sign A, but do not have sign B, c - have sign B and do not have sign A, d - do not have both signs at the same time. n is the total number of respondents who participated in the study.

The measure of the relationship between features is determined using the Q Yul coupling factor. The coefficient is given by the following formula:

$$Q = \frac{\mathrm{ad} - \mathrm{bc}}{\mathrm{ad} + \mathrm{bc}} \quad (2)$$

This coefficient is 0 if the features are independent, the approximation of the coefficient to 1 indicates a strong positive dependence of the features, and the approximation to -1 indicates a negative connection. It is usually said that there is a significant relationship between the two features if the value of the Q module exceeds 0.5.

You can use the following criterion table for a more accurate evaluation:

Table 8

Values of Yul measure

Value of Q ин Yul measure	Interpretation
up to 0.2	Very weak connection
up to 0.5	Weak connection
up to 0.7	Average connection strength
up to 0.9	High strength connection
over 0.9	Very high strength connection

As a result of the discussion at the scientific seminar of the Department of National Economics of EMIT Russian Presidential Academy of National Economy and Public Administration and the focus-group with managers of Russian companies undergoing training under the MBA program, 9 hypotheses were formulated, the verification of which was carried out as part of our study.

Results

The distribution of companies by type of activity is presented in Figure 1. The largest number of companies are extracting and production companies. Service-oriented companies are significantly represented. The smallest number of companies are holding management companies.

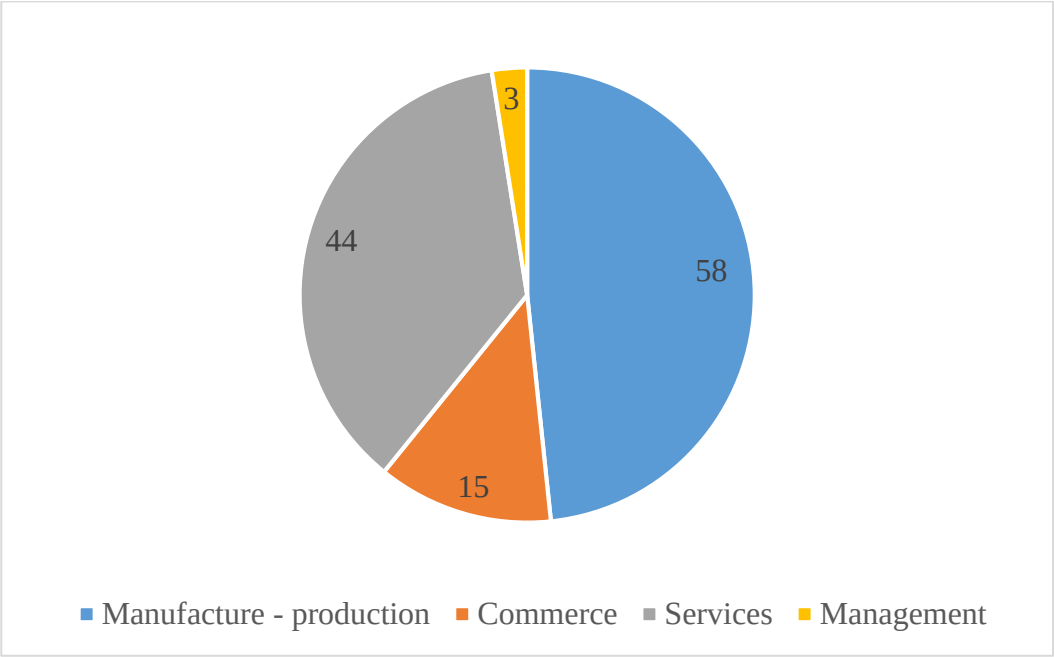

Fig. 1 - Distribution of companies by type of business

The vast majority of companies are private, that is, their controlling stake is not owned by the state. The distribution of companies by this characteristic is shown in Figure 2

