


MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE RUSSIAN FEDERATION  
NATIONAL RESEARCH TOMSK STATE UNIVERSITY

Institute of Economics and Management

PERMITTED TO DEFEND

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«23» June 2023

GRADUATE QUALIFICATION WORK OF MASTER'S DEGREE STUDENT  
(MASTER'S THESIS)


EFFECT OF ESG FOR MNES' INTELLECTUAL CAPITAL DEVELOPMENT

on the basis of the educational program for preparing master's degree students

38.04.02 – Management


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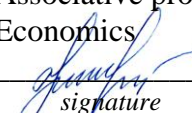
«23» June 2023

Tomsk-2023

Ministry of Science and Higher Education of the Russian Federation  
NATIONAL RESEARCH  
TOMSK STATE UNIVERSITY (NR TSU)  
Name of the educational structural unit

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15. 02. 2023

THE TASK

of completing the final qualification work of a bachelor / specialist / master to a student

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in the direction of training 38.04.02, main educational program (profile) “International Management”

1 Topic of the thesis

Effect of ESG for MNEs’ intellectual capital development

2 The deadline for student to complete the thesis:

a) to the academic office / 23.06.2023

dean's office –

б) to State Examination

Commission –

27.06.2023

3 Initial data for work:

The object of the study – multinational enterprises’ ESG implementation

The subject of the study – effect of ESG for intellectual capital development as seen through the practices of multinational enterprises

The aim of the study – to assess the effect of ESG on intellectual capital development in order to propose ways to improve enterprises’ knowledge and resource management

Tasks:

1. to specify concepts of ESG and IC, systemize defining factors of ESG ecosystem and IC components;

2. to examine relationship between IC, knowledge management and sustainability reporting practices;

3. compare models of assessing IC and ESG practices to determine our own approach;

4. to conduct a quantitative analysis of ESG effect on intellectual capital on data from multinational enterprises;

5. to develop recommendations for MNEs taking into consideration the results obtained.

Research methods:

literature research method, systematization, induction and deduction, comparison, statistical

method, descriptive research method and generalization method.

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The organization or industry on which the work is being carried out –  
Non-financial multinational enterprises

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#### 4 Summary of the work:

The following master's thesis evaluates effect of Environmental, Social, Governance on multinational enterprises' intellectual capital development. As a result of methodological and practical quantitative work regression analysis of proposed model estimated positive effect of ESG on IC efficiency. Based on this conclusion, recommendations on ESG implementation was proposed for multinational enterprises. Additionally, were considered main trends in ESG agenda for Russian enterprises.

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## АННОТАЦИЯ

Экологическое, социальное и корпоративное управление или ESG привлекает внимание многих исследователей в связи с необходимостью устойчивого развития компаний, в особенности во времена нестабильности и геополитических кризисов. Интеллектуальный капитал, в свою очередь, является одним из главных ресурсов для компаний в условиях постиндустриальной экономики.

Поэтому целью данного исследования выбрана оценка влияния ESG на развитие интеллектуального капитала международных компаний для дальнейшего использования в улучшении управления ресурсами и знаниями организации.

Объект исследования – ESG практика международных компаний.

Предмет исследования – влияние ESG на развитие интеллектуального капитала международных компаний.

В ходе исследования были использованы такие методы, как описательный и сравнительный методы, индукция, систематизация, обобщение, контент-анализ, статистические методы анализа.

На основе анализа существующих исследований и методов измерения исследуемых переменных, была предложена модель по оценке влияния ESG на эффективность интеллектуального капитала, собраны и рассчитаны данные по 300 крупнейшим международным компаниям, 136 из которых вошли в итоговую выборку. На основе полученных панельных данных были проведены корреляционный и регрессионный анализы и принята гипотеза о позитивном влиянии ESG на эффективность интеллектуального капитала компаний.

Практическая значимость исследования заключается в применении результатов анализа для практик международных фирм: внедрение ESG в бизнес-процессы, стратегию и отчетность компаний возможно осуществлять не только для повышения репутации и инвестиционной привлекательности, но и для создания конкурентного преимущества через поднятие эффективности интеллектуального капитала.

Научная новизна работы заключается в соединении двух областей исследования (ESG и интеллектуального капитала) для разработки теоретической модели влияния ESG на интеллектуальный капитал в процессе создания ценности, и в предложении модели оценки влияния ESG на эффективность интеллектуального капитала.

Ключевые слова: устойчивое развитие компаний, ESG, эффективность интеллектуального капитала, создание ценности.

## ABSTRACT

ESG gained attention of many researchers due to the need for sustainable development of companies, especially in times of instability and geopolitical crises.

IC, in turn, is one of the main resources for enterprises in the post-industrial economy.

The aim of the thesis: to assess the ESG effect for MNEs' IC development to use for future improvements of the resource and knowledge management of enterprises.

The object of the study - MNEs' ESG implementation.

The subject of the study - effect of ESG for IC development as seen through the practices of multinational enterprises.

Methods: descriptive and comparative methods, induction, systematization, generalization, content analysis, and statistical methods of data analysis.

Based on the obtained panel data, model was proposed to assess the connection of ESG to the efficiency of IC, correlation and regression analyzes were carried out and a hypothesis was accepted about the positive impact of ESG on the efficiency of the IC.

The practical significance lies in the application of the analysis results to the practices of MNEs: the ESG implementation can be carried out not only to increase investment attractiveness, but also to create a competitive advantage by raising the efficiency of IC.

The scientific novelty of the work lies in combining two areas of research to develop a theoretical model of the ESG effect on IC in the process of value creation, and in proposing a model for assessing this effect for IC efficiency.

Key words: corporate sustainability, ESG, intellectual capital efficiency, value creation.

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## ABBREVIATIONS

ESG – Environmental, Social, Governance

E – Environmental Governance

S – Social Governance

G – Corporate Governance

IC – Intellectual Capital

SC – Structural Capital

HC – Human Capital

CC (RC) – Client Capital (Relational Capital)

VAIC – Value-Added Intellectual Coefficient

MNE – Multinational Enterprises

S&P Global CSA – Standard and Poor's Global Corporate Sustainability Assessment

## INTRODUCTION

In recent years, there has been a substantial increase in awareness of sustainability issues. Consequently, within the past twenty-five years, the world has witnessed a rapid rise in the number of companies that collect and publish environmental data, social data, and governance data - which is known as ESG data. Whereas less than twenty companies disclosed ESG data in the early 1990s, the amount of organizations releasing sustainability or integrated reports and implementing ESG practices had grown significantly. By 2021, 86 percent of S&P 500 firms on an ongoing basis produced some kind of ESG-related report. On a global scale, sustainable development, processes and pathways to achieve sustainability, is a trend - United Nations developed Sustainable Development Goals (2015 to 2030) to achieve it worldwide.

Sustainability is one of the keys to successful and long-term functioning of enterprises in the global market. Stakeholders are placing greater pressure on enterprises to adopt more sustainable practices with lower social and environmental impacts, along with offering a more comprehensive representation of information regarding sustainability through proper disclosure policies.

There are plenty of studies that associate ESG data with numerous economically significant effects. In particular, these studies connected ESG disclosures with reduced capital constraints, capital costs, and changes in stock price movements [3, 24, 27, 41, 56, 99]. Many prior studies have also emphasized the strategic importance of ESG practices and investments in sustainability [41, 49, 74].

Despite the fact that many ESG studies reveal significant economic effects, we still lack an in-depth understanding and awareness of the ESG ecosystem as a whole and in which ways it may affect not only business models, but efficiency of enterprises, and generally how it contributes to society.

Intellectual capital (IC) is known as an effective tool to raise the competitive advantage of a firm and shape its value. ESG, in its own turn, is another way to improve the reputation, future development and investment of a company. While previous studies have identified intellectual capital and ESG reporting as significantly associated, certain limitations of studies exist and it is still unclear what kind of effect ESG has on IC. Therefore, this thesis focuses on the effect of ESG framework on intellectual capital of the multinational companies.

The object of the study - multinational enterprises' ESG implementation.

The subject of the study - effect of ESG for intellectual capital development as seen through the practices of multinational enterprises.

This thesis aims to assess the effect of ESG on intellectual capital development in order to propose ways to improve enterprises' knowledge and resource management.

In order to achieve this goal, the following tasks should be fulfilled:



1. to specify concepts of ESG and IC, systemize defining factors of ESG ecosystem and IC components;
2. to examine relationship between IC, knowledge management and sustainability reporting practices;
3. compare models of assessing IC and ESG practices to determine our own approach;
4. to conduct a quantitative analysis of ESG effect on intellectual capital on data from multinational enterprises;
5. to develop recommendations for MNEs taking into consideration the results obtained.

To accomplish tasks mentioned above, such research methods as literature research method, systematization, induction and deduction, comparison, statistical method, descriptive research method and generalization method were implied.

The theoretical and methodological basis of this study were the fundamental works and articles of international authors on ESG practices, and its impact on a firm's intellectual capital. Namely, S. L. Gillan, A. Koch, L.T. Starks, E. Karyani, M. R. Perdiansyah, A.E. Awad Bakry, G. K. Nakyeyune, etc.

The empirical basis of the thesis was the statistical data, ESG ratings (scores from S&P Global CSA), and reports from open sources, enterprises' financial statements.

The structure of the thesis includes the introduction, three chapters, conclusion, list of references, appendix.

In the first chapter the theoretical background of ESG and IC being researched, as well as already existing theoretical frameworks on their linkage and assessment.

The second chapter includes a methodological basis of study, comparison of existing assessment methodologies of ESG ratings and approaches to assessment of IC.

The third chapter contains analysis of the ESG effect on IC measured through Value-Added Intellectual Coefficient and provides recommendations on basis of this analysis.

The scientific novelty of this work lays in developed theoretical and methodological basis for assessing ESG effect on IC, connection between ESG and IC efficiency.

The practical significance contains results ESG effect on IC development evaluation and recommendations made based on results of this analysis.

## 1. Theoretical basis for ESG and IC research

### 1.1 Environmental, Social, Governance theoretical framework and assessment methods

According to the number of researchers [24, 27, 32], questions of ESG awareness rose from the start of covid-19 pandemic, with social movements increase and frequent occurrence of “black swan” events. The recent events in political global arena, rapid technological development, global warming and other environmental problems in 2023 are another call for sustainable development strategies from businesses and countries worldwide. Nowadays, customers and investors are more expecting enterprises to implement ESG principles into business processes, supply chains, talent management and other fundamental business areas than before.

ESG is an acronym that stands for environmental, social, governance and formally originates in 2004 report from the United Nations in collaboration with Swiss government titled “Who Cares Wins”, and brought up alongside with goals of strengthening and having more resilient financial markets, contributing to sustainable development, raising awareness and mutual understanding of involved stakeholders, improving trust in financial institutions [42]. However, principles in foundation of ESG are a lot older, and have been practiced in developed countries for decades.

Environmental (E) principles are evolved from general pollution reduction practices, that accompany many manufacturers throughout history. Now, it’s all about managing environmental risks, with especial attention to carbon footprint and use of natural resources.

Social (S) criteria already was in work via labor practices, health and safety issues, enterprises place in society (e.g., corporate philanthropy) and quality control. We might say that social pillar itself represents corporate social responsibilities of the enterprise. Its current form considers risk from societal actions, while taking into account interests of internal and external stakeholders.

Governance (G) pillar emerged from the history of management systems evolution. It is about enterprise’s management organization, how stakeholders interest fulfilled, how effective decision-making processes and leadership, and how business ethics applied.

Existing literature on ESG usually focused on its role in investment practices, corporate governance practices in ESG, and connection between implementation of ESG and financial performance in organizations [103]. However, with popularization of ESG concept, more researchers now interested in these principles, all three components of ESG, their interconnections, and how it triggers sustainable development in firms. This study intends to

define what effect ESG has on intellectual capital of the multinational enterprises, and that requires researching the ESG and intellectual capital in their theoretical and practical interconnection.

To understand ESG framework in details it is important to know how ESG analysis and evaluation performed. The ESG analysis for assessing a company covers the evaluation of environmental, social factors and indicators of the quality of state and corporate governance. In other words, to conduct ESG analysis, it is necessary to perform three separate analysis of environmental, social, and governance enterprise's practices.

Firstly, we need to study methodology for analysis of the enterprise's environmental responsibilities. To conduct a comprehensive analysis of the environmental impact that enterprise's operations have, it is necessary to develop a system of indicators that describe the negative and positive effects of the company's actions from an environmental point of view - several groups of environmental indicators:

1) the efficiency of the natural resources use shows the enterprise's ability to reduce the energy, water, and other natural resources consumption, while also finding solutions through supply chain management improvement;

2) the company's efficiency in lowering the environmental emissions during the production, running process of equipment;

3) environmental innovation, a set of indicators that reflects the firm's ability to minimize environmental costs and thereby create market opportunities by implementing innovative environmental technologies, processes, or ecologically designed products.

Among the assessment indicators from the first two groups, growth rates are distinguished: the actual amount of waste produced as a result of manufacturing processes per year; the actual annual volume of water withdrawn from the central water supply system, from underground, surface sources, and the total volume of wastewater discharged into water bodies in the course of operating activities per year. It is suitable to analyze in dynamics the change in the total volume of nitrogen oxides, sulfur, solid harmful substances released into the atmosphere as a result of the company's activities per year; total emissions of methane, carbon dioxide; as well as the total annual volume of electricity consumed in the process of operating activities.

If it is not possible to quantitatively evaluate the results of the activities of units to lower the adverse environmental impact, the system of logical (boolean) questions can be used. The idea of such qualitative metrics is to formulate a set of questions that reflect the strategic environmental goals of the company and imply two response options: "Yes" or "No". To convert a boolean data type to a number format, the responses are given points depending on whether the higher value is a positive or negative factor. Examples of modeling binary evaluation

variables are the presence of an ISO 14001 certificate in a company, indicating the functioning of a built-in environmental management system; developed policy on the use of renewable energy sources; prepared initiatives for reuse and waste reduction. Among positive factors are also such as the absence of environmental fines, the allocation of funds for environmental events, the implementation of ways to improve production safety.

To assess the effectiveness of the company's strategy for the introduction of innovative technologies that allow for a more rational use of natural resources, reducing the adverse effects of operating activities on the environment, the ratio of expenses for environmental research and development to gross proceeds from the sale of goods and services; the ratio of recycled waste to total waste can be used.

To obtain the final ESG-score for the environmental pillar, it is necessary to consolidate the available indicators and bring them to one unit of measurement. For these purposes, in practice, the use of a rank approach is common, which is based on comparing the indicators of the analyzed company with the values of competitors' indicators in the same industry and establishing ranges with the corresponding step sizes. Since external, as well as internal, evaluation involves the analysis of indicators in dynamics, there is a need to smooth out the cyclicity of indicators in order to minimize the impact of random statistical outliers (indicator values that differ significantly from the average values). This procedure is carried out by sequentially weighing the indicators for the last three years by the coefficients approved by the relevant ESG analysis methodology. The ESG-assessment procedure for the environmental pillar can be presented in the form of a Figure 1.1.

If we evaluate environmental indicators using the example of energy companies, then in order to build a reputation for environmentally responsible companies, it is advisable for management to direct internal resources to improve the following set of indicators that are elements of an external assessment. Monitoring the amount of the associated petroleum gas utilized is an important indicator, as well as the percentage of the area of contaminated land reclaimed during the year and the area of contaminated land; share of the spilled volume of oil, oil products, condensate as a result of accidents, gusts in the total amount of hydrocarbons produced and transported; the percentage of incidents on pipelines that resulted in spills of oil, oil products, condensate and formation waters to the total length of pipelines.

For the investment attractiveness of the company, the issue of reporting disclosure is important, including the availability for investors of non-financial reporting in the field of sustainable development or environmental reports that meet the requirements of international companies. In practice, companies are willing to provide open access to an incomplete amount of information, for fear of losing competitive advantages as a result of disclosing production

secrets. To increase the transparency of doing business, companies are implementing centralized measures to provide public access to plans for the prevention and response to oil spills at oilfield facilities with a feedback mechanism, documents on environmental impact assessment of large projects; publication on the official website of objective information about the absence or presence of industrial accidents and measures to eliminate their consequences; disclosure of quantitative results of industrial environmental monitoring to the public.

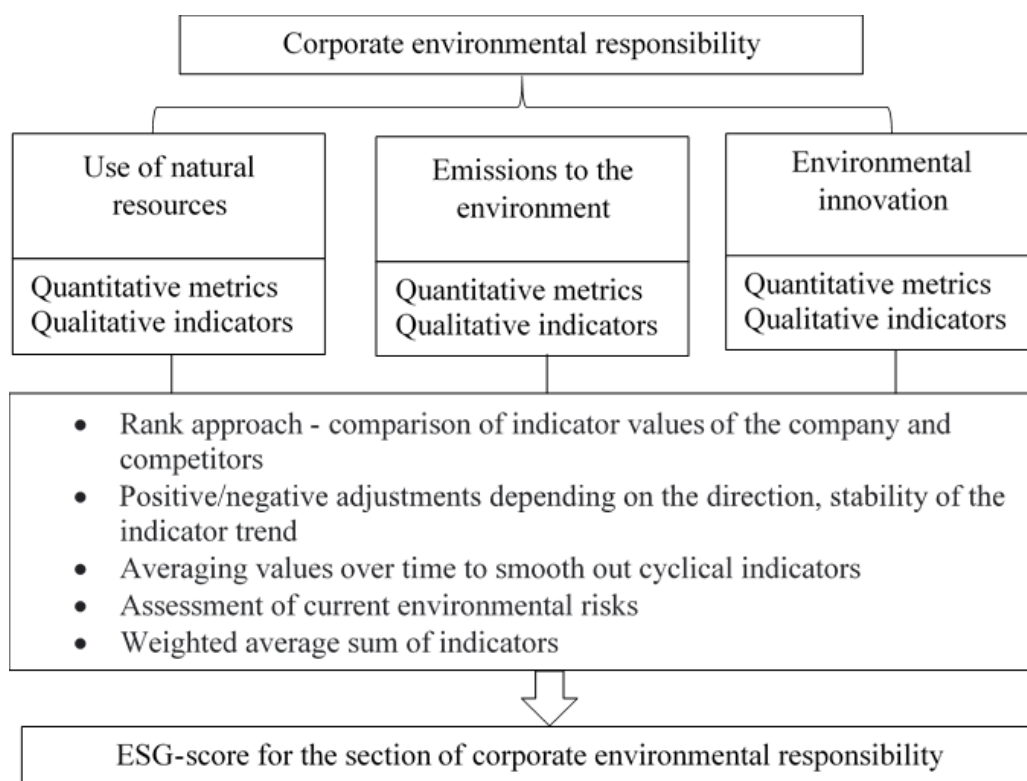


Figure 1.1 – Procedure for ESG-score of Corporate environmental responsibility

Excessive openness of companies, the publication of a large number of news about controversial environmental situations carry reputational risks of losing investment attractiveness. As part of the issue of environmental responsibility, companies build an environmental risk management system, monitor and prevent situations that threaten the safety, health of employees, consumers, the people in the areas where the company operates along with entire environment. Companies need to ensure conditions for minimizing the risks of spills of oil, oil products, sludge and drilling fluids and their entry into sea, river and other natural landscapes; emissions of pollutants into the atmosphere, their accumulation in adjacent water bodies and soils; man-made disasters causing damage to natural landscapes – fires, explosions; violations of ecosystems during exploration, production; formation of industrial waste, dumps, sludge storages.