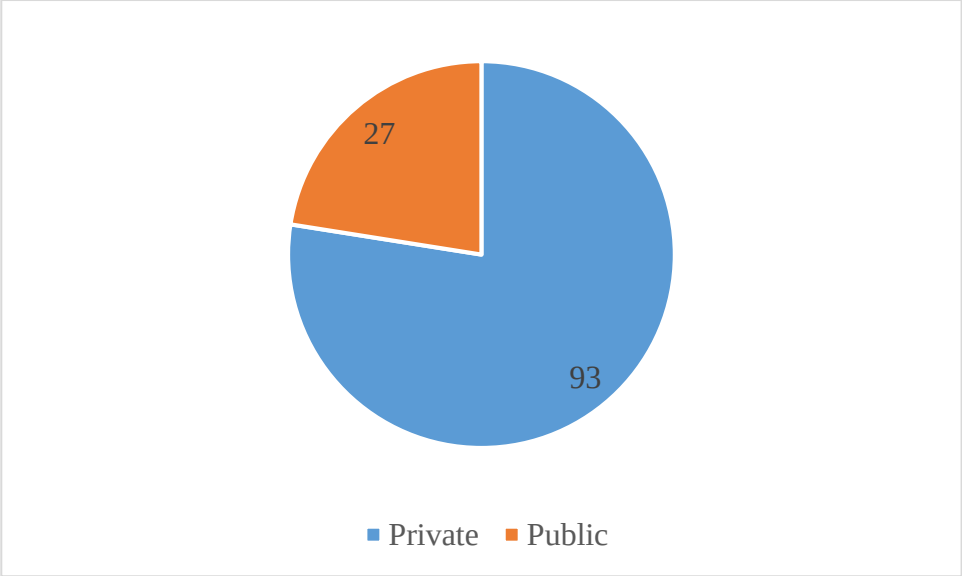

Fig. 2 - Distribution of companies by form of ownership

Thereafter, our study examined the capital structure of the companies in the sample. Most of the companies (67) have equity in excess of total borrowed capital, including long-term and short-term borrowings. 53 companies are mainly financed by borrowed capital. The next important characteristic of the companies participating in the study is the stage of their life cycle. The basis for obtaining information on the stage of the life cycle (birth, growth, maturity, decline) was the data on cash flow reports, namely the ratio of flows from the main, investment and financial activities of companies. The results of the study are presented in Figure 3. In such a way, the overwhelming number of participants in the rating of the largest companies in Russia is expected to be at the maturity stage.

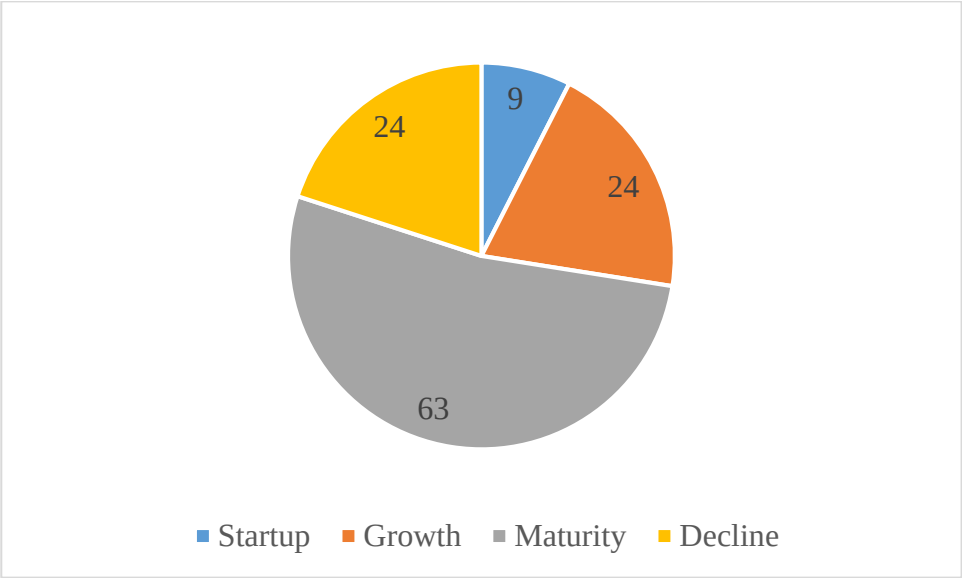

Fig. 3 - Distribution of companies by life cycle stage

The next parameter of our study was the size of economic profit. This indicator represents the difference between accounting profits and the lost alternative benefits of investors, also called capital costs. The company's return on equity and the capital cost estimate made on the basis of the CAPM model [33] were used to calculate the economic profit using the data of the Damodaran.com website [34] to select the risk premium values and the industry sensitivity of the shares. The positive value of economic profit indicates that the owners received income exceeding the average market and fully covering alternative costs. The results of the study on this parameter are shown in Figure 4.