Secondly, for social pillar we need to conduct analysis of Corporate Social Responsibility (CSR). An external assessment of social responsibility involves an analysis of the company's

ability to satisfy the interests of not only internal stakeholders (employees, managers, etc.) but also external stakeholders, including customers, government authorities, and the people living in the areas where the company operates. This idea is consistent with the key provisions of the stakeholder theory, which expands the traditional approach to analyzing the company's performance from the perspective of the owners, considering the effect of interaction with all stakeholders. Simultaneously, the social factors evaluation includes an analysis of the dynamics of such groups of indicators as personnel assessment, which measures the satisfaction of employees with the work process; the company's efficiency in terms of compliance with labor protection requirements to build a safe and healthy working; protect diversity and keep equal opportunities for employees development; analysis of how well company meet the standards of the main human rights conventions; evaluation of the responsibility of the company as a member of the society – the company's concerns about the population's health, commitment to the principles of business ethics; evaluation of the enterprise's accountability for the quality of products and services, which includes the company's ability to develop products and services, taking care of the safety of customers and the confidentiality of information.

The methodology for calculating the ESG-score for the social pillar does not differ from the procedure for determining the environmental component and is shown in Appendix A.

Among the possible quantitative metrics that can be used in assessing the social policy of the company and its divisions, the following should be highlighted: the cost of training one employee; the average number of hours spent by an employee on training during the year (by categories of personnel); staff turnover rate; the gap between the highest and average wages for the company and its divisions; indicators of gender equality, in particular, the ratio of the number of male and female employees, the share of women in the management and administrative staff, the ratio of average salaries of male and female employees in the company and by divisions; occupational injury rates; share of the number of missed working days by employees/contractors/managers due to work-related injuries in the total number of working days; specific mortality rate per 1000 employees; the share of investments in the social development of the regions where the enterprise operates, including the financing of projects to create infrastructure, maintain the regional system of education, healthcare, sports, in the total amount of funds allocated for investment purposes per year.

In turn, the qualitative performance indicators include the company's will to pay attention to the staff, allocate funds for its development, provide equal opportunities for professional training for employees from different age, gender, national and ethnic social groups. The fulfillment of these working conditions increases the loyalty of employees, qualitatively improves the working climate in the team, and can cause an increase in labor productivity.

The relevance of external evaluation for organizational development and its relationship with internal evaluation is emphasized by the fact that the ability of companies from within to influence the previously listed indicators of external evaluation as a result of compliance with labor protection requirements, the creation of safe, comfortable working conditions in the company's divisions, the presence of impressive social investments increases the attractiveness of the company both for existing employees and for new highly qualified personnel, investors, consumers of goods and services produced.

Not all the results of the company's social policy might be assessed quantitatively, owing to the existence of socio-psychological aspects in building the enterprise's relationships with a large number of different stakeholders. In fact, in practice, it is quite difficult to evaluate the so-called cognitive capital of a company, which can be described as a single semantic space based on fairness, trust, mutual assistance, common goals and values of employees, uniting for the implementation of current strategic tasks and forming the company's reputation in the external and internal environment. To assess such social factors, can be used a set of qualitative metrics, which may include logical questions and statements: the presence in the company of a mentoring system, a system of individual psychological support for personnel; relationships between employees vertically and horizontally are characterized by a high degree of trust; satisfaction of the majority of employees with current working conditions; availability of a corporate pension program, voluntary medical insurance for employees and members of their families; availability of a product quality control system; the frequency of unresolved work conflicts; cases of emotional burnout, professional deformation of personality. In order to influence these indicators from the inside, the collection of socio-psychological information by departments in practice might be carried out through questionnaires with a certain frequency and tracking the dynamics of changes in answers to similar questions.

When managing social risks, they strive to minimize the risks of emergencies that threaten the safety, life of employees and the people living in the areas where the enterprise operates; occupational risk, which consists in an increase in the frequency of occupational diseases of people performing certain duties. The risk of a lack of key personnel should be minimized; turnover of highly qualified personnel. In case of lack of mutual understanding, low degree of trust between employees and management of departments, non-compliance with labor protection requirements, there is a danger of overloading personnel and dishonest performance of official duties, as a result of which there may be a risk of labor productivity not meeting the planned performance. It is equally important to monitor the risk of social tension on the part of the local population, which arises when the company ignores the interests of indigenous people in the course of its production activities and which can lead to the risk of suspension of the operations

of units, the risk of disruption of supply chains due to strikes by the population. When assessing the social responsibility of a company, it is important to check whether the social strategy being implemented balances the interests of a large number of stakeholders, including employees, suppliers, customers, and government authorities.

Finally, analysis of the quality of corporate governance of the company should be conducted. As part of assessing the independence, balance, competence of the composition of the company's supreme executive body, compliance with the functions and powers assigned to it, it is possible to single out groups of indicators that characterize the quality of corporate governance (hereinafter referred to as management): the effectiveness of the company's management system, adherence to the principles of best corporate governance practice; the effectiveness of the company in relation to equal treatment of shareholders and in the fight against takeovers; transparency of corporate social responsibility strategy.

There are many approaches to external evaluation of corporate governance being developed in various analytical organizations, and one option involves comparing the current performance of a company's governance with generally recognized, successful examples of corporate governance practices in other companies in the industry. This procedure, if examples of reference management practices are available in the public domain, is also available for internal evaluation. The structure of assessing the quality of corporate governance in the framework of the ESG analysis is shown in Figure 1.2.

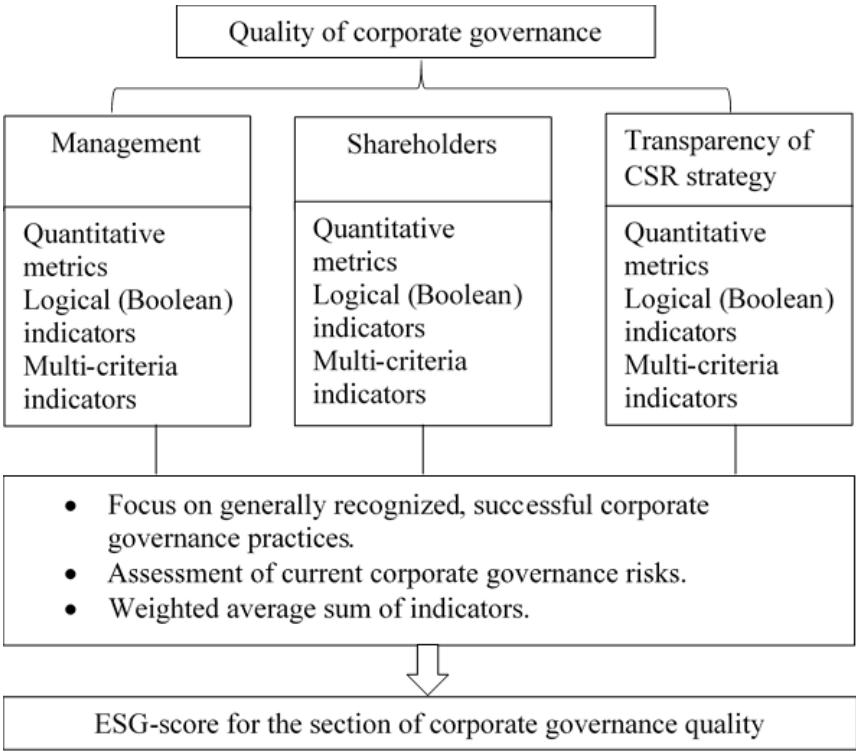


Figure 1.2 – Procedure for ESG-score of the corporate governance quality



Examples of multi-criteria indicators for companies are the average tenure of individual board members by number of years; the ratio of members of the board of directors who independent from affiliates in the total number of participants, broken down by shares; the ratio of board members whose previous jobs were companies from the same area in the total number of members, broken down by shares. Other factors include the following multi-criteria variables: the presence of blocking stakes held by individual shareholders, broken down by the degree of concentration of shareholding; regularity of publication of financial and non-financial statements in the public domain, broken down by frequency and completeness of data disclosure.

Binary control variables are also used. To describe the management structure of the company, a logical qualitative variable is modeled to separate the positions of the company's president with chairman of the board of directors; and to measure the effectiveness of the enterprise's policy in the field of shareholders' rights fulfilment, existence of a policy to ensure equal treatment of minority and majority shareholders can be used as a metric. To assess the reputation and investment attractiveness of the enterprise, one can evaluate the changes in the number of proven corruption scandals, criminal cases, bankruptcy precedents, in which representatives of the company's senior management and administrative personnel took part.

When assessing the quality of corporate governance, it is important to pay attention to the risks in making management decisions, including the risks of losing the independence of the board of directors when new members appear who are in relationships with shareholders owning large blocks of shares; merger and acquisition risks; currency market risks due to the attraction of multicurrency borrowed funds; stock, interest rate market risks as a result of using untimely futures, options, forward strategies in the market of derivative financial instruments.

Moreover, when making strategic decisions on entering new sales markets and diversifying the company's asset portfolio, marketing risks may arise due to increased competition in new markets; reputational risks associated with the risks of corruption and fraud of senior management also might arise. The company's strategy for introducing technological innovations into production depends on the quality of corporate governance, which is interconnected with the danger of obsolescence of fixed assets and equipment. Therefore, management activity is characterized by versatility and a large number of risks.

To obtain a cumulative ESG score, the arithmetic mean of the ESG scores from each of the sections is found. By analogy with credit ratings, information and rating agencies assign an ESG rating to companies, depending on which range the final value of the ESG rating falls into.

Summarizing this paragraph, we can conclude that ESG is a relevant framework for modern enterprises, that have complex evaluation methodology and based on fundamental business practices, that define enterprise's future sustainable development.

Another important thing to mention here is how closely connected social pillar (S of ESG) with human capital, and its development. Basically, working conditions, training of employees and their turnover are all metrics that matter both to social practices and human capital of organization. It's again brings up an idea of relationship between ESG and intellectual capital, because better implementation of social practices (part of ESG) lead to development of enterprise's human capital (part of intellectual capital). That indicates the validity of hypothesis about positive effect of ESG on intellectual capital development.

In order to better understand what connects ESG and enterprise's intellectual capital we will need to research the theoretical nature of intellectual capital, its structure and assessment methodology.

## 1.2 Intellectual capital definition, structure and measurement

The first mention of the "intellectual capital" was found in a letter to M. Kalecki by J. Galbraith in 1969, the term "intellectual capital" became widespread only in the 1990s.

Nowadays, scientists still do not leave this category without attention, emphasizing the importance of the intellectual component in the development of high-quality socio-economic processes.

Among foreign authors, one can single out the works of K. E. Sveiby, L. Edvinson, E. Brooking, G. Means, Richard R. Nelson and Sidney J. Winter and others. Russian scientists also significantly contributed to the development of the intellectual capital theory. The works of B. Milner, A. L. Gaponenko, I. A. Ivanyuk, B. B. Leontiev, V. L. Inozemtsev, N. P. Gibalo and others are of scientific interest.

Let us study some definitions of intellectual capital developed by researchers in this field.

B. B. Leontiev proposed the following definition: "Intellectual capital is a system of capital stable intellectual advantages of a given company or firm in the market"[57].

According to E. Brooking, intellectual capital is "a term for intangible assets, without which a company cannot exist, enhancing competitive advantages"[25].

This way, human assets, infrastructure and market assets, and intellectual property are all parts of intellectual capital. Human assets are described as the combination of the enterprise's employee's collective knowledge, problem-solving abilities, leadership qualities, their capacity for creative thinking, entrepreneurial and managerial skills.

The Organization for Economic Cooperation and Development (OECD) experts developed the following definition. "Intellectual capital is the economic value of two categories of intangible property of a company: organizational (structural) capital and human capital"[68].

The definition given by OECD experts defines and synthesizes the value of intangible assets. The OECD experts concretize the components of intellectual capital. For example, structural capital includes proprietary software systems, distribution and supply channels. Human capital includes external and internal human resources, i.e. personnel resources and resources of buyers and suppliers.

The position of B. B. Leontiev reveals the peculiarity of intellectual capital as a factor in the formation of competitive advantages.

And the definition of E. Brooking reveals the position of the practitioner, intellectual capital is considered here as a management concept.

Therefore, intellectual capital is a total of knowledge and experience, human skills and competencies, organizational capabilities and information channels which can be used to form competitive advantage and create value of an organization.

Nonetheless, we need to elaborate components of intellectual capital structure.

In order to highlight the structural components of intellectual capital, T. Stewart in his book "Intellectual Capital. The New Wealth of Organizations" outlines three types of intellectual capital. These three types are human, structural and consumer capital (Figure 1.3).

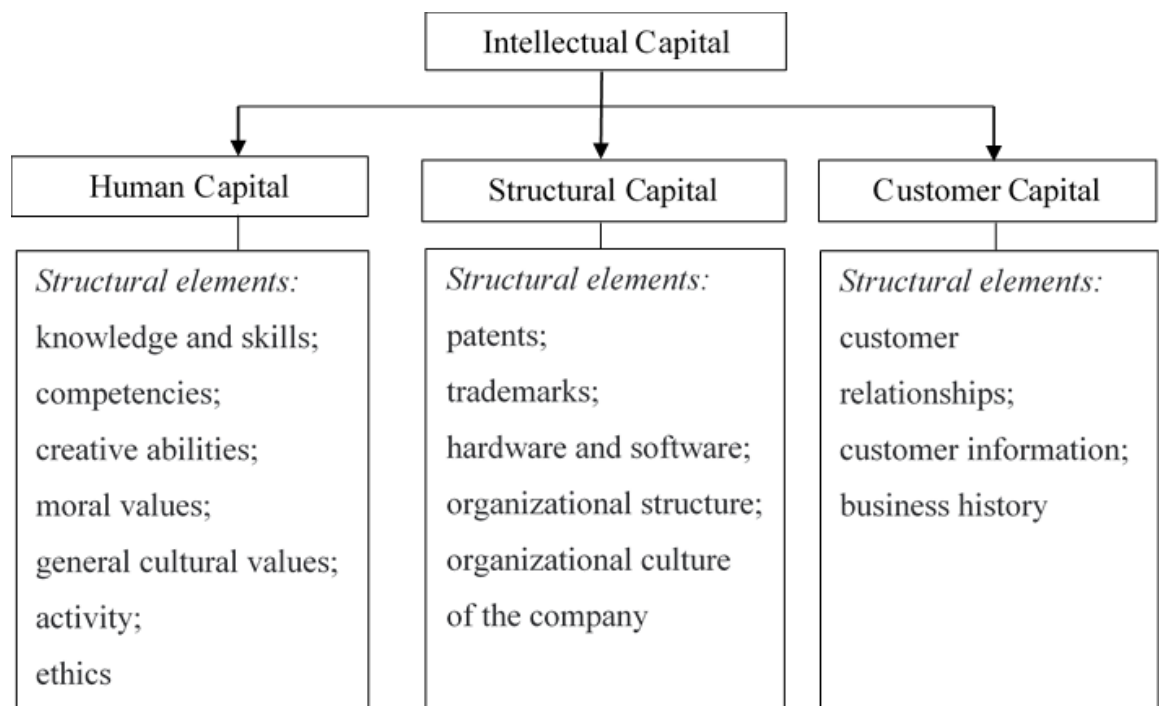


Figure 1.3 – The structure of intellectual capital.

Human capital is a type of intellectual capital that is associated with an individual's qualities. These are knowledge, practical skills, creative abilities, moral and general cultural values, work culture, activity and ethics, general cultural values. Human capital plays a significant role in the implementation of the organization's sustainable practices.

Structural capital consists of patents and license agreements, trademarks, technologies, management systems, hardware and software, organizational structure and organizational culture, brand of the organization. It is relevant to the entire enterprise and reflects organizational ability to respond to market demands.

Customer (or relational) capital includes a set of connections and stable relationships with customers and consumers. Main goal of customer capital formation is the creation of a structure that enables the consumer to interact with the enterprise's staff effectively.

Such a division of intellectual capital is convenient from the point of view of measuring each structural element and adapting it for investment.

Besides, there is a clear linkage between these methods of defining the intellectual capital's structure. Structural capital refers to the internal structure, as consumer capital to the external structure, and human capital to the competence of the personnel.

For better understanding of intellectual capital place in general capital of organization, it is important to compare it with physical (or tangible) capital.

Among the similar characteristics of intellectual and physical capital, the following can be noted. Both physical and intellectual capital arise as a result of the investment of resources. Money, material objects (materials, equipment) and intangible resources (knowledge and qualifications of personnel) can act as resources.

In the process of producing goods or services, both physical and intellectual capital bring income to their owner. Another similar characteristic of these two types of capital is their obsolescence. Moreover, according to experts, intellectual capital is sometimes even more subject to obsolescence (both software and any knowledge depreciate).

However, there are obviously a number of differences between intellectual and physical capital. The nature of the origin of capital is different. Physical capital has a material nature, i.e. it can be touched and seen. Intellectual capital is inherently intangible. We cannot see the knowledge of employees, the organizational culture of the company, customer relationships. Only some external manifestations of these processes. Therefore, intellectual capital is sometimes called an invisible asset.

Intellectual and physical capital also differ in time orientation. Physical capital is the result of certain previous actions. Intellectual capital is also the product of previous investments, but it is more focused on the future.

The physical capital is valued on the basis of those expenses that have already been invested. Intellectual capital is difficult to evaluate in terms of expenses, thus, the basis for its evaluation is the value, that defined from its future use estimation.

Another important point is that physical capital mainly evaluated via cost indicators, but intellectual capital additionally uses non-value indicators due to difficulties in evaluation of its individual structural components.

As a rule, cost (quantitative) analysis is supplemented by non-value (qualitative) analysis. Physical capital is assessed on a periodic basis (as a rule, when compiling financial statements and summarizing the work of the organization for a certain period of time). The assessment of intellectual capital should be carried out continuously, since intangible assets bring not only financial or material performance, but additionally non-material results in the form of high employees' competence and qualifications, better image of the organization, marketing opportunities, competitiveness etc.

In terms of capital ownership, the physical capital is wholly owned by the enterprise (equipment, buildings, materials, etc.). On the other hand, companies do not completely own the intellectual capital. Human capital is something that enterprise owns jointly with its employees, just as they share relational capital with customers and counterparties. Partial ownership of intellectual capital gives rise to some problems in its distribution and requires appropriate legislative support (for example, in terms of the distribution of rights to the results of intellectual activity and the payment of appropriate royalties).

Human, structural and customer capital initially integrate. Investing in each separately is not sufficient. These components have crossed influence on each other, for instance, through interaction with structural and human capital, customer capital is transformed into financial.

Evaluation of intellectual capital allows to identify the structure and properties of its elements used at the enterprise, assess the contribution of each element to the formation of business value, develop a set of organizational and management decisions aimed at increasing competitive advantages and increasing business value. The assessment of intellectual capital is also aimed at forming the company's development strategy.

Based on this, we can formulate the main goal of assessing intellectual capital - ensuring the sustainable development of the organization.

Quantitative and qualitative, financial and non-financial, all these methods used in modern procedure of intellectual capital assessment. The choice of assessment method depends on the enterprise's goals and tasks that need to be completed. Important to mention that problem of intellectual capital assessment and management have been and continue to attract a significant number of researchers, experts, and professionals.

However, none of the methods is yet universal. It is possible that there is no pressing need to create a universal methodology for assessing intellectual capital, because intellectual capital itself is a multifactorial, dynamically changing phenomenon, that is unique to each individual, enterprise, or country.

Further, we study in detail the methods for assessing intellectual capital at the level of enterprises. Methods like these are based on evaluating the costs of enterprises alongside with determining how effectively organized enterprise's business processes using intellectual resources.

1) Balanced Scorecard. These methods for evaluating the effectiveness of business processes basically have a balanced scorecard linked to a particular situation and company. This system, created by D. P. Norton and R. S. Kaplan, retains traditional financial indicators that represent the assessment of events that have already occurred. This system was valuable for companies in the industrial society, when customer relationships, employee investment, and staff qualifications were not the primary success factors.

These financial indicators for assessing and managing business processes, on the contrary, are not that effective in the post-industrial era, when management efforts are focused also on creating value by investing in customers, suppliers, employees, technology and innovative projects.

It is a tool that allows to fully link the strategy of the enterprise with the operational business, this system also makes it possible to make completely objective decisions in the field of distribution of intellectual resources. The system is primarily aimed at linking indicators in monetary terms with operational indicators of such aspects of an enterprise's activity as customer satisfaction, internal business processes of the company, innovative activity, and measures to improve financial results.

Thus, it is designed to provide answers to the four most important questions for the enterprise: how do customers evaluate it (from aspect of the client); what processes can provide it with an exclusive position (internal aspect); how further improvements can be made (innovation and learning aspect); how shareholders evaluate the enterprise (financial aspect).

A particularly important area of application of the balanced scorecard turned out to be the management of the processes, that increase the value of enterprises.

2) Skandia Navigator. In 1995, the Swedish insurance company Skandia included a section on intellectual capital in its annual report. L. Edvinsson, an expert in intellectual resource management, established the model for analyzing intellectual capital and presenting the results of this analysis in the annual report for the company. The model was called the Skandia Value Scheme and was the basis for the new practice on the content of annual reports.

In the below scheme of this model (Figure 1.4), human capital is defined as a set of competencies and abilities possessed by the enterprise's employees. Human capital is naturally mobile, and departs from the company along with the employees. What remains in the company is structural capital. The structural capital itself consists of two types – customer capital and organizational capital.

Customer capital is an asset created in the process of communicating with clients. Organizational capital is further subdivided into innovation and process capital. Innovation capital

primarily consists of legal rights (patents, licensing agreements) as well as of what is difficult to define exactly but, to a significant extent, determines the enterprise's value (ideas, trademarks). Process capital is the infrastructure of the firm (IT, work processes, etc.).

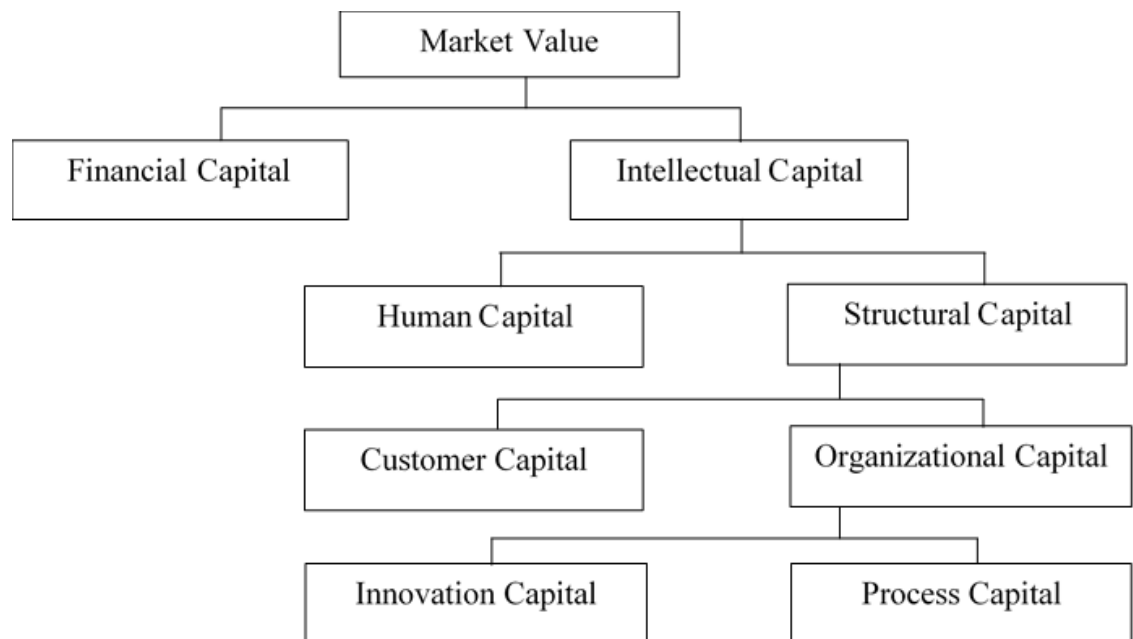


Figure 1.4 – Structure of intellectual capital in Skandia Value Scheme model by L. Edvinsson

Thus, tracking changes in intellectual capital in the main areas of development (finance, customers, business processes, personnel and development / renewal) provides a holistic view of the organization's activities and the achievement of its goal.

3) The methodology of the consulting firm Ernst & Young (EY) “Measures that Matter”.

The EY specialists take as a basis for assessing intellectual capital some areas of the company's activities that are qualitatively related to the use of the company's intellectual potential.

This methodology measures what matters to the development of a company.

For example, the quality of management, corporate culture, the effectiveness of product improvement, the strength of the marketing position, the compensation policy for senior management, the quality of communications with investors, the quality of products and services, customer satisfaction.

The primary focus of measuring intellectual capital is on those indicators that enable achieving sustainable growth in competitiveness and capitalization of company.

Specific assessment indicators are grouped into three areas in accordance with the structural elements of intellectual capital (Table 1).

EY experts advise broadening these indicators to incorporate a wider range of target

indicators in practice.

Table 1.1 – Evaluation criteria for the structural components of intellectual capital (Measures that Matter)

Human Capital	Organizational Capital	Customer Capital
Composition of Human Resources. Personnel satisfaction. Sales and value added per company's employee. The level of personnel education and their work experience. Training costs in total and per employee. Staff turnover.	Extents, functions and application of information systems. Effectiveness of administrative systems and organizational structures. Investments in new management methods, research and development (R&D), information systems and technologies. The stability of organization (the age of the company, experience in the market, the turnover of management personnel, indicators of the staff consistency).	Number of clients and structure of the client base. Ways to interact with customers and customer satisfaction. Profit and sales per customer. Orders repeatability.

4) K. E. Sveiby's "Intangible Asset Monitor". In his model, Swedish researcher K. Sveiby attempts to consider the elements of intellectual capital both separately and together, and determines their various roles in creating the enterprise's value.

K. Sveiby's monitor is a matrix that rationalizes the system of indicators and criteria for assessing the structural elements of intellectual capital. Each of the three non-financial indicators is evaluated in terms of growth and renewal, efficiency and stability (Table 1.2).

5) Intellectual Capital Audit or Technology Broker. The intellectual capital audit model was proposed by E. Brooking, who considers intellectual capital as a combination of four main elements: market assets, intellectual property, human assets and infrastructure assets. The methods are based on 20 audit questions. The fewer questions a company can answer yes to, the more managerial effort it needs to put into intellectual capital management.



Table 1.2 – Intangible Asset Monitor by K. E. Sveiby

Index	Competence (knowledge, abilities, accumulated experience, education)	Internal structure (patents, copyrights, databases, administrative systems, R&D)	External structure (company image, trademarks, product recognition)
Growth and renewal	Number of education years.	Investment in R&D	Market share growth
Efficiency	Value added per employee.	Percentage of maintenance staff.	Profit per client
Stability	Turnover of professional staff.	Turnover among maintenance staff.	Orders repeatability

Thus, these methods imply the ability to see how the final financial performance effected by productive use of knowledge and information, while connecting quantitative assessments with business goals and strategy. Most parts of evaluation relate to non-material factors (employee knowledge, business processes and customers), but the key purpose of evaluation levels' is to improve the business processes of enterprise, and they do not provide a clear answer about the efficiency of knowledge use. As a result, cost and coefficient measures are used in addition to qualimetric indicators to describe the increase in business value as a result of the intangible resource use.

6) Market capitalization method. According to the market capitalization method, intellectual capital can be calculated as the difference between the company's market value and the value of intangible assets reflected in the organization's balance sheet.

The market capitalization method also involves the calculation of the Tobin ratio. This is a calculated coefficient that is used to assess the enterprise's investment attractiveness, or the existence of the goodwill. The Tobin ratio is the proportion of a company's market capitalization to its net asset value.

If the Tobin coefficient is higher than one, the market value of the company's assets exceeds the book value, indicating that the market value reflects some of the company's non-measurable or undocumented assets and that the company successfully uses intellectual resources.

7) Evaluation of the effectiveness of investments in intellectual capital. The methodology for assessing the effectiveness of investments in intellectual capital management processes includes calculating traditional investment efficiency indicators. Among them are net present value, profitability index, payback period, and internal rate of return (NPV, PI, PP, IRR).

However, it is important to be careful when evaluating investments in knowledge management processes: such projects require significant investments, mainly in large-scale

information technology, and involve delayed returns that are difficult to calculate.

Another indicator to measure IC efficiency is value added intellectual coefficient (VAIC) suggested by Pulic in 1998. This coefficient consists of the sum of three types of capital efficiency ratios – human capital efficiency (HCE), structural capital efficiency (SCE), and capital employed efficiency (CEE). This indicator purpose is to show what effect IC have on the company's ability to create new value.

The problems of the formation and use of intellectual capital are closely related to the effectiveness of the sustainability programs implementation within the strategic framework of enterprises and organizations. Implementation of innovative processes related to the development of new technologies, types of products, etc. requires not only financial costs, but also the use of special organizational and economic tools. Intellectual capital, in this context, becomes an effective organizational and managerial tool for developing an enterprise and increasing its position in competition.

Intellectual capital's main function in modern world lays in accelerating the growth of profits by forming and implementing system of knowledge, relations and things, that enable company's efficient economic activity. Intellectual capital determines the rate and nature of technological and product update, and that, in turn, gives significant competitive advantage in the market. Thus, it is a way of obtaining long-term competitive advantages and, thereby, sustainable development of an enterprise in the market.

To sum up, this paragraph researched intellectual capital definition, assessment methodologies and linkage to sustainable development. Next, we turn to existing theoretical basis for the nature of relationship between the ESG and intellectual capital.

### 1.3 ESG and IC connection

Value creation in modern economy is not that dependable on tangible assets as it was before. Nowadays, it relies on intangible assets in a lot of ways, and intellectual capital is being considered as a leverage for creating and keeping competitive advantage and sustainable activities of enterprise. In our case, ESG might be a critical from perspective of IC management.

The central question in ESG researches is usually “Does being good pay off?” and whether ESG integration lead to positive changes in a company's financial performance or not. Topic of financial gain from ESG was widely discussed, but there is a little research about ESG importance for intellectual capital development. Most of them delved into the topic of ESG and IC relationship from an audit perspective, studying ESG and IC reports.

It was already mentioned before how social pillar of ESG has positive effect on human

capital, and, consequently, on intellectual capital, however, we need to look into connection of other structural components and these two concepts as a whole.

Theoretical framework of this connection origins in the resource-based view (RBV), at first formally presented in 1991 by J.B. Barney and B. Tyler in the article “Firm resources and Sustained Competitive Advantage”. They stated that firms gain their competitive advantages from resources and capacities that they control. At the moment of emergence RBV was compared highly to stakeholder theory, some even said it was “new stakeholder theory”. View pointed out that the source of firms’ competitive advantage is better understood through not only an external environmental analysis but also through analysis of internal strengths and flaws. Indeed, high tempo of external environment changes, and additional need not only live up to them, but to create your own unique value proposition, made companies shift their strategic focus on internal environment. It meant addressing internal problems and opportunities, concentrating on owned resources and capacities. The thought about firms’ resources heterogeneity lead to strategies based on specific resources, that have certain qualities for forming competitive advantage. For their precise description was developed VRIN-concept, that named valuable, rare, inimitable and non-substitutable as main characteristics for resource, that could be used for gaining certain capabilities.

Capabilities of enterprise represented by combination of resources, people, structural elements, knowledge, rules. etc., that allows company doing things, that other companies are not able to do. They differ from resources by being not individual definite thing (e.g., patent, equipment, etc.). This idea was brought up before, but gained general attention after “The Core Competence of the Corporation” article publication in Harvard Business Review. Thus, managing resources with accordance to capabilities become main path for acquiring competitive advantage in RBV. ESG as a significant strategic element is considered as a distinctive capability, while IC management efficiency is a resource of high importance in determining enterprises’ value and competitive advantage among other modern organizations.

The next natural development for RBV was knowledge-based view (KBV). KBV basic beliefs are derived from RBV, but the most valuable for strategic development resource in this view is knowledge. The idea of knowledge being a source of sustainable competitive advantage makes KBV a good theoretical support for IC ideas and developing IC concept in practice.

Both IC and ESG are important company’s capabilities according to RBV and KBV, but to understand connection between them we need to address agency theory.

The agency theory originated in economics studies and further spread to other research areas such as organizational and financial management. It focuses on the relationship between a principal and an agent, and analyses the problem that emerged from “separation of ownership

and control” and called agency problem. In general, main outcome from this problem is the potential lack of goal compatibility between shareholders (principals) and managers (agents), thus giving rise to opportunistic behavior by managers, who control business processes. In this potential situation conflicting goals lead to managers wasting enterprise resources and making ineffective decisions in order to use opportunity to increase their personal well-being, often at expense of shareholders. “Shirking, cheating, distorting information, appropriating resources, etc.” are all source of “agency costs” creation in situation like this [86].

The root of this problem is in asymmetric information between managers and shareholders on operational and investment decisions, and the owners’ inability to write complete contracts [95]. Shareholders expect managers to focus on creating value, and this process depend not only in effective use of financial and physical capital, but also on organizational IC. Several studies highlight the importance of managing IC by minimizing agency problems in organizations [11, 45, 58, 75]. IC efficiency might be substantially reduced by agency costs, e.g., when management poor decision-making might lead to reducing funding for training and, consequently, IC development. Besides, agency costs reduce value of the enterprise’ shares, and that results in raised cost of outside capital required to finance IC. Managing IC involves managers creating goals and practices with regard to the IC development, as well as coordinating and motivating the behavior of enterprise’ members towards realizing these goals [95].

At the same time, ESG signals information about the company's commitment to the welfare and social and environmental issues, lowering informational asymmetry. ESG information can improve the firm's reputation and value of intangible assets as reflected in the efficiency of IC, which includes employees' expertise and knowledge contained within the organization. E.g., corporate governance systems of an organization are expected to work as control mechanisms to protect shareholders by minimizing the agency problem.

Another reason for ineffective management decision-making might be found in stakeholder theory. Main purpose of stakeholder theory is to help corporate management to understand stakeholder environment and manage existing corporate relationships successfully. In accordance with stakeholder theory, firms continue to ensure their survival so that stakeholders believe in their performance and have undertaken the necessary responsibilities, especially regarding the firm's business activities related to their surrounding community and environment. Thus, implementing ESG could help fulfil ethical aspects of stakeholder theory, therefore, make decisions and manage IC in optimal way, hence, create value for stakeholders and enterprise.

To simplify all these theoretical connections, we will reflect relationships between ESG, IC and theories mentioned above in Figure 1.5.

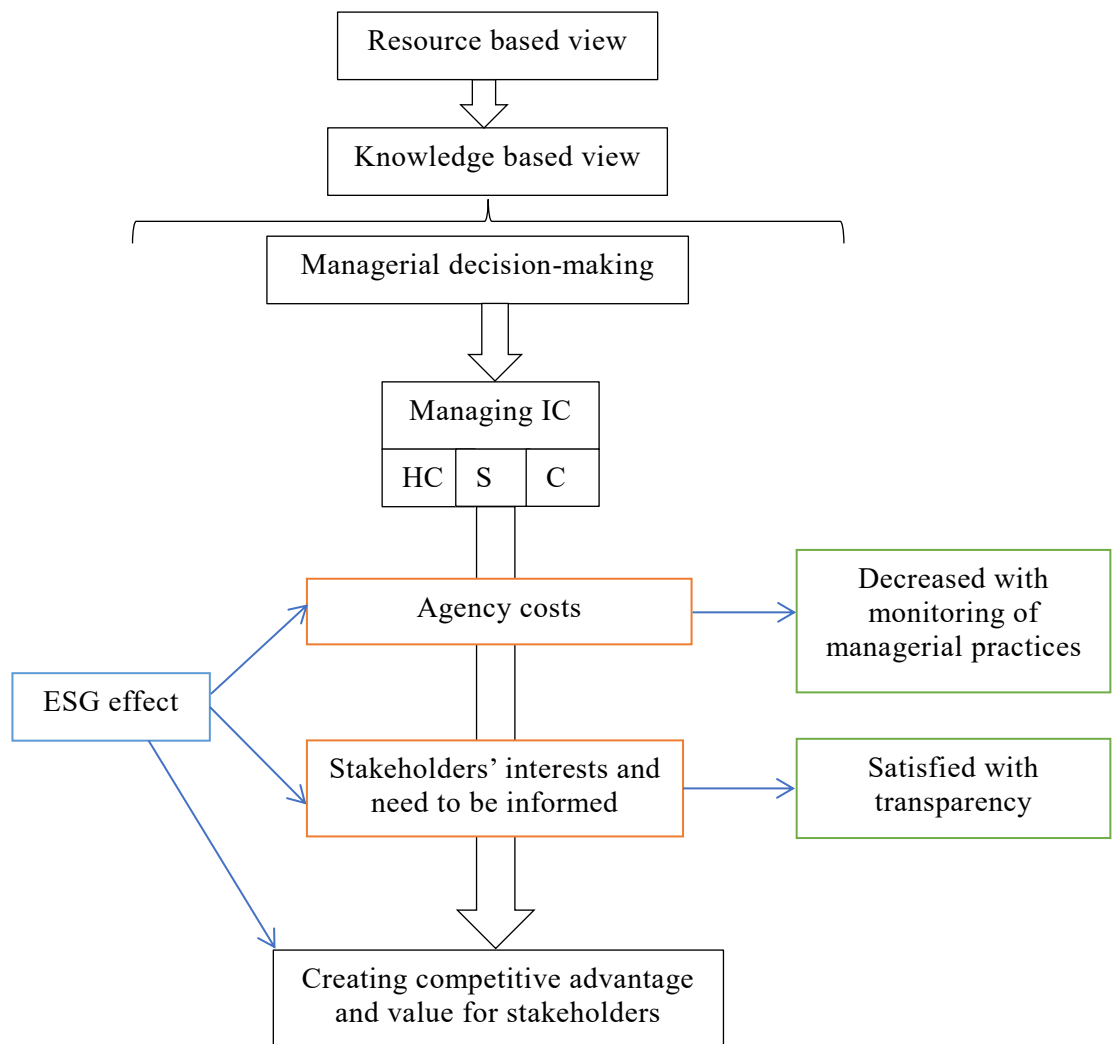


Figure 1.5 – Theoretical basis of ESG effect for IC

According to previous studies, IC is influenced by the environmental dimension (E), which enables companies to conduct their productive activities in a way that limits damage to the natural environment, and participates in the development of IC [21]. Poor environmental performance due to pollution, resulting from inefficient use of resources, reduces productivity. Green management allows companies to be more competitive. Those that invest significantly in green management resources cannot only avoid environmental protests or fees but also improve their corporate image, develop markets, and increase their competitive advantage. When environmental issues are perceived positively, companies tend to base operations on the interests of shareholders and stakeholders and exhibit more progressive environmental strategies, involving more resources in intellectual capital [79].