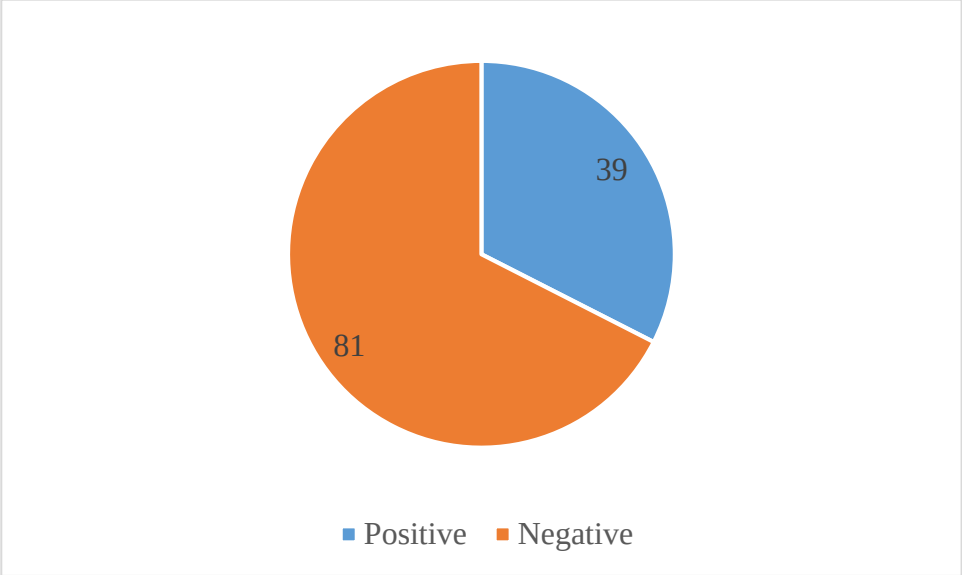

Fig. 4 - Distribution of the company by sign of economic profit

Therefore, most of the participants in the rating (81 companies) have negative economic profit, that is, they bring a real loss to their owners.

The valuation of the company's intellectual capital was made by us using the Tobin ratio, which is the ratio of the company's market value and the book value of its assets. This ratio characterizes the contribution of intellectual capital to the market value of the business [35], which is practically not represented in the balance sheets of companies. The value of the Tobin coefficient exceeding the value of 1 is an indicator of the positive contribution of intellectual capital to the market value of the company. The results of our sample analysis are shown in Figure 5.

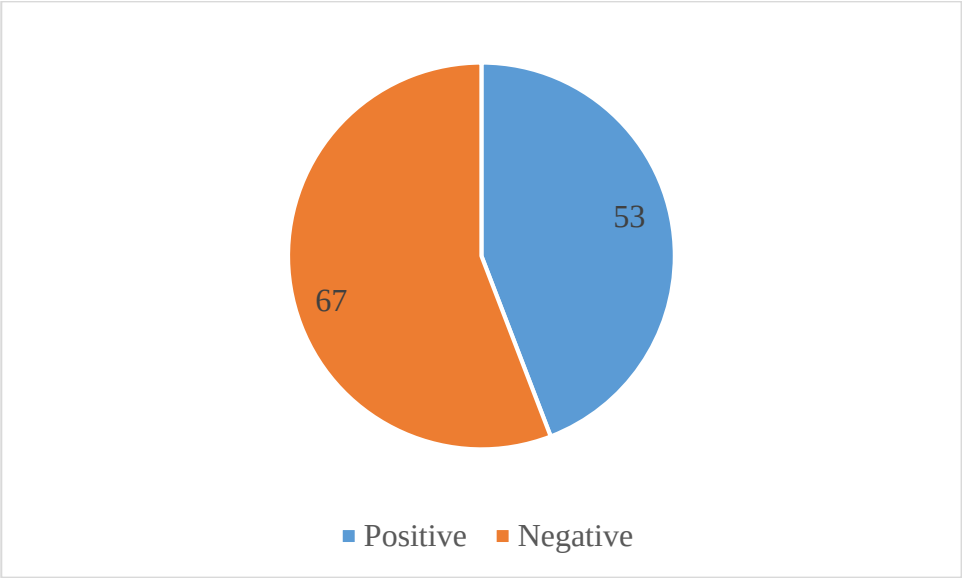

Fig. 5 - Distribution of the company by intellectual capital contribution to the value