Social dimension (S) includes the firm's ability to manage its relationship with its workforce, communities in which it operates, and political environment. Using 83 firms

categorized as the world's most ethical corporations, Rossi et al. in 2021 stated that adopting an ethical and socially responsible approach is related to IC disclosure in a positive way [81]. Firms with good social capital will reduce the need for expensive business activity monitoring processes and lower transaction costs, thus encouraging their creation of added value. Social initiatives and activities also assist companies in developing IC, in terms of human capital (HC), by increasing employee loyalty and commitment to achieve a competitive advantage relative to their competitors [2]. Social activities enhance the firm's relational or customer capital (RC, CC), one of the components of IC, i.e., its image and reputation, and consumer loyalty [87]. As a result, there might be a positive connection between the social dimension and IC efficiency.

Additionally, prior studies have emphasized the importance of understanding the corporate governance (G) in successfully employing, preserving, and maintaining an organization's IC [11]. According to Jing et al., corporate governance (G) works as an “intensive monitoring package for a firm to reduce opportunistic behavior” of managers and minimize the negative impact on IC. Aslam and Haron in 2020 and Reboredo and Sowaity in 2022 also reported that releasing information on the governance dimension improves IC efficiency in terms of HC, SC and CC. The higher the level of G in managing its IC, the higher the chances of achieving organizational goals [13, 79].

Based on earlier studied theoretical background of ESG and IC alongside with small pool of recent researches on ESG-IC connection, we will provide theoretical model for ESG effect on IC development.

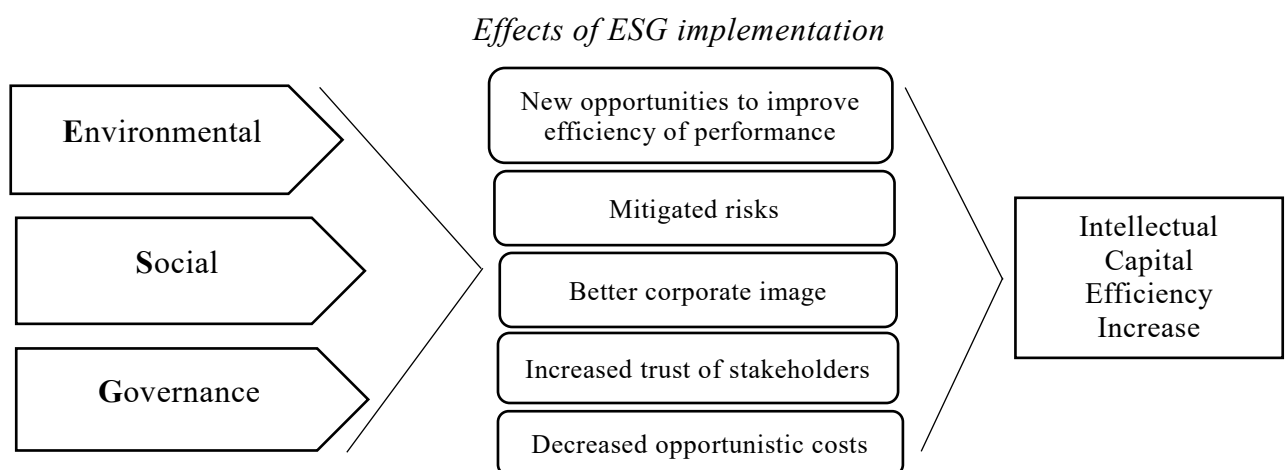


Figure 1.6 – Theoretical Model for ESG effect on IC development

As was considered earlier, intellectual capital consists out of human capital, structural capital and relational capital. Effects of ESG listed on Figure 1.6 are directly lead not only to overall increase in performance by reducing costs, mitigating risks and gaining new opportunities in form of partnerships or new resources, but to increase in separate business

operations as well.

For example, better corporate image means increasing attractiveness of enterprise as employee and, consequently, attraction of human capital of higher quality. New opportunities, such as green investment, green innovations or clean technologies (these are part of E-dimension), could lead to obtaining new intangible assets and increasing efficiency of structural capital.

Increased from compliance with regulatory standards on ESG trust of stakeholders, in its own turn, lead to better transparency and reliability in eyes of potential business partners and clients.

Thus, ESG can be considered as an asset for enterprise, that is able to make IC more valuable resource, than it would be without ESG practices. This connection leads to expanding explanation of why ESG-oriented strategy is capable of resulting in better performance. The classical idea of competitive advantage now implemented in using intangible assets, which do not let competitors imitate enterprise's strategy.

## 2. Methodology for assessing ESG and IC

### 2.1 ESG assessment methodologies

ESG is a diversified field to study and measure, especially in context of managerial implementation on a company's level.

Depending on industry, company's size, profitability or country where the enterprise operates, the possibilities and ways for implementing ESG into operations and reporting practices differ. Considering such heterogeneous field, it is reasonable that one unique assessment method does not exist in ESG space.

In terms of measuring ESG level of a multinational enterprise and defining existing risks of current corporate responsibilities exists different ESG ratings by different providers. Common way to get an ESG assessment or to know initial ESG "quality" of a firm is getting it from reliable ESG ratings.

There a number of ESG ratings providers, most known are MSCI, S&P, Refinitiv, Bloomberg, Sustainalytics, TruValue Labs, FTSE Russell etc. These providers use their own independent methodologies, various metrics and different data sources for assessing ESG practices of companies.

Nowadays, these ratings are of high importance to the companies, mainly because investors use them while considering potential future investments.

ESG ratings providers play an increasingly important role in the investment process through their assessments of companies across various ESG metrics. Since ESG ratings influence investors decision-making process, a poor score and rating might result in delisting of the firm or lower value of its shares (value at discount) to the closest competitors of the firm.

Poor ratings might result from lack of reporting from enterprise, but at the same time the reason might lay in poor handling of ESG risks or insufficient implementation of ESG practices.

ESG ratings provide a better insight of how the outside world perceived the enterprise's ESG performance and give a useful input ensuring that current ESG implementation (strategy and reporting) fulfill market expectations.

At the same time lack of transparency and reliability in data gathering process from respondents is a serious barrier to evaluation process, and to adoption of ESG strategies in general.

For realistic assessment we need to know at least about existence of certain internal documents or policies, that companies are usually reluctant to share or not share at all.

Another barrier to objectivity and credibility of modern ESG ratings is their lack of



consistency.

ESG ratings are inconsistent across different rating agencies and analytical firms. A 2019 MIT study noted that the correlation among six prominent ESG ratings agencies was, on average, 0.61. On the contrary, credit ratings from mainstream agencies like Moody's and S&P had a correlation of 0.99 [22]. Need for standardization of ESG ratings already highlighted, but at the same time is not the ultimate truth for ESG assessment.

It is important to remember, that ESG score generated not from purely quantitative data in the first place. A lot of significant structural parts of ESG are hard to measure, since it is intangible assets (human capital, business ethics, existence of different environmental strategies, etc.). Thus, different scope divergence from different key evaluation points chosen, measurement variance caused different data accessed even in same indicators, and weights differences appeared from different assessment of relevance of certain indicators led to mentioned inconsistency.

On contrary, ESG ratings have common ground. The evaluation criteria and indicators are almost similar and emerge from E, S, G pillars alongside with UN SDGs. Ratings use both quantitative and qualitative approaches to evaluation, consider industries, and gain information directly from enterprises where it is possible through questionnaires or surveys.

It is valuable to remember about these limitations, while using ESG scores for practical implementation of environmental, social and governance policies and assessing situation in industry through external analysis. ESG score is a starting point and a tool to see performance from outside, not the provider of complete real picture of operations in social, environmental and governance areas.

Let us compare the methodologies of a few popular global ESG ratings to identify the key distinctions and overlaps in the process of ESG assessment and calculating companies' ESG scores.

MSCI (Morgan Stanley Capital Investment) is one of the most popular sources to obtain data about ESG score. It is American financial services providing enterprise, that has a multi-asset portfolio of analysis tools and products. This company runs different indexes, beside ESG one and highly credible [63].

MSCI ESG ratings similarly to other ESG risk ratings look at companies' exposure to ESG risks and how these risks managed. ESG metrics perceived more on material side – what financial effect ESG risks may have on the company.

MSCI have immense database, and looks at more than 1000 data points when compiling ESG ratings. Data points include information about companies' key performance indicators, existing policies, targets, etc.

Among 33 key issues, the ones that belong to environmental and social themes are made in a way that interlinks industry-specific and company's unique issues. Thus, rating assess companies in comparison with their industry peers, while corporate behavior and governance assessed for all companies identically.

Refinitiv is another provider of financial market data in a global market. The company has American-British origin and previously was a Thomson Reuters, part of Thomson Financial [80].

Refinitiv calculates ESG scores based on the 10 category weights and using both Boolean and numeric data.

Boolean data – that means data based on answers to a certain question. Usually it based on yes or no answers (or “no answer”). The answer is assigned with numerical value in the form of 0 or 1, depending on question. Default values for positive questions would be 1 for “yes” and 0 for “no”. Analogically, for negative questions, “no” would be 1 and “yes” would be 0. Zero is also assigned when no relevant data on topic is present in the company's public reports.

Numeric data – used when data point can be obtained from all companies of industry group in form of relative percentile ranking. This data also assessed as positive or negative, depending on context. For instance, high emissions are negative, while high amount of recycled waste is positive.

For calculating 10 category scores and controversial score Refinitiv use percentile rank scoring methodology. It depends on number of companies with value in general, number of companies with the same value and number of companies that are worse than one currently assessed.

To calculate the environmental and social category scores, as well as the controversies score, Industry group of The Refinitiv Business Classifications is used as the benchmark to calculate category scores (except governance).

To calculate the governance categories, the country of incorporation is used as the benchmark, as best governance practices are more consistent within countries.

Materiality for Refinitiv ESG scores is defined in the form of category weights.

Category weights are calculated based on an objective and data-driven approach to determine the relative importance of each theme to each individual industry group.

Sustainalytics is another global company that rates ESG performance. Initially emerged from Canadian-European merger, nowadays it is bought by American financial services company Morningstar [88].

Sustainalytics' ESG Risk Ratings are created to assist investors in their decision-making process, helping in recognizing and comprehending financially significant ESG risks. At the

same time, these ratings show companies exposure to industry-specific ESG risks and their risk management.

The greater the proportion of the unmanaged ESG risk, the higher ESG Risk score.

Based on result of multi-dimensional measurement, score identified and one of five categories of ESG risk is assigned to a company (negligible, low, medium, high, severe).

In process of assessment, Sustainalytics study total exposure at the subindustry level, manageable and unmanageable risks (proportion between these two defined for each company at the subindustry level), managed risk, management gap and unmanaged risk.

Last but not least, S&P (Standard and Poor's) Global, the company publicly known for its credit ratings.

This company has Corporate Sustainability Assessment (CSA), an annual evaluation of companies' sustainability practices [83].

In this assessment company focuses on ESG criteria that financially relevant and industry-specific as well.

Through web-based questionnaire and publicly disclosed company documents approximately one thousand datapoints per company covered by these scores alongside with 130 sustainability topics covered by question-level scores.

ESG score here is calculated based on the responses of listed companies and information available in the public domain.

The CSA focuses on past and current performance on ESG issues.

The rating uses a consistent, rules-based methodology with specific approaches for 61 different industries.

There are approximately 100 questions for each industry, with each question falling under one of approximately 23 different themes or criteria. The criteria, in turn, fall under one of the three dimensions: Environmental, Social, and Governance & Economic.

Some criteria are common across industries, while others are industry-specific.

The CSA generates a total ESG score for every company covered as well as individual scores for the three dimensions, with 100 being the best score in each case.

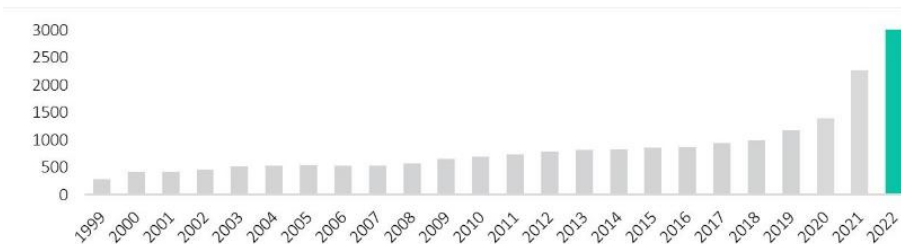
Final score calculated as below:

$$SP_{ESG} = \sum(((SP_{QP} \times SP_{QW}) \times SP_{CW}) \times SP_{DW}),$$

where  $SP_{ESG}$  – S&P Global ESG Score,  $SP_{QP}$  – Question Points,  $SP_{QW}$  – Question Weight,  $SP_{CW}$  – Criteria Weight,  $SP_{DW}$  – Dimension Weight.

The assessment is conducted via dedicated CSA Portal, which provides all invited companies free access to scorecards, statistics, and assessment feedback.

**Three-fold increase in three years to over 3,000 CSA participants**



**Development by region**

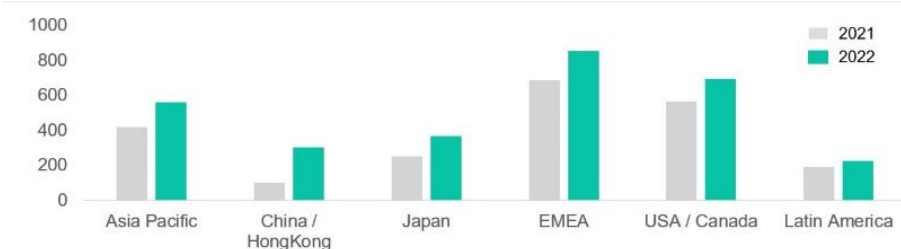


Figure 2.1 – S&P CSA dataset dynamics in numbers of participants and by region [84]

Figure 2.1 reflects growth dynamics of this rating since 1999. In 2023 S&P Global will continue to grow, inviting over 13,000 companies worldwide to participate in the CSA.

Companies that are not actively participate in CSA, also might be assessed based on their disclosure and publicly available data.

Any company interested in the CSA may participate free of charge, with the agreement that the resulting ESG Score is public on S&P Global platforms.

It is obvious, that despite similar topic of assessment, methodologies of these ratings are quite different.

Not only ways of calculating final score may differ, the initial evaluation criteria are also not identical. Sustainalytics' ESG rating especially stands out from the rest of ratings considered above due to its focus on risks. In fact, ESG risks are also considered to a high degree by others ratings as well, for example MSCI rating or S&P's CSA. But Sustainalytics make an emphasis on useful data for investors.

All of these ratings are useful to companies implementing ESG principles and to their potential investors for forming portfolio as well.

But this research focuses on managerial applications of ESG, particularly on its effect on intellectual capital.

Therefore, it would be more appropriate to prioritize scores from rating that have ESG performance and feedback to assessed companies as focus points.

Obtained information on the described above ratings methodologies summarized by using table form of comparison.

Table 2.1 – ESG Ratings methodology comparison [63, 80, 83, 88]

Methodology	S&P Global CSA	MSCI	Refinitiv	Sustainalytics
Objectives	Measure exposure to & performance on ESG risks & opportunities, the level of disclosure, awareness of ESG issues. Focus on quantitative, performance-driven metrics and management programs & policies	Measure resilience to long-term, financially relevant ESG risks	Transparently and objectively measure a company's relative ESG performance, commitment and effectiveness, based on company-reported data	To help investors identify and understand financially material ESG risks at the security and portfolio level
Number of companies assessed	8,000 companies (around 13,000 invited)	8,500 companies	12,500 companies	16,300 public equity, fixed-income, and privately held companies
Data basis	Data from companies participated in CSA, publicly available information	Extracting data from web sources, using technologies and AI, voluntary companies' disclosure and alternative data sources	Companies' reports, news sources, stock exchange filings, companies' and NGO websites	Companies' reports, news & other media, NGO reports/websites, multi-sector sources (GRI, CDP reports), companies' feedback
Key calculations/features	Scores are measured on a scale of 0 – 100. Points are awarded at the question-level based on assessment of underlying data points. "Question-level Scores" aggregate up to the "criteria-level", depending on the subindustry (up to 30 per company). The Criteria-level Scores further form standalone E, S and G "Dimension Scores", which roll up into ESG Score.	Industry relative. A seven-point AAA-CCC scale. For each company, identified 2 to 7 industry-specific Environmental and Social Key Issues (out of total 33). Environmental and Social Key Assessment of a company's governance Key Issues is made using a deduction-based scoring model.	ESG magnitude (materiality) weightings (for each industry on a scale 1-10). Transparency stimulation (applied weighting, 'immaterial'/ 'highly material' data points). ESG controversies overlay (severity weights, controversy scores are adjusted based on a company's size). Industry and country benchmarks at the data point scoring level. Percentile rank scoring methodology (a 0-100 score and letter grades).	Two-Dimensional Materiality Framework (exposure to industry-specific material risks & managing those risks) 3 Central Building Blocks (corporate governance, material ESG issues, and idiosyncratic issues (black swans)). Five Risk Levels (negligible (0-10), low (10-20), medium (20-30), high (30-40) and severe (40+)). The ratings framework is supported by 20 material ESG issues.

Table 2.1 (Continued).

Methodology	S&P Global CSA	MSCI	Refinitiv	Sustainalytics
Number of metrics	More than 130 questions and 1000 datapoints	Thousands of data points, 33 key issues, each with number of metrics	More than 630	300 indicators and 1,300 data points
Main themes (key issues)	Operational Eco-Efficiency, Product Stewardship, Supply Chain Management, Climate Strategy, Human Capital Development, Human Rights, Information Security, Innovation Management, etc. (industry-specific)	Natural Capital, Environmental Opportunities, Climate Change, Pollution & Waste, Product Liability, Social Opportunities, Human Capital, Stakeholder Opposition, Corporate Governance, Corporate Behavior.	Emissions, environmental product innovation, resource use, human rights, workforce, community, product responsibility, shareholders, management, CSR strategy	Corporate governance, material ESG issues, and idiosyncratic issues (black swans)
Maintenance	Monthly updates; Methodology adjusted and reviewed on annual basis	Annually	Updated on weekly basis	Annually (except Benchmarking and Corporate Governance indicators)

As we can see from the table 2.1, S&P and Refinitiv scores data are more suitable for our research.