Most participants in the rating (67 companies) have a negative contribution of intellectual capital to the value of the company. However, it should be noted that a large number of companies (53) have a positive contribution of intellectual capital to the market value of the company. Companies of large-format trade, metallurgy and information technology have the greatest importance of the Tobin coefficient.

The next stage of our research involved testing hypotheses about the relationship of different characteristics of companies with the value of intellectual capital, expressed in the Tobin coefficient. 9 hypotheses were formulated, the verification of which was carried out as part of our study.

Hypothesis 1 Companies with lower revenues more often have a positive value of intellectual capital. This hypothesis arose as a result of the assumption that it is more difficult for large companies to provide sufficient market value.

Hypothesis 2 Service oriented companies are more likely to have a positive intellectual capital value. This hypothesis was based on the assumption that the role of intellectual capital is higher in service companies, since the main cost of such companies is obtained as a result of the use of human resources, intellectual property products and established relations with customers.

Hypothesis 3 Private companies have a greater value of intellectual capital than companies with greater government participation. This hypothesis was based on the assumption that private companies have to pay more attention to market value and management efficiency, while state-owned companies are under less competitive pressure and have easier access to various sources of financing. Innovation is not a prerequisite for survival.

Hypothesis 4 Trade companies have less value of intellectual capital than other companies. This hypothesis was adopted for consideration in connection with the assumption that intellectual capital is sufficiently low for trade companies. Participants in the scientific seminar expressed the opinion that trade companies may have more standard business processes and, therefore, are less dependent on human capital. In addition, they have a very large number of customers, with each of which they do not maintain relations. However, for trade companies, the structural component of intellectual capital, including brands, trademarks and licenses, is extremely important.

Hypothesis 5 Most companies with a positive intellectual capital value are already considered mature. This hypothesis arose on the basis of the opinion that mature companies have enough opportunities to develop intellectual capital. The maturity stage is characterized by a large positive cash flow from the main activity, which allows making quite significant investments in intellectual capital, such as paying for corporate training, developing new technologies, acquiring brands and supporting customer loyalty programs.

Hypothesis 6 Most companies with a positive intellectual capital value are at a growth stage. This hypothesis is opposite to hypothesis 5. It is based on the assumption of the great importance of intellectual capital for growing companies. This assumption is based on the fact that there is a large investment flow at the stage of active growth. These investments can be directed not only to physical, but also to intellectual capital and innovation.

Hypothesis 7 The greater importance of financial leverage contributes to the growth of intellectual capital. This hypothesis is based on the assumption that active attraction of borrowed capital can contribute to the development of human and intellectual capital of the company.

Hypothesis 8 Large intellectual capital is owned by companies that have a large share of equity. This hypothesis is the inverse of hypothesis 7. This suggestion was made by the seminar participants on the basis of the discussion of the thesis that a large debt burden can reduce the company's ability to invest in intellectual capital, diverting a significant amount of funds to service debt.

Hypothesis 9 The great importance of intellectual capital is accompanied by the positive value of economic profit. This hypothesis is derived from the assumption that highly profitable and efficient companies are more likely to have positive intellectual capital.

Hypothesis 3 and Hypothesis 9 were confirmed based on categorical analysis. The Yul Q coefficient for both hypotheses turned out to be 0.65, which corresponds to the average positive measure of the relationship between the features.

According to other hypotheses, the Yula coefficient was weakly positive or weakly negative, which does not allow us to talk about the presence of a connection.

Therefore, it can be said that private companies with positive economic profits are most likely to have a positive value for intellectual capital.

Discussion

The next task of our research is to develop elements of the methodology for estimating the level of intellectual capital based on the index of public disclosure of information about intellectual capital [37].