While MSCI and Sustainalytics have a huge dataset, they are more concentrated on ESG risks, that are especially important for investors. These scores would be useful in research of interconnections between ESG and financial performance of enterprises.

S&P Global CSA and Refinitiv have a needed for our research accent on ESG performance of companies in their assessment. And while Refinitiv has more extensive dataset and frequent updates, dataset of S&P Global largely based on information provided by companies themselves. That means that S&P's assessment based also on provided internal data, not necessarily publicly available.

## 2.2 Intellectual capital evaluation models

An intellectual capital assessment is a complex evaluation of the company's intangible assets, that has serious strategic implementations for firms functioning in modern post-industrial economies.

Intellectual capital assessment from managerial viewpoint might be defined as the set of economic and management decisions and goals that serve as the foundation for evaluating an enterprise's knowledge assets.

This definition includes two generic choices for assessment:

- 1) the managerial approach;
- 2) the most appropriate “evaluation architecture” for collecting and communicating the measurement-related information [58].

First one means managerial goals of implementing IC assessment system. It might be relevant for managers to assess IC by number of reasons. Manage value creation dynamics at the enterprise, or communicating the value generated by the firm.

Aim of approach based on value management theoretical ground is to manage strategy planning and the company’s behavior accomplish strategic objectives.

Value communication approach, on the other hand, concentrated on the company’s reporting activities, enabling disclosure of significant data about companies’ intellectual components value.

Second choice refers to the structure and the operational methodologies used for collecting information for assessment.

There are two primary sub-categories for “evaluation architecture” – scorecard-based and index-based.

Both designs share a holistic view of the enterprise. On the contrary, they differ in terms of methodologies applied for analyzing and assessing intellectual capital of the company.

First architecture uses perspective-based approach, identifies at beginning main areas for IC and its components evaluation and after that proceeds to determine a set of key measures for these areas. The metrics in scorecard-based architecture defined by “top-down” approach. Strategic objectives of the enterprise are transformed into actions that must be performed and linked to metrics.

Second architecture strives to develop measures for providing combined information. This approach especially helpful for situations when the company needs to provide a comprehensive depiction of itself.

IC reporting and assessment are fundamental for the company’s internal and external benchmarking and setting future strategic objectives. It strengthens the company’s understanding of its competitive position as well as emerging risks and opportunities.

Mentioned above approaches are theoretical basis of IC assessment methodologies, that serve to support value creation in the enterprise through providing relevant data for maintaining, developing and increasing organizational IC. Furthermore, these assessments enable determining of the company’s overall value by considering IC.

There is no one universal and widely acknowledged method for measuring IC, despite the fact that several methods have been developed and used by number of researchers.

The lack of physical financial qualities of IC and its intangible nature cause difficulties in measurement process.

Another issue in IC measurement that makes it more challenging is high variety (and differences) of non-financial measures between enterprises and high dependence of these measures on internal policies.

Previous studies on IC assessment listed existing methods of evaluation on basis of modern research papers. Andriessen and Chan [50] works particularly provided list of existing measurement methods. They listed 30 and 34 methods of IC calculation respectively. Some of these methods we briefly described in previous chapter.

Pike and Ross [81] assessed some of these methods considering their theoretical connection and concluded that these methods for measuring IC are reliable.

Chan distinguished five main approaches for all methods assessed. It is market capitalization, direct measurement, scoreboard, economic value-added and VAIC approaches. In Chan's research deliberately analyzed were first four approaches.

According to market capitalization approach, IC of an enterprise can be calculated by subtracting net assets value of the company from its apparent market value. This approach established on the ground of the accounting paradigm of historical cost and balance sheet assessment. Main challenges for this approach are the constantly changing market value of an enterprise and possible speculations in the capital market.

Additionally, components of IC are not instantly defined in this approach and, consequently, this approach does not exactly lead managers to understanding of IC, its ways of existing and its impact on business dynamics.

Direct approach to IC measurement evaluates and provides a direct monetary value for whatever individual components of IC the enterprise has (intangible assets of the enterprise). A number of audit surveys required for identifying these components.

The reporting for this approach might be provided in the form of value in certain currency (e.g. dollar) or can be formed as a set of coefficients.

Qualitative nature of this evaluation and of key intellectual capital components determination is a potential shortcoming for this approach, because it can be very subjective.

This approach cannot be used as a universal method, that could allow unified assessment and comparison of enterprises due to lack of widely agreed upon definition of IC in it.

Scorecard approach have number of different methodologies that differ in definitions and views on IC structural components classification.

First applicable scorecard approach, for IC assessment and reporting, was the Skandia Navigatore by Edvinsson and Malone.



Scorecards are used to generate indicators and indices, and may not require the assignment of a financial value to the IC components.

The balanced scorecard was originally used in management reporting, and was later suggested that IC measuring activities such as those of Skandia could also be incorporated into the reporting of the balanced scorecard.

The qualitative nature of these methods coupled with the lack of standardization could be argued as a potential challenge facing their general adoption, especially, when consideration is given to public and statutory reporting.

The Economic Value-added Approach (EVA) was intended to be a comprehensive measure for studying the performance of the business in general; economic value added may be established by the following equation:  $EVA = \text{Net sales} - \text{operating expenses} - \text{taxes} - \text{capital charges}$ .

If we accepted the assumption that a company's increase in EVA only results from the effective management of the company's knowledge assets, and nothing else, then EVA might seem a reasonable tool for measuring IC. This may be a challenging assumption to accept because tangible assets also contribute to the well-being of a company as indicated by the resource-based view.

IC alone may not function without the support of tangible assets such as stock, machinery and financial capital.

The VAIC approach (Austrian approach) we will consider deliberately below.

This method proposes standardized and accurate measure of IC and might be used for comparative studies at micro and macro levels (and international levels as well). First introduced by Ante Pulic in 2000s, now it is one of the most common models for assessing IC in quantitative researches, and literature on topic shows that this approach is widely used in measuring IC for financial sector companies.

Pulic's method emerged from Skandia Navigator and was modified by shift in meanings of main terms. This new system concentrated on IC value creation ability for the company instead of costs as it was before. Pulic's method puts greater emphasis on the company's ability to effectively use IC as a tool for value creation.

This method of IC assessment allowed calculate intellectual capital efficiency based on accounting documentation. Data for defining values of this method derived from balance sheet and income statement. It is important to note, that capacity and worth of VAIC method limited by financial accounting constraints (e.g. subjectivity or historical cost). While this method relied on balance sheet figures as on real reflection of IC performance of the company, this data is still representation of financial position of the company at one certain point in time.

Simplified nature and comparatively easier process of gaining data for assessment made this method popular among many researchers. Besides, it is useful for research not only IC efficiency, but also to analyze different components of IC and their efficiency.

VAIC method provides a variety of advantages highlighted by several researchers [20, 51, 55], which we may sum up as follows:

- results of this evaluation can be quantified, without required further elaborations;
- can be used on enterprise of any size, from small to big corporation, provides a form of standardized evaluation;
- improves financial statements usability by introducing IC performance indicators, especially for stakeholders;
- straightforward and easy to comprehend, especially in the computation and derivation of results;
- useful for comparison of variety of enterprises from different industries and of various sizes and benchmarking;
- consistent with the stakeholder view and resource-based view;
- consistent widely accepted definition of IC and treatment of human capital in a way of considering it as the most important resource.

Outlined above advantages of this method make it the most appropriate method for measuring IC performance in any enterprise. Besides, existence of prior studies, that use VAIC in IC research of listed companies in many countries makes this methodology more credible. Thus, this methodology was chosen as a way of IC assessment in this research.

VAIC represents the total sum of value added by IC efficiency, that is a sum of two components – IC efficiency and capital employed efficiency. IC efficiency in its own turn has two structural components, human and structural capital efficiencies.

The following are the ways for calculating the VAIC and its components.

$$VAIC = ICE + CEE, \quad (1)$$

where ICE – Intellectual Capital Efficiency and CEE – Capital Employed.

$$CEE = \frac{VA}{CE}, \quad (2)$$

where VA – Value Added, CE – Capital Employed. Capital employed includes both physical and intellectual capital.

$$VA = OUT - IN, \quad (3)$$

where OUT – total sales (revenue), IN – expenses.

$$ICE = HCE + SCE, \quad (4)$$

where HCE – Human Capital Efficiency, SCE – Structural Capital Efficiency.

$$HCE = \frac{VA}{HC}, \quad (5)$$

where HC – Human Capital. Human capital in this model assessed as expenses for employees, in particular, total wages and salaries.

$$SCE = \frac{SC}{VA}, \quad (6)$$

where SC – Structural Capital. Structural capital calculated as difference between value added and human capital.

The calculations above suggest following algorithm for assessing VAIC.

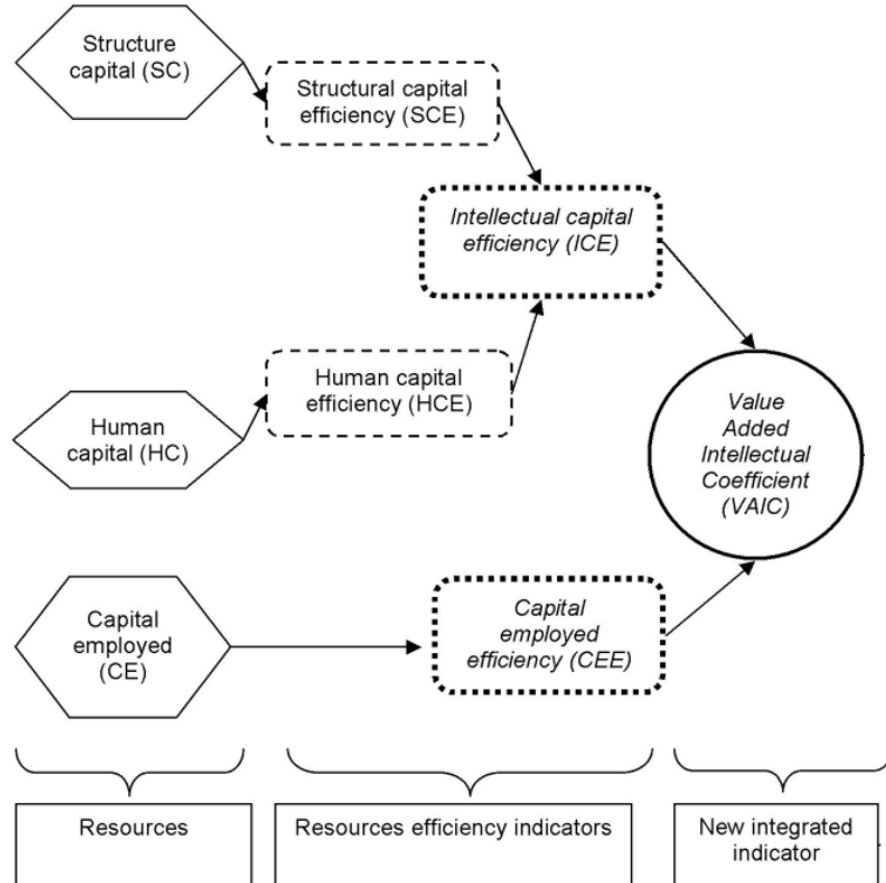


Figure 2.2 – Algorithm for determining VAIC [55]

Existing studies used VAIC model and its components as dependent and independent variables, conditioned by purpose of research and context of studies.

For our research VAIC is considered dependent, because our goal is understanding of whether this indicator changes depending on level of ESG (score) of the enterprise.

To make conclusions about efficiency indicators, Pulic suggest a simple way of evaluation.

ICE	HCE	SCE	Judgment
1	1	0	Worse performance (much worrying: edge of survival)
1.25	1.13	0.12	Low performance (worrying)
1.75	1.44	0.31	Relatively good performance
2.00	1.62	0.38	Good performance
$\geq 2.5$	$\geq 2$	$\geq 0.5$	Successful performance

Figure 2.3 – ICE and measure of performance [76]

Provided by Pulic evaluation on how effectively IC is used by a company is simple and also allows to make separate conclusions by two structural parts of IC.

### 2.3 Model for evaluation ESG effect on IC

Considering the information on ESG and IC assessment from previous paragraphs, we will make a research model to identify connection between these two concepts.

We construct regression model to evaluate the relationships between ESG and IC for chosen multinational enterprises.

The data sample for these enterprises was based on Forbes Global 2000 results in 2023.

Forbes Global 2000 is a rating that exist for second decade already, it ranks largest enterprises in the world by four financial metrics – sales, profits, assets and market value based on latest financial data available. Forbes rating allows to define successful globally operating enterprises.

Using enterprises from this list can not only help to establish ESG-IC connection, but also benchmark what ESG scores or IC efficiency levels have the leaders of industries in their value creation. In other world, results of such sample's analysis might not just help our research goal, but also provide an insight on value creation management in leading enterprises,

Companies from this list represent 58 countries, most of them are either Chinese or American enterprises.

Our data sample were derived from first 600 companies on the list and by elimination of companies that do not have physical presence in different countries (do not meet 'multinational' criteria) or part of financial sector, decreased to 300 companies. Enterprises were included also based on conditions of audited and disclosed statements reported and published in their official website and their ESG score from S&P also can be publicly accessed to their participation in CSA.

Financial companies were not included into the final sample because of already existing increasing dynamic of ESG relevance for financial sector. Credibility and reputational

improvement, that ESG gives have gain attention from financial institutions, alongside with ESG demand in investment decisions. Additionally, most of the studies considered ESG effects for banks or other financial services enterprises. For us the results from other industries enterprises are more fitting for establishing connection between ESG and IC.

Chosen enterprises represent 48 valid industries, among which are following: Oil & Gas Upstream & Integrated; Automobiles; Telecommunication Services; Food & Staples Retailing; Semiconductors & Semiconductor Equipment; Pharmaceuticals; IT Services; Transportation and Transportation Infrastructure; Chemicals; Machinery and Electrical Equipment; Retailing; Computers & Peripherals and Office Electronics; Interactive Media, Services & Home Entertainment; Software; Health Care Providers & Services; Food Products; Oil & Gas Refining & Marketing; Textiles, Apparel & Luxury Goods; Biotechnology; Metals & Mining; Beverages; Trading Companies & Distributors; Construction & Engineering; Aerospace & Defense; Electric Utilities; Steel; Real Estate, etc.

The most represented industries listed in Table 2.2.

Table 2.2 – Industries representation in sample of multinational enterprises

Industry	Total listed	% of full sample
Oil & Gas Upstream & Integrated	20	6,7
Automobiles	13	4,3
Telecommunication Services	10	3,3
Food & Staples Retailing	10	3,3
Semiconductors & Semiconductor Equipment	17	5,7
Pharmaceuticals	10	3,3
IT Services	11	3,7
Transportation and Transportation Infrastructure	10	3,3
Chemicals	11	3,7
Machinery and Electrical Equipment	10	3,3
...	...	...
Total	300	100%

Thus, the sample is quite representative in terms of non-financial industries, that will allow us to use generalization in based on research model conclusions.

The final data sample of 300 multinational enterprises listed on Forbes Global 2000 in

2023 consists of their financial data for calculating IC metrics and ESG scores from 2020 to 2022.

ESG scores was obtained from S&P Global CSA, previously studied in terms of ESG assessment.

A distinctive feature of this rating is measurement of ESG practices in the company alongside with level of ESG information disclosure. It means that even for companies with high ESG performance final score calculation considers their transparency levels, and vice versa.

Besides, data for this rating obtained not only from open sources but directly from enterprises-participants of corporate sustainability assessment.

S&P ESG score is industry-specific and calculated with special weights for evaluation indicators (each dimension, criteria, question), that depends on industry.

Data for calculation of VAIC and assessing IC development level obtained from financial statement of enterprises for a chosen time period.

Research model was constructed on basis of existing research of ESG effect on IC efficiency, namely, by work of J.C. Reburedo and S. Sowaity in 2022 on Jordanian listed firms and E. Karyani and M. Perdiansyah research on the Association of Southeast Asian Nations emerging markets [54, 79].

For research model we use panel regression, where IC efficiency and its components are dependent variables, while ESG score is independent variable, and control variables are firm size and leverage:

$$VAIC_{i,t} = \alpha_i + \beta_1 ESG_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 LEV_{i,t} + \varepsilon_{i,t} \quad (7)$$

where  $ESG_{i,t}$ , denote the dummy variables that indicate whether firm  $i$  have assessed environmental, social, governance disclosure and practices at time  $t$ , respectively,

$\beta_1$  account for the marginal effects of ESG on IC efficiency as given by the dependent variable VAIC.

Exchanging VAIC for each of its components (HCE, SCE or CEE), we can check for the effects of ESG practices and disclosure on the individual IC efficiency components. To control for unobserved heterogeneity by cross-section and over time, we include firm fixed-effects dummies, as given by  $\alpha_i$  and year fixed-effect dummies.

IC efficiency of three years in this research computed by applying frequently used in similar research and mentioned previously VAIC model.

VAIC represents the total sum of value added by IC efficiency, that is a sum of two components – IC efficiency and capital employed efficiency (according to Pulic, process of value creation inextricably binds IC and physical capital, that also involved in the process). IC efficiency in its own turn has two components, human and structural capital efficiencies.

In addition, as in the recent previous studies by J.C. Reburedo and S. Sowaity in 2022 [79], we consider control variables for firm size and risks so as to avoid confounding effects. Firm size is measured as the natural logarithm of the firm total assets, whereas risk is reflected in leverage, defined as the debt-to-asset ratio and where a higher ratio reflects greater exposure to default and bankruptcy.

Table 2.3 – Description of research variables

Variables	Measure	Data source
<b>Dependent variable</b>		
Value Added Intellectual Coefficient (VAIC)	$VAIC = HCE + SCE + CEE$ $HCE = \text{Human Capital Efficiency} = VA / HC$ $SCE = \text{Structural Capital Efficiency} = VA / SC$ $CEE = \text{Capital Employed Efficiency} = VA / CE$ $VA = \text{value added} = \text{total revenue} - \text{cost of goods sold} - \text{operating expense (excluding staff expenses)}$ $HC = \text{human capital} = \text{labor cost}$ $SC = \text{structural capital} = VA - HC$ $CE = \text{capital employed} = \text{book value of total asset}$	Financial statements of multinational enterprises
<b>Independent variable</b>		
Environmental, Social, Governance (ESG)	$SP_{ESG} = \sum(((SP_{QP} \times SP_{QW}) \times SP_{CW}) \times SP_{DW})$ , where $SP_{ESG}$ – S&P Global ESG Score, $SP_{QP}$ – Question Points, $SP_{QW}$ – Question Weight, $SP_{CW}$ – Criteria Weight, $SP_{DW}$ – Dimension Weight.	S&P Global CSA
<b>Control variable</b>		
Enterprise size (SIZE)	Natural log of corporate total assets	Financial statements of multinational enterprises
Financial leverage (LEV)	$LEV = (\text{Total Debt} / \text{Total Net Assets})$	Financial statements of multinational enterprises

Table 2.3 provides detailed description of all the variables used in research model.

IC efficiency components intended to be calculated from audited accounting data from chosen multinational enterprises. Content analysis of financial statement (2020-2022 income statement, balance sheet) allows to extract needed information and calculate efficiencies in VAIC model.

Control variables obtained from the same source.

As mentioned above, ESG scores were obtained from S&P Global Corporate S

Thus, by compiling panel data and analyzing it quantitatively using regression to decide on nature of its connection, we will study effect of ESG on IC development.



### 3. Testing effect of ESG on IC development of MNEs

#### 3.1 Analysis of ESG effect on IC

To carry out analysis of ESG effect on IC development, expressed through IC ability to have an effect on value creation in the enterprise under the reviewed time period, it was obligatory to collect panel data in the first place.

Panel data is the basis on that correlation and regression statistical analyzes were performed.

Panel data were collected in accordance with methodology described earlier. ESG scores were obtained from S&P Global CSA for 3 years of 2020-2022 and data for calculating VAIC, size and financial leverage were obtained from publicly disclosed audited financial reports of enterprises from the sample. Additionally, we included in data used for analysis available information about environmental, social and governance scores separately for the year of 2022.

For each or enterprise in the final sample out of 300 multinational enterprises ESG Scores were manually obtained one by one from open source of S&P's assessment and the indicators for VAIC model were calculated – book value of capital employed, structural capital, value added, capital employed efficiency, structural capital efficiency, intellectual capital efficiency and value-added intellectual coefficient. For VAIC and control variables calculation of chosen time period (2020-2022) were obtained 5400 datapoints and 9000 were calculated.

In the process of calculating panel data the final sample was filtered and decreased to 136 enterprises by a number of reasons. The final sample included around 6528 datapoints for VAIC and control variables (2448 obtained from financial reports and 4080 calculated in basis of obtained ones).

The reason why a lot of companies were excluded from sample was their lack of data on human capital. According to VAIC Model human capital assessed as a cost of wages and salaries, but not all enterprises choose to share this data. Many multinational enterprises provide this data in their audited consolidated annual reports.

Another reason for filtering sample was the absence of gross margin of some enterprises in some of the chosen years. Despite being in the Forbes Global 2000 in this and last year, in period of 2020-2022 many of these enterprises did not gain positive difference between their sales and cost of these sales. Thus, it would be rational to assess IC contribution to creation of value, if there was no value added in the first place.

Final sample of multinational enterprises provided in Appendix B. All data analyses were performed in Excel using Analysis ToolPak.

First of all, correlation analysis was performed in order to discover whether ESG and VAIC have statistical relationship or not. For that, the correlation coefficients for three years were calculated. The results of calculation presented in form of a correlation matrix below.

Table 3.1 – Correlation matrix

	ESG 2020	ESG 2021	ESG 2022	VAIC 2020	VAIC 2021	VAIC 2022
ESG 2020	1	0,92	0,78	0,38	0,45	0,48
ESG 2021	0,92	1	0,90	0,42	0,52	0,54
ESG 2022	0,78	0,90	1	0,47	0,58	0,60
VAIC 2020	<b>0,38</b>	0,42	0,47	1	0,90	0,88
VAIC 2021	0,45	<b>0,52</b>	0,58	0,90	1	0,97
VAIC 2022	0,48	0,54	<b>0,60</b>	0,88	0,97	1

According to the results of the correlation coefficients calculation, there is a certain correlation between ESG and VAIC in 2020-2022.

In 2022 correlation coefficient was 0,6, that is a medium correlation. From one point a view it gives us idea about existing interconnection of two variables. On the other side, it is not high enough to have multicollinearity problems in regression model, thus, these variables can be tested in one equation.

The dynamics of this correlation in the period of 2020-2022 is also raising, from 0,38 in 2020 to 0,6 in 2022. That means that connection between these two variables strengthens over period of research.

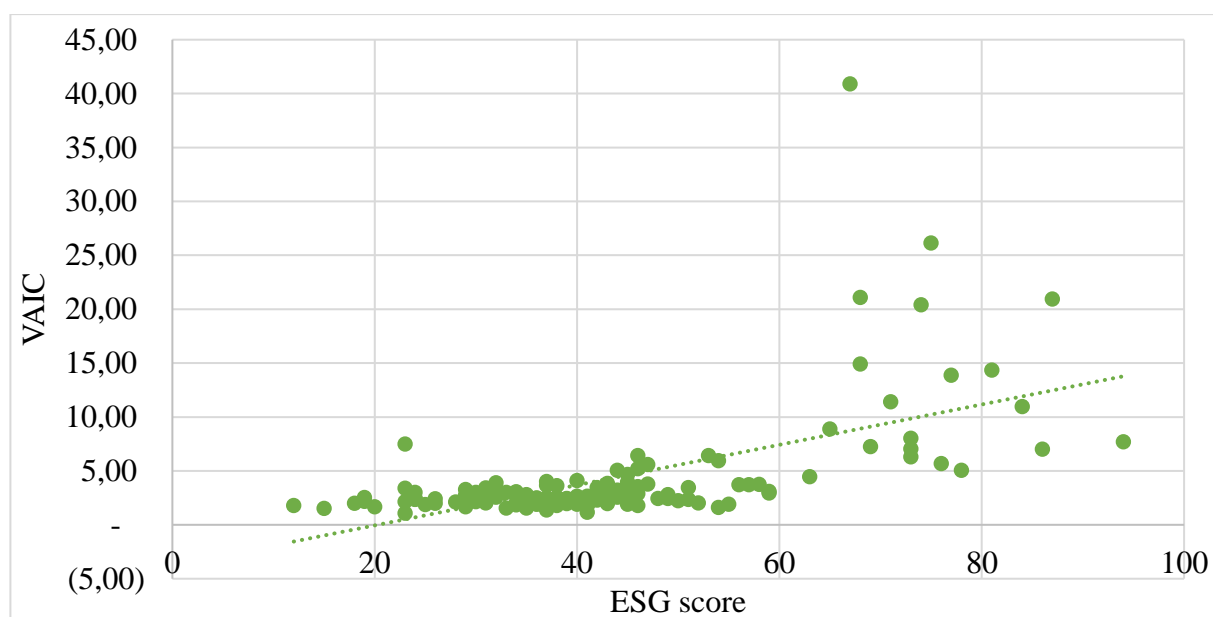


Figure 3.1 – Scatterplot for ESG-VAIC correlation in 2022

Figure 3.1 reflects scatterplot of ESG-VAIC correlation. By building trend line through this scatterplot, we clearly can see positive trend. That means positive correlation between independent and dependent variables.

In the process of gathering data for ESG scores, we obtained separate scores for E, S, G dimensions in 2022. Thus, for detailed evaluation of effect of structural components of ESG on intellectual capital, makes sense to also perform following regression model:

$$VAIC_i = \alpha_i + \beta_1 E_i + \beta_2 S_i + \beta_3 G_i + \beta_4 SIZE_i + \beta_5 LEV_i + \varepsilon_i, \quad (8)$$

where  $E_{i,t}$ ,  $S_{i,t}$ ,  $G_{i,t}$ , denote the dummy variables that indicate whether firm  $i$  have environmental, social, governance scores respectively.

Before running regression model, we calculated descriptive statistics for main variables.

Table 3.2 – Descriptive statistics

	Mean	Standard Deviation	Skewness	Minimum	Maximum	Observation
VAIC	4,046664	4,972146856	4,752349	0,160377	42,60606	408
ESG	40,30147	18,2761992	0,720972	1	94	408
SIZE	4,773869	0,374002244	0,418167	3,952405	5,716105	408
LEV	0,625807	0,17676437	0,159578	0,094244	1,310923	408
E (2022)	50,375	18,00326616	0,092393	9	93	136
S (2022)	38,54412	19,25534756	1,082098	9	96	136
G (2022)	43,05882	16,59529818	0,802855	11	91	136

The mean VAIC value is 4,047, indicating that added value is positively generated from during the chosen period, and the contribution of IC in generating added value exceeds the costs incurred.

The VAIC standard deviation is 4,972, indicating that IC dispersion over the listed firms is relatively low. The descriptive statistics also indicate that the added value generated by the VAIC components exceeds the costs incurred.

For the environmental, social, and governance dimensions, mean values are 50,375, 38,544, and 43,059, respectively.

Score among the multinational companies from the sample is greatest for the environmental dimension (despite having lowest maximum), and lowest for the social dimension. That represents high attention of multinational enterprises to environmental policies and reporting in 2022, and lack of those for social initiatives.

Regarding control variables, firm mean size is 4,774, and the fact that size ranges from a minimum of 3,95 to a maximum of 5,72 reflects good variation. The mean leverage value of 0,63 (more than a half of total assets is financed by creditors) indicates relatively high indebtedness of multinational enterprises.

For running regressions, we hypothesize that ESG have positive effect on VAIC.

H: ESG (total) is positively associated with intellectual capital efficiency.

Table 3.3 presents evidence for regression model, where VAIC – dependent variable, ESG – independent, SIZE and LEV – control variables.

Table 3.3 – Regression results for ESG effect on IC development

Indicators	Results
Intercept	4,314
ESG	0,138
SIZE	-1,004
LEV	-1,642
Multiple R	0,503
R Square	0,253
Adjusted R Square	0,248
Standard Error	4,313
Observations	408
F significance	2,04667163528866E-25

Table 3.3, showing evidence on the relationship between ESG score and VAIC, points to a positive relationship between ESG and IC efficiency in value creation

Positive coefficient for ESG reflects positive effect of ESG on IC efficiency. Thus, the higher ESG score, the higher value-added intellectual coefficient. That means that enterprises with higher ESG reporting and implementation will gain more value added from intellectual capital and its components.

R square have relatively low results, meaning that model accounts for 25% of the dependent variable's variance. However, it is still significant for our research. For example, resembling regression model in J.C. Reboredo and S. Sowaity research from had less than 20% [79].

The standard error represents typical size of the residuals and shows how wrong model can be on average.

F significance indicator showing results of p-value for F-test on statistical significance of our model. Obtained results showing a very small value (E-25 indicates that we need to move the decimal point 25 places to the left). From this we can conclude that our results are adequate and model is working.

Independent variable ESG also have p-value of 2,72484921165105E-27, that indicates that this variable statistically significant and we can accept hypothesis about positive relationship between ESG and IC efficiency by rejecting the null hypothesis that the coefficient

equals zero.

Thus, we can claim that ESG has a positive effect on IC efficiency, and considering strengthening of these variables' correlation, this effect also might strengthen.

Table 3.4 presents evidence for regression model (8), where VAIC – dependent variable, E, S, G – independent variables, SIZE and LEV – control variables.

For this regression we have similar hypothesis, that E, S and G have positive effect on IC efficiency.

Table 3.4 – Regression results for ESG dimensions effect on IC efficiency in 2022

Indicators	Results
Multiple R	0,624880687
R Square	0,390475873
Adjusted R Square	0,367032637
Standard Error	4,073958611
F significance	1,08454234497206E-12
Observations	136
Interception	1,991219265
E	0,005119914
S	0,065867891
G	0,120898076
LEV	-1,031299511
SIZE	-1,059866281

Higher R square means that in comparison with model that uses whole ESG score as independent variable, the model, that uses separately E, S and G dimension scores are more favourable for estimating effect on IC efficiency. It means more than 36% of dependent variables from sample might be explained by independent variables.

F-stat meaning have tiny value, that is smaller than any reasonable significance level. Thus, we can say that our regression model generally statistically significant.

For independent variables in this model p-value are as follows:

0,861 – for E;

0,076 – for S;

0,002 – for G.

Obtained p-values for first two independent variables are greater than 0,05, meaning we can accept them as statistically significant. Their presence in the model might reduce the model's precision. Important to note, that S variable have a close p-value to usual, meaning that testing other samples might lead to different results and show it as a significant variable for VAIC.

Another reason for these results might be multicollinearity problem of E, S, G regression model, because these independent variables usually correlated between each other. Different problem is a small number of observations. If we had data on dimensional scores for a few years we could run this model more successfully.

Independent variable G, on the other hand, can be considered statistically significant and have positive effect on intellectual capital efficiency, because of its positive coefficient.

To sum up, the model that considers effect of separate components of ESG might be slightly better, but can have robustness problems.

Accordingly, we can accept hypothesis for second regression, except for environmental and social dimensions.

Results of second model are not part of our main research goal, but provide us with initial insight about ESG dimensions effect. From results of this model we can say that corporate governance is the most important factor for intellectual capital efficiency, while environmental dimension has almost no connection with VAIC, and social dimension have a weak positive connection, that we can not accept as statistically significant.

Obtained results and accepted hypothesis allow us to make recommendations for practical management of intellectual capital and ESG.

### 3.2 Managerial applications of ESG for IC development

Our evidence highlights the importance of ESG implementing in increasing the value added by intellectual capital of multinational enterprises. Thus, ESG increases value of enterprises' intangible assets, and the overall value of the enterprise, not only its financial performance, as stated by a large pool of researches before.

Our research draws attention to the potential offered by multinational enterprises involvement in sustainability practices in improving IC efficiency.

A developing IC will lead to improvement of value added and competitive advantage, while ESG leads to increase in enterprise's image, attractiveness to stakeholders, likewise enhances the company's competitive advantage, and possible opportunities in partnerships.

Based on our analysis, ESG is not only investment attractiveness tool, and can create value not just attracting financing with high ESG scores, but by integrating ESG practices in enterprises operations and strategic goals. Intellectual development in the enterprise might be implemented simultaneously with the introduction of ESG agenda.

One of the most pressing problems in formation of ESG reporting is the question of what indicators should be reported and how to measure them.

These questions are easier to answer in countries where ESG regulations fixated on a legal level. Even though regulators often do not provide a universal formula for compiling non-financial reports, it still easier to have compliance with requirements if enterprise knows about at least general requirements.

At the same time, for multinational enterprises can be important adjust to requirements of different regulators, depending on country.

Nowadays, number of countries proposed and passed new ESG regulations on a legal level. Among them are Australia, Canada, Chile, Colombia, India, Singapore, the United States, European Union countries, and the United Kingdom.

Besides, in 2021 IFRS established the ISSB (International Sustainability Standards Board), that generates global sustainability disclosure standards, focused on needs of investors from 140 participating countries.

While compliance is a first step to implement ESG, it is important to keep the balance between internal and external ESG needs. Enterprises needs to assess their non-financial performance and practices not only to provide external stakeholders with important information, but also to keep track of their own path of value creation and to keep employees aware and accountable.

Thus, there can not be one universal way to implement ESG. Depending on country, industry, size of enterprise and other factors, different ESG goals, practices and assessment should be implemented.

Most of enterprises already does at least possible minimum of ESG practices, at least because ESG is partially organic development of corporate social responsibility, a lot of enterprises just do not reflect what they did in special reports or do not create specific ESG goals or KPIs. This means that a lot of efforts might resulted in stronger efficiencies for the enterprise, if only they were goal-oriented and monitored.

Important to mention that running second model showed us that especially corporate governance affects intellectual capital efficiency. On that basis, especially important to pay attention to governance of enterprise.

Corporate governance in ESG is a complex dimension that includes ESG reporting itself (transparency about management structure and functioning), business ethics, risk-management and internal control alongside with strategy of the enterprise.

Table 3.5 – Corporate Governance ways of affecting IC

ESG Dimension	Categories	Effect on IC
Governance	Board of directors: composition, functioning, reward system, information disclosure	Transparency about management of the enterprise and regular publications of financial and non-financial reports might result in reducing agency costs, higher managerial involvement (with reasonable reward system), higher trust of shareholders, clients and possible partners, etc. It all leads to increase in value of HC by motivating managers, RC by setting high level of trust with clients and having compliance with regulators, and SC by having better managerial solutions.
	Shareholders: ownership structure, shareholders rights	
	Disclosure of information	
	Business ethics	Strong business ethics code will lead to higher trust of employees, partners and other stakeholders, this will improve relational and human capital
	Risk-management and internal control	By mitigating risks and monitoring enterprise will reduce opportunistic costs, and have more effective processes, thus, higher quality of structural capital and more resources for IC development
	Strategy: existing SMART goals, sustainable development plans	Integrating ESG issues in the core business strategies and driving purposeful businesses will result in higher engagement of employees (higher HC results); better managerial decisions (higher SC)

Table 3.5 reflects main ways in which Corporate Governance has a positive effect on the enterprise's intellectual capital development.

As we can see, transparency is a key to many categories here. Being honest about the ways the enterprise is managed not only a way to increase trust of stakeholders, but a way to increase accountability of the enterprise's internal environment. To have board of director meetings or internal strategy and KPIs is one thing, but publishing results of these meetings or



data about strategical accomplishments openly is a different approach.

Enterprises need to disclose information on ESG dimensions in order to attract investors and other stakeholders.

To establish credibility and attract international capital, enterprises are recommended to authorize third-party sustainability audits, since this way audits would increase transparency for international stakeholders.

Knowledge creation in the enterprise is not possible without knowledge about this enterprise in the first place.

Employees that know what strategic goals they are working for and managers who understand power balance and have clear monitoring system will have higher results, results that might be not so precisely assessed as increased physical assets, but still increase value created by enterprise.

Another important part of ESG implementation is ESG risk-management.

To mitigate risks, enterprises need to not only monitor ESG performance indicators, but also evaluate potential ESG trends on an international level.

Likewise, the current competitive economic and technological environment, where you need to develop your product at a high speed, sustainability also demands to keep up with the times. Green innovations, new social issues, emerged managerial practices, all of it just a small part of factors that could change directions of ESG agenda. Innovations are one of the reasons of ESG and IC interconnection – to create value you need strong ESG implementation, and to have this implementation, you need certain level of knowledge in the enterprise.

To sum up, the enterprises that want to increase value added through intellectual capital development, need to develop their ESG practices and reporting. This could be done by a systematic and consistent actions:

- meet regulatory requirements;
- enhance communications about ESG to ensure awareness of stakeholders;
- develop ESG goals (KPIs), integrate ESG into risk management, establish ESG information system;
- monitor ESG performance;
- integrate ESG into business operations and strategies.

### 3.3 ESG practices and perspectives in Russia

Taking into consideration the fact that widely known international rating agencies providing ESG rankings have excluded Russian companies due to geopolitical tension, sanctions and difficulties in the assessing these enterprises in current conditions, we believe that there is a need to examine main ESG trends and possibilities for Russian enterprises.

For Russian enterprises ESG is relatively new practice. Gained attention in 2021



Figure 3.2 – Reputation management system “SCAN-Interfax” data on ESG mentions in Russian media [69]

Figure 3.2 reflects dynamics of ESG mentions in Russian media, provided by SCAN-Interfax research.

Recent geopolitical events made Russia enterprises, especially enterprises, that operate on global arena to rethink their ESG transformations.

The departure of large foreign companies from Russian market alongside with sanctions, that restricted access to Western markets and manufacturing technologies have certainly become a barrier to previously established ESG strategies of many Russian enterprises. First months after start of special military operation showed notable decrease of the interest in the ESG agenda in Russia. Such a change was explained on the basis of suggestion, that the most relevant reason for sustainable development for Russian enterprises was primarily opportunity to get foreign investments and trade with Western countries. In that sense, the withdrawal from Russian market Western consulting companies, rating agencies and certification systems.