Based on the study of the methods of modern consultants, as well as the opinions of managers and experts of the Russian Presidential Academy of National Economy and Public Administration and Higher School of Economics, it was assumed that the intellectual capital of the company should be reflected in open sources, such as the company's website, employer forums and annual reporting to shareholders. We assumed that the greater the intellectual capital of the company, the more detailed and more meaningful the disclosure of information about it would be. Based on the opinions of specialists of the Russian Presidential Academy of National Economy and Public Administration and Public Service and the Higher School of Economics, a table was compiled to assess the level of disclosure of information about intellectual capital based on its division into human, organizational and client capital.

Table 2

Calculation of the disclosure index

Section and title of criterion	Criterion description	Disclosure Level 0 to 2
Human capital	**Assessment of knowledge and practical skills of management and employees.**	
Number of employees	Number of employees based on positions (management and frontline employees)	
Management Information	Information on members of the Board of Directors and the Management Board.	
Dividend payments	Dividend Payment Information	
Employee experience	Age, education. Average number of years in the company; presence of women in top management	
Professional development	Number of trainings, training days, training costs	
Staff turnover	Number of employees leaving the company	
Staff satisfaction	Positive feedback from company staff on the Internet	
The ability of staff to participate in decision-making.	Availability of mechanisms and institutions for staff influence on decision-making. (for example, the presence of shares owned by employees) or the possibility of feedback from staff to management.	
Ability to transfer experience	Availability of a system of staff rotation, mentoring,	
Availability of social programs for employees	Information on employee social support programs	
Motivation system	Information on material and intangible forms of employee rewards	
Career and growth	Information on work with the personnel reserve; internship programs of university graduates	
Organizational Capital		
Research and development costs	Investments; research and development	
Innovation examples	Information on new products, production and sales technologies	

Innovation infrastructure	Having innovative committees, a fund to support employee ideas, information about the possibility of direct communication of employees with senior management	
Interaction with training centers and Universities	Information on the existence of forms of interaction with educational and scientific organizations	
Information systems	Information on production and sales management systems used	
Costs of information systems	Information systems expenditures	
Corporate culture	Information on corporate events, intangible motivation of employees, principles and values of the organization	
Partners (excluding customers)	Supplier and subcontractor Information	
Social capital	Information on relations with authorities, participation in charity and social projects	
Intrasectoral interaction	Participation in industry associations and partnership projects with other industry participants	
Environmental protection	Information on measures to increase occupational safety and environment protection	
Veterans Support	Information on material and social support of veterans and pensioners - former employees of the company	
Regional programs	Information on regional development programs of the Russian Federation	
Image in the media	Assessing internet image by contextual search	
Client capital		
Presence of a long-term marketing strategy	Information on strategic plans for market development and ways of attracting new customers	
Client composition	Information about customers, their number.	
Marketing costs	Information on marketing costs (in more detail than solely commercial costs)	
Customer Satisfaction	Degree of satisfaction based on Internet content	
Total:		

Value 2 means detailed disclosure of this parameter, Value 1 - some incorrect information, Value 0 - absence of information. The maximum possible value of the disclosure index is 62 points.

Further, a pilot study of Table 2 was carried out on the example of 25 large Russian companies of the real sector of the economy of various areas of activity according to the reporting data of 2020.

Gazprom (52), Norilsk Nickel (51) and Megafon (51) demonstrated the highest total values of the disclosure index.

The average value of the aggregate disclosure index was 40.5 points. In such a way, most companies participating in the study demonstrated a fairly high value for the Intellectual capital disclosure index.

The average index per trait was 1.39 for human capital, 1.17 for organizational capital and 1.38 for client capital. Therefore, it can be concluded that organizational (structural capital) in open reporting is weakest, while human and client capital are roughly the same.

Conclusion

The task of further research is to expand the base of the companies under study for calculating the disclosure index, to build a binary model for linking index values with the size of intellectual capital, to select weights for various types of capital in order to improve the explanatory power of the model. It is also possible to build a regression model of the dependence of the Tobin coefficient on the financial performance of companies. In addition, it is planned to expand the list of hypotheses about the connection of various characteristics of companies with the value of the Tobin coefficient and the use of an expanded mathematical method for testing hypotheses.

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