Despite the fact that Western ESG practices and possibility of creating partnerships with Western enterprises were indeed forming factors for ESG agenda in Russia, this is only part of the overall ESG implementation in Russian context.

The change in geopolitical situation lead to revision of ESG strategies by Russian enterprises.

Under the new conditions, social dimension turned out to be the most in demand due to raise of social issues. Simultaneously, the environmental agenda and the quality of the corporate governance faded into the background. As the result, Russian enterprises cut their sustainable development expenses by 40% in 2022 [69].

At the same time these conditions showed that ESG in Russian is aimed not only (and not in such great extent) at foreign markets, but at the sustainability of the business itself.

The demand for implementing principles of sustainable development emerges not only from counteragents, but from society itself.

A lot of ESG-goals with right implementation of specific environmental, social or governance projects might lead to increase in business efficiency in crisis conditions.

For instance, the reuse of resources will optimize manufacturing processes and reduce the costs of raw materials.

The Russian ESG agenda is now supported by internal factors.

There are few drivers for ESG of Russian enterprises now:

- caring for employees during turbulence;
- preparation for the introduction of mandatory non-financial reporting;
- accounting by the Central Bank of ESG-indicators in credit analysis;
- lending to ESG projects on favorable terms and issuing green bonds (for example, Sberbank has a similar program);
- Russian "green" standards (for example, in September 2022, such a standard was approved for multi-apartment housing);
- participation in Russian ESG ratings.

Over the past few years, the ESG agenda, which originally came from abroad, has been firmly localized in Russia. Thus, at the end of 2021, the largest Russian companies announced the creation of the National ESG Alliance. It was officially registered in March 2022. The Alliance is also involved in the development of national ESG reporting standards.

The Public Non-Financial Reporting bill, shelved over a year ago amid growing sanctions pressure, is back on the government agenda.

The draft law was developed by the Ministry of Economic Development as part of the concept for the development of the Public Non-Financial Reporting, approved by the previous

government in May 2017. For public discussion, the first version of the bill was published in 2018.

The draft obliges state corporations, public companies, state unitary enterprises and business entities with an annual revenue or assets of more than 10 billion rubles, as well as companies whose securities are included in the quotation lists of stock exchanges, to disclose public non-financial reporting.

In March 2023, speaking at the Russian Union of Industrialists and Entrepreneurs (RSPP) congress, President supported the disclosure of non-financial reporting by companies.

Assumed that such reporting will contribute to the growth of the authority of Russian business, will strengthen its market and public positions.

In instructions following the results of the congress, published in early May, the government was instructed, with the participation of the Bank of Russia and the RSPP, to work out proposals for the publication of annual non-financial reports by June 1.

Documents of a non-financial nature that guide organizations when compiling public non-financial reports still exist, the use of various recommendatory approaches by companies makes it difficult for interested users to analyze non-financial reporting, does not improve its quality and reduces the comparability of disclosed indicators. What is needed is a law, the adoption of which will make it possible to stimulate adherence to the principles of responsible business conduct, determine common approaches in the preparation and disclosure of reports in the field of sustainable development.

The draft law provides for flexible regulatory mechanisms. Thus, the organization is granted the right not to draw up non-financial reporting (sustainable development reporting) in the case of a motivated justification of the relevant circumstances. Considering the effect of sanctions, it is possible to exclude from reporting information determined by the government, which should protect Russian organizations from additional risks.

Currently, several hundred Russian enterprises are already voluntarily disclosing ESG indicators, but these data are published in different formats, at different intervals, and there are no universal standards for them.

Summing up, the main trends of ESG agenda for Russian enterprises at the moment are as follows:

- fall in interest & funding due to decrease in partnership with western enterprises;
- raise in importance of Social criteria of ESG, decrease in Environmental and Social;
- interest of governmental bodies (The Civic Chamber of the Russian Federation project on regular public assurance of public non-financial reporting in the field of ESG and sustainable development, Public Non-Financial Reporting law in process);

- anti-sanction legislative actions (temporary permission to not disclose corporate information until July 1, 2023).

Russian enterprises may use the same recommendations that were provided earlier for multinational enterprises in general.

More specifically in terms of development ESG indicators, enterprises might refer to recommendations of Central Bank of Russian Federation, that recently made an assessment on basis of existing Russian ESG ratings methodologies and proposed model for ESG ratings by itself [28]. This unified methodology model can form the basis for establishing and information system on ESG indicators for enterprises.

## CONCLUSION

Sustainability is one of the keys to successful and long-term functioning of enterprises in the global market. Stakeholders are placing greater pressure on enterprises to adopt more sustainable practices with lower social and environmental impacts, along with offering a more comprehensive representation of information regarding sustainability through proper disclosure policies. This fact has given rise to many studies on ESG and its connection to financial performance.

Simultaneously, in times of Industry 4.0 one of the main resources for enterprises to remain in their competitive position is information. Rapid development of technologies, continuing education of employees and R&D investment nowadays are part of economic activity for many multinational enterprises. High significance of intangible assets was proven by many examples of real enterprises.

Few recently appeared researched on topic of ESG and IC connection for enterprises improvement made us examine the impact of ESG on the activities of international enterprises from the other side.

To evaluate the effect of ESG on multinational enterprises intellectual capital development in process of writing a master's thesis the number of tasks were set and performed consistently, corresponding to set objective.

1. Theoretical concepts and backgrounds for ESG and IC were researched and specified, IC structural components and ESG ecosystem components were defined.
2. Relationship between IC and ESG practices in knowledge management context were examined, based on existing pool of studies;
3. Comparison of models of assessing IC and ESG practices to determine our own approach was performed;
4. A quantitative analysis of ESG effect on intellectual capital based on data gathered from multinational enterprises reports and open data from S&P Global was conducted;
5. Recommendations for MNEs taking into consideration the results obtained were developed.

The scientific novelty of this work lays in developed theoretical and methodological models for assessing ESG effect on IC, connection between ESG and IC efficiency.

The practical significance contains results ESG effect on IC development evaluation and recommendations made based on results of this analysis for ESG implementation.

By comparing ESG methodologies from the most reliable rating and data agencies (MSCI, Refinitiv, Sustainalytics, S&P Global), were recognized main principles of ESG scores calculation and chosen the most suitable source of data for quantitative analysis.

For assessing IC development were studied existing assessment methodologies and approaches and chosen most commonly used in similar researches VAIC model. This model allows to calculate IC efficiency or level of IC development in terms of ability to create value. Data for calculating value added intellectual coefficient was obtained from audited financial reports of multinational companies.

The data sample for multinational enterprises was based on Forbes Global 2000 results in 2023, where largest enterprises in the world ranked by four financial metrics – sales, profits, assets and market value based on latest financial data available. Companies from this list represent 58 countries, most of them are either Chinese or American enterprises.

Our data sample were derived from first 600 companies on the list and by elimination of companies that do not have physical presence in different countries (do not meet ‘multinational’ criteria) or part of financial sector, decreased to 136 companies. Enterprises were included also based on conditions of audited and disclosed statements reported and published in their official website and their ESG score from S&P also can be publicly accessed due to their participation in CSA.

For VAIC and control variables calculation of chosen time period (2020-2022) were obtained 5400 datapoints and 9000 were calculated. The final sample included around 6528 datapoints for VAIC and control variables (2448 obtained from financial reports and 4080 calculated in basis of obtained ones).

After data gathering, were suggested regression model and main hypothesis to test.

Hypothesis: ESG (total score) is positively associated with intellectual capital efficiency.

Correlation and regression analyses were performed in Excel using Analysis ToolPak

Performed regression resulted in positive coefficient for ESG, that reflects positive effect of ESG on IC efficiency. In other words, the higher ESG score, the higher value-added intellectual coefficient. That means that enterprises with higher ESG reporting and implementation will gain more value added from intellectual capital and its components.

For estimation of statistical significance and testing hypothesis was performed F-test, obtained results showed that model and ESG variable are statistically significant and we can accept hypothesis about positive relationship between ESG and IC efficiency by rejecting the null hypothesis that the coefficient equals zero.

Alongside with raising over researched period of time correlation we may suggest that this effect also might strengthen.

As we obtained data about separate ESG scores for E, S, G dimensions, was decided to perform another regression model to assess effect of each dimension. Due to limitations of time period and size of sample, this model can not be as reliable as the first one. But it showed that

only G (Governance) dimension had a statistically significant positive effect on IC efficiency amongst three.

Based on this, as a part of our recommendations we provided elaboration on Governance categories and ways in which they can affect IC.

On basis of the regression analyses results, we suggested general systematic and consistent actions for MNEs' ESG implementation:

- meet regulatory requirements;
- enhance communications about ESG to ensure awareness of stakeholders;
- develop ESG goals (KPIs), integrate ESG into risk management, establish ESG information system;
- monitor ESG performance;
- integrate ESG into business operations and strategies.

Lastly, were researched current ESG agenda for Russian multinational enterprises. Due to restrictions and uncertainties we could not obtain data on ESG scores of Russian multinational enterprises from foreign rating agencies. Thus, instead we studied Russian ESG agenda and its current trends:

- fall in interest & funding due to decrease in partnership with western enterprises;
- raise in importance of Social criteria of ESG, decrease in Environmental and Social;
- interest of governmental bodies (The Civic Chamber of the Russian Federation project on regular public assurance of public non-financial reporting in the field of ESG and sustainable development, Public Non-Financial Reporting law in process);
- anti-sanction legislative actions (temporary permission to not disclose corporate information until July 1, 2023).

Despite new barriers, Russian enterprises may use the same recommendations that were provided earlier for multinational enterprises in general.



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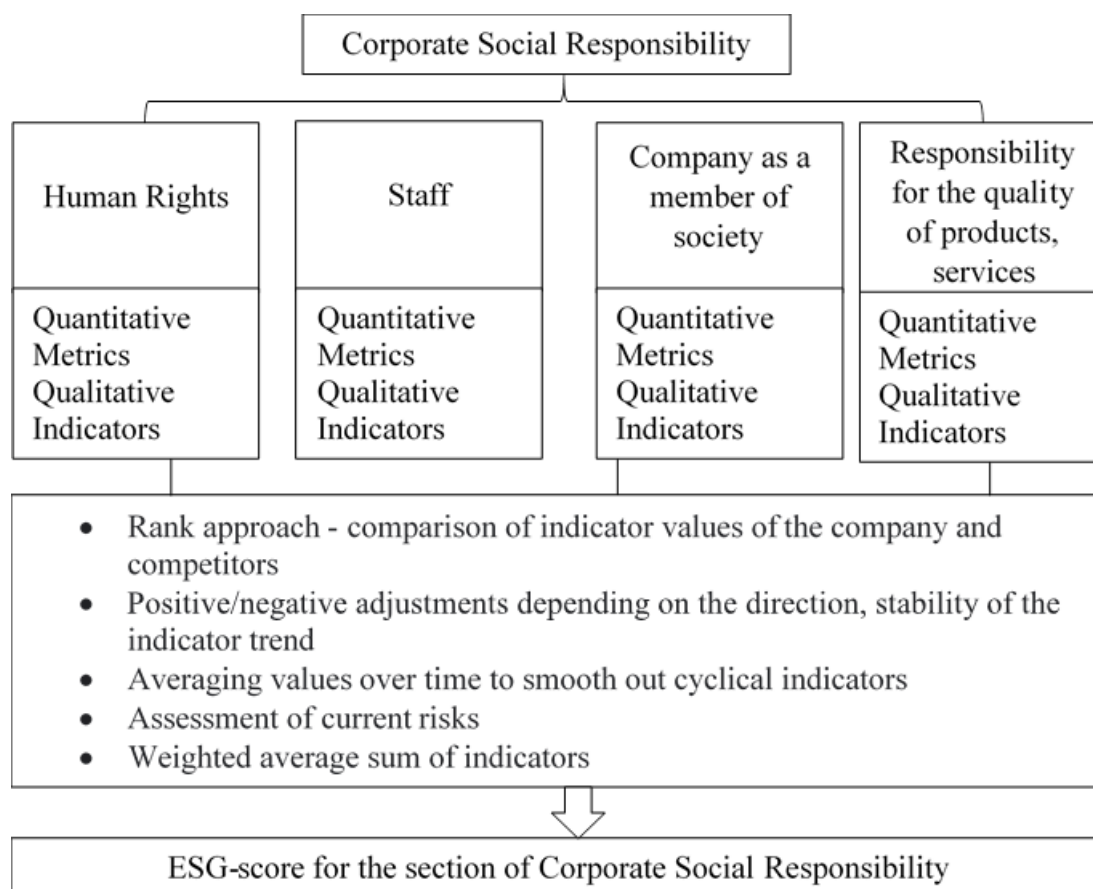
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## APPENDIX A

The methodology for calculating the ESG-score for the social pillar



## APPENDIX B

Table B. Calculation of VAIC for sample of multinational enterprises

Name	ES G 202 0	ES G 202 1	ES G 202 2	VAI C 202 0	VAI C 202 1	VAI C 202 2	SIZ E 202 0	SIZ E 202 1	SIZ E 202 2	LE V 202 0	LE V 202 1	LE V 202 2	2022		
													E sco re	S sco re	G sco re
Amazon	21	24	20	2,5	2,2	1,7	5,5	5,6	5,7	0,7	0,7	0,7	25	14	24
Toyota Motor	49	40	45	2,4	2,4	2,6	5,6	5,7	5,7	0,6	0,6	0,6	52	43	41
Alphabet	40	44	46	2,5	3,2	2,9	5,5	5,6	5,6	0,3	0,3	0,3	74	42	36
Microsoft	58	58	56	3,2	3,6	3,7	5,5	5,5	5,6	0,6	0,6	0,5	79	43	56
Walmart	39	49	51	2,2	2,3	2,4	5,4	5,4	5,4	0,7	0,7	0,6	67	34	55
Tencent Holdings	26	34	48	3,0	2,6	2,4	5,3	5,4	5,4	0,4	0,5	0,5	59	50	39
Total (TotalEnergies SE)	69	70	77	8,3	10,8	13,9	5,4	5,5	5,5	0,6	0,6	0,6	80	78	75
Comcast	41	40	28	2,0	2,1	2,1	5,4	5,4	5,4	0,7	0,6	0,7	44	17	37
Alibaba Group	19	14	26	2,4	2,0	2,0	5,3	5,4	5,4	0,3	0,4	0,4	29	20	31
Meta Platforms	14	18	24	2,8	3,1	2,5	5,2	5,2	5,3	0,2	0,2	0,3	61	17	12
Mercedes- Benz Group	25	33	37	1,8	1,4	2,5	5,5	5,5	5,5	0,8	0,7	0,7	44	36	31
Nestlé	72	48	39	2,4	2,3	2,4	5,1	5,2	5,2	0,6	0,6	0,7	52	28	39
BP	48	49	46	16,5	2,5	5,2	5,4	5,4	5,5	0,7	0,7	0,7	51	34	54
Nippon Telegraph & Tel	84	79	84	11,1	11,2	11,0	5,2	5,2	5,2	0,5	0,6	0,6	84	86	82
Reliance Industries	39	22	24	2,7	2,6	3,0	5,1	5,2	5,3	0,6	0,4	0,4	15	25	30
Sony	43	36	41	1,9	1,9	2,0	5,2	5,3	5,3	0,8	0,8	0,8	70	34	23
Ford Motor	27	34	37	0,5	1,6	1,8	5,4	5,4	5,4	0,9	0,8	0,8	43	27	41
Procter & Gamble	60	58	49	2,7	2,8	2,8	5,1	5,1	5,1	0,6	0,6	0,6	59	33	58
Petrobras	68	74	71	4,8	8,4	11,4	5,3	5,3	5,3	0,7	0,6	0,6	71	84	57
Deutsche Telekom	89	91	94	7,2	9,5	7,7	5,5	5,5	5,5	0,7	0,7	0,7	93	96	91
PepsiCo	32	34	42	2,2	2,3	2,3	5,0	5,0	5,0	0,9	0,8	0,8	55	35	38
Merck & Co.	39	38	43	2,4	2,7	2,9	5,0	5,0	5,0	0,7	0,6	0,6	51	40	45
Anheuser- Busch InBev	24	28	31	2,5	2,5	2,5	5,3	5,3	5,3	0,7	0,6	0,6	42	27	27
Walt Disney	26	28	41	1,6	1,6	1,8	5,3	5,3	5,3	0,5	0,5	0,5	57	32	47

United Parcel Service	58	59	43	2,4	5,1	3,8	4,8	4,8	4,9	1,0	0,8	0,7	46	36	50
Mitsubishi	36	36	43	1,6	1,4	2,0	5,1	5,1	5,2	0,7	0,6	0,6	63	47	27
Raytheon Technologies	19	16	31	1,4	2,1	2,1	5,2	5,2	5,2	0,5	0,5	0,5	38	32	26
Bristol Myers Squibb	33	35	36	1,7	2,2	2,2	5,1	5,0	5,0	0,7	0,7	0,7	44	28	43
Oracle	32	37	35	2,7	2,8	2,8	5,1	5,1	5,0	0,9	1,0	1,1	51	26	35
Thermo Fisher Scientific	22	22	36	2,7	2,9	2,5	4,8	5,0	5,0	0,5	0,6	0,5	62	29	36
Costco Wholesale	17	20	19	2,4	2,5	2,5	4,7	4,8	4,8	0,7	0,7	0,7	25	9	28
BASF	37	49	50	1,9	2,3	2,2	5,0	5,0	5,0	0,6	0,5	0,5	59	44	45
Iberdrola	87	89	87	19,8	21,7	21,0	5,1	5,2	5,2	0,6	0,6	0,6	86	90	86
Hitachi	53	57	41	2,0	1,8	2,0	4,8	4,9	5,0	0,6	0,6	0,6	59	33	34
Visa	63	62	65	7,8	8,5	8,9	4,9	4,9	4,9	0,6	0,5	0,6	85	60	59
Tesla	15	27	37	1,9	2,7	4,0	4,7	4,8	4,9	0,5	0,5	0,4	60	20	34
Deere & Company	24	41	46	2,7	3,6	3,5	4,9	4,9	5,0	0,8	0,8	0,8	43	43	50
Danaher	19	32	40	2,1	2,5	2,6	4,9	4,9	4,9	0,5	0,5	0,4	49	31	46
Lowe's	45	48	44	2,6	3,0	3,2	4,6	4,7	4,7	1,0	1,0	1,1	50	31	53
FedEx	32	35	31	1,7	2,1	2,1	4,9	4,9	4,9	0,8	0,7	0,7	42	20	36
Lockheed Martin	74	72	69	8,6	8,2	7,2	4,7	4,7	4,7	0,9	0,8	0,8	74	61	71
Dell Technologies	36	41	34	1,7	1,8	2,1	5,1	5,1	5,0	1,0	0,8	1,0	46	21	38
Honeywell International	22	25	31	2,9	2,9	3,0	4,8	4,8	4,8	0,7	0,7	0,7	35	18	37
China Telecom	25	31	34	2,0	1,9	1,9	5,0	5,1	5,1	0,5	0,4	0,5	47	33	27
Telefónica	79	87	86	9,9	8,3	7,0	5,1	5,1	5,1	0,9	0,8	0,8	87	90	81
China Vanke	15	39	45	4,6	3,3	3,5	5,5	5,5	5,4	0,8	0,8	0,8	47	45	43
SAIC Motor	4	12	15	1,7	1,6	1,5	5,1	5,1	5,1	0,7	0,6	0,6	9	20	16
Nike	56	30	29	2,1	2,6	2,5	4,5	4,6	4,6	0,7	0,7	0,6	39	19	32
Eli Lilly	29	33	41	2,5	2,5	2,7	4,7	4,7	4,7	0,9	0,8	0,8	61	35	43
General Electric	28	31	36	1,6	2,0	1,9	5,4	5,3	5,3	0,9	0,8	0,8	36	32	40
CK Hutchison	21	24	32	3,7	3,0	2,9	5,2	5,2	5,2	0,5	0,5	0,4	23	30	39
Freeport-McMoRan	58	69	74	7,7	22,8	20,4	4,6	4,7	4,7	0,6	0,5	0,5	76	73	74
Merck KGaA	38	39	43	2,1	2,3	2,4	4,7	4,7	4,7	0,6	0,5	0,5	64	40	42
Volvo Group (AB Volvo (publ))	28	35	35	2,2	2,6	2,5	4,7	4,7	4,8	0,7	0,7	0,7	39	35	32

McKesson	30	27	24	2,2	2,3	2,3	4,8	4,8	4,8	0,9	1,0	1,0	27	30	15
Novo Nordisk	40	40	58	4,0	3,8	3,8	4,3	4,5	4,6	0,6	0,6	0,7	67	52	62
Ecopetrol	66	68	76	3,2	5,6	5,7	4,5	4,8	4,9	0,6	0,6	0,6	63	86	80
LyondellBasell Industries	28	30	47	3,4	7,5	5,6	4,5	4,6	4,6	0,8	0,7	0,6	45	41	56
Contemporary Amperex Technology	1	14	51	2,9	3,8	3,4	4,3	4,6	4,9	0,5	0,7	0,7	48	46	58
EssilorLuxottica	29	45	41	1,4	1,7	1,8	4,8	4,8	4,8	0,4	0,4	0,4	42	41	41
Starbucks	47	49	40	2,5	4,4	4,1	4,5	4,5	4,4	1,3	1,2	1,3	56	29	46
Nucor	11	20	23	4,6	7,9	7,5	4,3	4,4	4,5	0,4	0,4	0,4	24	15	31
TJX Cos	27	28	29	2,7	1,5	2,6	4,4	4,5	4,5	0,8	0,8	0,8	39	17	35
Tesco	65	73	59	3,3	2,9	3,1	4,8	4,8	4,8	0,7	0,7	0,7	72	49	58
BOE Technology Group	27	24	23	2,4	4,5	1,1	4,8	4,8	4,8	0,6	0,5	0,5	25	28	18
Marubeni	67	50	38	1,6	1,6	2,0	4,6	4,7	4,8	0,8	0,8	0,7	49	44	26
Automatic Data Processing	29	30	31	3,1	3,0	3,4	4,6	4,7	4,8	0,9	0,9	0,9	38	17	41
Tyson Foods	32	33	47	3,4	4,1	3,8	4,5	4,6	4,6	0,6	0,5	0,5	49	52	39
Sumitomo	25	37	39	1,6	1,2	2,0	4,8	4,8	4,8	0,7	0,7	0,6	63	36	30
Zijin Mining Group	17	37	54	5,1	6,4	6,0	4,4	4,5	4,7	0,6	0,6	0,6	57	54	52
Richemont (Compagnie Financière Richemont SA)	26	31	30	1,8	1,7	2,1	4,6	4,6	4,7	0,4	0,5	0,5	37	25	31
Danone	69	57	52	2,1	2,0	2,0	4,7	4,7	4,7	0,6	0,6	0,6	67	47	41
Nippon Steel	22	24	30	1,2	1,5	3,0	4,7	4,7	4,8	0,6	0,6	0,6	28	33	30
Couche Tard	9	21	24	2,3	2,5	2,4	4,4	4,4	4,5	0,6	0,6	0,6	18	21	35
Becton Dickinson	48	46	45	1,8	1,9	1,9	4,7	4,7	4,7	0,6	0,6	0,5	51	42	46
Panasonic	31	28	38	1,9	1,9	1,8	4,6	4,7	4,7	0,7	0,6	0,6	64	31	24
Paramount	10	23	36	2,5	2,2	1,9	4,7	4,8	4,8	0,7	0,6	0,6	57	30	33
Indian Oil	19	37	57	2,4	3,7	3,7	4,6	4,6	4,7	0,7	0,7	0,7	69	58	45
Dollar General	14	17	19	2,1	2,3	2,2	4,4	4,5	4,5	0,7	0,8	0,8	12	15	28
Kraft Heinz Company	62	58	59	3,3	3,1	2,9	5,0	5,0	5,0	0,5	0,5	0,5	64	51	62
CSX	65	63	67	42,6	41,8	40,9	4,6	4,6	4,6	0,7	0,7	0,7	74	58	73

Woolworths															
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	42	45	36	1,9	2,4	2,1	4,4	4,4	4,4	0,8	1,0	0,8	36	32	43
Anhui Conch Cement	10	18	29	6,7	6,0	3,3	4,5	4,6	4,6	0,2	0,2	0,2	25	29	32
Fiserv	22	33	40	1,8	1,9	2,2	4,9	4,9	4,9	0,6	0,6	0,6	32	27	57
ENEOS Holdings	34	34	38	1,0	1,8	2,5	4,7	4,8	4,8	0,7	0,7	0,7	49	36	29
Tata Consultancy Services	73	76	73	5,1	6,3	6,3	4,2	4,2	4,2	0,3	0,3	0,4	92	70	66
OMV Group	72	73	73	1,9	4,1	7,1	4,8	4,8	4,8	0,7	0,7	0,6	70	74	75
American Tower	18	33	45	5,6	6,0	4,7	4,7	4,8	4,8	0,9	0,9	0,8	47	42	46
Haier Smart Home	11	14	23	2,1	2,2	2,2	4,5	4,5	4,5	0,7	0,6	0,6	25	25	18
Eaton	32	34	35	2,4	2,5	2,6	4,5	4,5	4,5	0,5	0,5	0,5	37	22	44
BT Group	39	41	46	6,1	7,1	6,4	4,8	4,8	4,8	0,7	0,8	0,7	67	41	40
CRRC	6	11	12	1,9	2,0	1,8	4,8	4,8	4,8	0,6	0,6	0,6	13	11	11
Mitsubishi Electric	43	45	46	1,9	1,8	1,8	4,5	4,5	4,6	0,4	0,4	0,4	56	39	43
Toyota Tsusho	22	35	39	2,1	2,1	2,4	4,5	4,6	4,6	0,7	0,7	0,7	59	36	32
Canon	56	56	55	1,6	1,8	1,9	4,5	4,5	4,6	0,4	0,3	0,3	78	45	46
Emerson Electric	25	24	32	2,5	2,5	2,6	4,4	4,4	4,6	0,6	0,6	0,5	35	22	38
Pernod Ricard	34	37	44	2,4	2,5	2,6	4,5	4,5	4,6	0,5	0,5	0,5	61	47	28
Sysco	25	26	30	1,9	2,0	2,4	4,4	4,3	4,3	0,9	0,9	0,9	35	19	38
Orsted	30	33	35	0,2	2,7	1,6	4,5	4,6	4,7	0,6	0,8	0,8	47	23	33
Lam Research	55	57	63	3,4	4,1	4,5	4,2	4,2	4,2	0,6	0,6	0,6	53	68	67
Baidu	8	39	41	1,8	1,6	1,8	4,7	4,8	4,8	0,4	0,4	0,4	45	45	36
DSV A/S	39	46	53	2,3	5,7	6,4	4,2	4,4	4,4	0,5	0,5	0,5	57	48	56
Sherwin- Williams	22	26	26	2,4	2,4	2,4	4,3	4,3	4,4	0,8	0,9	0,9	26	17	35
Prologis	68	70	73	5,3	7,0	8,0	4,7	4,8	4,9	0,4	0,4	0,3	77	73	67
Carrier Global	21	34	38	2,3	2,4	2,5	4,4	4,4	4,4	0,7	0,7	0,7	34	33	50
CSL	32	31	34	3,0	3,1	2,8	4,2	4,2	4,4	0,6	0,5	0,5	32	30	39
Keurig Dr Pepper	19	33	36	2,4	2,4	2,3	4,7	4,7	4,7	0,5	0,5	0,5	45	30	33
Toyota Industries	27	36	29	1,7	1,6	1,7	4,6	4,7	4,7	0,5	0,5	0,5	48	20	22
Bharti Airtel	63	78	78	2,8	9,0	5,1	4,6	4,6	4,6	0,7	0,8	0,7	75	77	80

Henkel	37	37	40	2,0	2,0	1,9	4,5	4,6	4,6	0,4	0,4	0,4	63	34	34
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Intuit	27	42	45	2,7	2,4	2,0	4,0	4,2	4,4	0,5	0,4	0,4	52	40	46
NetEase	18	39	49	2,4	2,3	2,4	4,3	4,4	4,4	0,3	0,4	0,4	31	54	53
Lenovo Group	57	49	40	2,3	2,4	2,7	4,5	4,6	4,7	0,9	0,9	0,9	60	24	39
George Weston	22	33	31	1,8	2,2	2,0	4,6	4,6	4,6	0,7	0,7	0,7	36	21	38
Parker-Hannifin	30	34	37	3,1	3,4	3,7	4,3	4,3	4,4	0,7	0,6	0,7	40	29	40
Imperial Brands	39	39	42	3,5	3,8	3,5	4,6	4,6	4,6	0,8	0,8	0,8	51	37	40
Mitsui Fudosan	18	31	37	1,9	1,1	1,4	4,7	4,7	4,8	0,7	0,7	0,6	50	30	28
Inpex	66	69	68	7,2	13,6	21,1	4,5	4,6	4,6	0,4	0,4	0,4	66	77	61
Canadian Pacific Kansas City	66	73	75	25,4	29,3	26,1	4,3	4,7	4,7	0,7	0,5	0,5	76	74	76
Compass Group	51	32	29	1,7	1,8	2,1	4,3	4,3	4,4	0,7	0,7	0,7	45	16	38
Dollar Tree	15	20	18	2,0	2,1	2,0	4,3	4,3	4,3	0,7	0,6	0,6	18	12	26
Suzuki Motor	20	24	25	2,1	2,0	1,9	4,4	4,5	4,5	0,5	0,5	0,5	33	20	23
Hermès International	26	28	45	3,1	3,7	4,0	4,1	4,2	4,3	0,3	0,3	0,3	58	40	42
Bouygues	38	42	41	2,0	1,7	1,2	4,6	4,7	4,8	0,7	0,7	0,8	49	36	38
Longi Green Energy Technology	10	15	23	5,9	4,8	3,4	4,1	4,1	4,3	0,6	0,5	0,6	29	24	19
Thales	70	63	39	1,8	2,0	2,1	4,5	4,6	4,6	0,8	0,8	0,8	32	46	39
Walgreens Boots Alliance	55	52	54	1,7	1,8	1,6	4,9	4,9	5,0	0,8	0,7	0,7	49	56	58
Kuehne & Nagel International	48	48	44	2,8	4,7	5,1	4,0	4,2	4,2	0,8	0,8	0,7	70	29	43
NXP Semiconductors	25	34	34	1,4	2,7	3,1	4,3	4,3	4,4	0,5	0,7	0,7	35	34	33
Halliburton	53	61	68	9,5	10,9	14,9	4,3	4,3	4,4	0,8	0,7	0,7	56	72	73
Kimberly-Clark	27	28	29	3,2	2,9	2,7	4,2	4,3	4,3	0,9	1,0	0,9	48	17	30
Teck Resources	89	83	81	5,0	12,8	14,4	4,5	4,6	4,6	0,5	0,5	0,5	82	81	81
MediaTek	27	31	33	2,2	2,9	3,0	4,2	4,3	4,3	0,3	0,3	0,3	33	42	28
Illinois Tool Works	37	41	38	3,3	3,5	3,6	4,2	4,2	4,2	0,8	0,8	0,8	48	18	45
Advanced Micro Devices	31	35	33	2,4	3,3	1,6	4,0	4,1	4,8	0,3	0,3	0,1	46	21	31
Bunge	34	42	32	4,1	5,3	3,9	4,4	4,4	4,4	0,5	0,4	0,4	32	23	42

# Отчет о проверке на заимствования №1



Автор: Kalenova A.M.  
Проверяющий: Kalenova A.M.

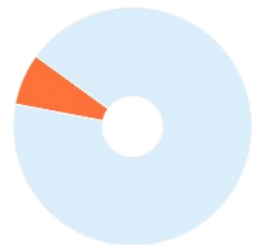
Отчет предоставлен сервисом «Антиплагиат» - <http://users.antiplagiat.ru>

## ИНФОРМАЦИЯ О ДОКУМЕНТЕ

№ документа: 99  
Начало загрузки: 25.06.2023 23:41:44  
Длительность загрузки: 00:00:20  
Имя исходного файла: Final thesis text.docx  
Название документа: Final thesis text  
Размер текста: 125 кБ  
Символов в тексте: 128137  
Слов в тексте: 18555  
Переводные заимствования по eLIBRARY.RU (EnRu), Переводные заимствования Число предложений: 742 по Интернету (EnRu), Переводные заимствования издательства Wiley ,

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Начало проверки: 22.06.2023 23:42:05  
Длительность проверки: 00:01:58  
Комментарии: не указано  
Поиск с учетом редактирования: да  
Проверенные разделы: основная часть с. 1-59  
Модули поиска: ИПС Адилет, Библиография, Сводная коллекция ЭБС, Интернет Плюс\*, Сводная коллекция РГБ, Цитирование, Переводные заимствования (RuEn),  
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СОВПАДЕНИЯ 7,09%   
САМОЦИТИРОВАНИЯ 0%   
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Совпадения — фрагменты проверяемого текста, полностью или частично сходные с найденными источниками, за исключением фрагментов, которые система отнесла к цитированию или самоцитированию. Показатель «Совпадения» — это доля фрагментов проверяемого текста, отнесенных к совпадениям, в общем объеме текста.

Самоцитирования — фрагменты проверяемого текста, совпадающие или почти совпадающие с фрагментом текста источника, автором или соавтором которого является автор проверяемого документа. Показатель «Самоцитирования» — это доля фрагментов текста, отнесенных к самоцитированию, в общем объеме текста.

Цитирования — фрагменты проверяемого текста, которые не являются авторскими, но которые система отнесла к корректно оформленным. К цитированиям относятся также шаблонные фразы; библиография; фрагменты текста, найденные модулем поиска «СПС Гарант: нормативно-правовая документация». Показатель «Цитирования» — это доля фрагментов проверяемого текста, отнесенных к цитированию, в общем объеме текста.

Текстовое пересечение — фрагмент текста проверяемого документа, совпадающий или почти совпадающий с фрагментом текста источника.

Источник — документ, проиндексированный в системе и содержащийся в модуле поиска, по которому проводится проверка.

Оригинальный текст — фрагменты проверяемого текста, не обнаруженные ни в одном источнике и не отмеченные ни одним из модулей поиска. Показатель «Оригинальность» — это доля фрагментов проверяемого текста, отнесенных к оригинальному тексту, в общем объеме текста.

«Совпадения», «Цитирования», «Самоцитирования», «Оригинальность» являются отдельными показателями, отображаются в процентах и в сумме дают 100%, что соответствует полному тексту проверяемого документа.

Обращаем Ваше внимание, что система находит текстовые совпадения проверяемого документа с проиндексированными в системе источниками. При этом система является вспомогательным инструментом, определение корректности и правомерности совпадений или цитирований, а также авторства текстовых фрагментов проверяемого документа остается в компетенции проверяющего.

№	Доля в тексте	Источник	Актуален на	Модуль поиска	Комментарии
[01]	2,01%	<a href="https://mdpi-res.com/d_attachment/sustainability/sustainability-14-0...">https://mdpi-res.com/d_attachment/sustainability/sustainability-14-0...</a> <a href="https://mdpi-res.co m">https://mdpi-res.co m</a>	16 Июнь 2023	Интернет Плюс *	
[02]	1,92%	<a href="https://mdpi-res.com/d_attachment/sustainability/sustainability-14-0...">https://mdpi-res.com/d_attachment/sustainability/sustainability-14-0...</a> <a href="https://mdpi-res.co m">https://mdpi-res.co m</a>	24 Июнь 2023	Интернет Плюс *	
[03]	1,81%	<a href="http://icanig.org/ican/documents/CONFERENCE-PROCEEDINGS-2016. ...">http://icanig.org/ican/documents/CONFERENCE-PROCEEDINGS-2016. ...</a> <a href="http://icanig.or g">http://icanig.or g</a>	18 Сен 2020	Интернет Плюс *	
[04]	1,76%	Effects of intellectual capital and corporate governance on performanc ... <a href="https://core.ac.u k">https://core.ac.u k</a>	15 Июнь 2023	Интернет Плюс *	
[05]	1,66%	<a href="https://etheses.whiterose.ac.uk/7330/1/Andreea%20Bordianu%20%20 ...">https://etheses.whiterose.ac.uk/7330/1/Andreea%20Bordianu%20%20 ...</a> <a href="https://etheses.whiterose.ac.u k">https://etheses.whiterose.ac.u k</a>	16 Янв 2023	Интернет Плюс *	
[06]	0,86%	<a href="https://www.refinitiv.com/content/dam/marketing/en_us/documents...">https://www.refinitiv.com/content/dam/marketing/en_us/documents...</a> <a href="https://refinitiv.com">https://refinitiv.com</a>	10 Июнь 2023	Интернет Плюс *	Источник исключен. Причина: Маленький процент пересечения.
[07]	0,86%	<a href="https://www.refinitiv.com/content/dam/marketing/en_us/documents...">https://www.refinitiv.com/content/dam/marketing/en_us/documents...</a> <a href="https://refinitiv.com">https://refinitiv.com</a>	10 Июнь 2023	Интернет Плюс *	Источник исключен. Причина: Маленький процент пересечения.
[08]	0,79%	<a href="https://www.refinitiv.com/content/dam/marketing/en_us/documents...">https://www.refinitiv.com/content/dam/marketing/en_us/documents...</a> <a href="https://refinitiv.com">https://refinitiv.com</a>	21 Apr 2022	Интернет Плюс *	Источник исключен. Причина: Маленький процент пересечения.
[09]	0,6%	<a href="https://pdfs.semanticscholar.org/243b/747b896a211458952d56526b4...">https://pdfs.semanticscholar.org/243b/747b896a211458952d56526b4...</a> <a href="https://pdfs.semanticscholar.org">https://pdfs.semanticscholar.org</a>	29 Apr 2020	Интернет Плюс *	Источник исключен. Причина: Маленький процент пересечения.
[10]	0,59%	<a href="https://www.refinitiv.com/content/dam/marketing/en_us/documents...">https://www.refinitiv.com/content/dam/marketing/en_us/documents...</a> <a href="https://refinitiv.com">https://refinitiv.com</a>	21 Apr 2022	Интернет Плюс *	Источник исключен. Причина: Маленький процент пересечения.
[23]	0,08%	раньше 2011 Сводная коллекция ЭБ			