sciendo International Conference KNOWLEDGE-BASED ORGANIZATION
Vol. XXIX No 1 2023

MEASURING SUPPLY CHAIN PERFORMANCE FROM ESG PERSPECTIVE

Sebastian Emanuel STAN*, Mihail-Aurel ȚÎȚU, Gabriel MĂNESCU***
Florin Vasile ILIE*, Maria Lucia RUSU*

***"Nicolae Bălcescu" Land Forces Academy, Sibiu, Romania**
****"Lucian Blaga" University of Sibiu, Romania,**
Academy of Romanian Scientists, Bucharest, Romania
sebastian.stan@armyacademy.ro,mihail.titu@ulbsibiu.ro, manescug@armyacademy.ro,
ilieflorinv@yahoo.com, rusu.maria@armyacademy.ro

Abstract: *This paper aims to show the relationship between environmental, social, and governance (ESG) factors and the most common supply chain (SC) performance indicators within an organization. The main interest is to identify the challenges that organizations face when trying to gain a competitive advantage over other organizations by measuring supply chain efficiency and effectiveness. Therefore, the concepts and terms used are clarified in the first section, in a broader framework, to note their relevance in the context of the paper, but also the relationship between them. In the second section, scientific papers on this topic are briefly presented, which served as a scientific foundation and prompted us to undertake our study to contribute to the body of scientific knowledge on this little-addressed topic. In the third section of the research, we established a qualitative design, composed of qualitative data from secondary sources, which were obtained data through a literature review and analysed using the comparative-deductive method. The result is to propose a simplified model for measuring SC performance from an ESG perspective. In the conclusions, possible uses of this model are proposed, as well as future perspectives that could improve performance measurement by adding new indicators.*

Keywords: ESG, Supply chain, Management, Measuring performance

1. Introduction

The increasing complexity of global trade and the need to manage ever longer and more complex supply chains (SC) has taken the concept of supply chain management (SCM) to a higher stage, forming a high degree of its adaptability together with a broad conceptual approach. Supply chain management pertains to the synchronization and oversight of diverse activities encompassed in the manufacturing and transportation of commodities and amenities from providers to consumers. It includes processes such as sourcing, procurement, logistics, and inventory management. Supply chain management focuses on optimizing the entire supply chain, while logistics focuses on managing the physical movement of goods and materials.

Supply chain management performance is often constituted in indicators measuring efficiency and effectiveness. The most common are:

- The rate of perfection in orders, encompassing accuracy, punctuality of delivery, and the absence of damage; (*Perfect order rate)*

DOI: 10.2478/kbo-2023-0026

- The expenses incurred, inclusive of warehousing and storage, labour, and fulfilment; (*Costs)*
- The rate of orders, reflecting the proportion of orders that can be dispatched from the available stock without incurring sales losses, backorders, or stockouts; (*Order fill rate)*
- The duration of the cash-to-cash cycle, which serves as an indicator of the length of time required to generate revenue sufficient to offset the costs of goods sold. *(Cash-to-cash cycle time)* [1]

Environmental, Social, and Governance (ESG) refers to a set of criteria used to evaluate a company's performance in terms of its impact on the environment, society, and corporate governance. These factors are becoming increasingly important for investors, stakeholders, and customers who are interested in sustainable and responsible business practices. The acronym ESG represents the three pillars of Environmental, Social, and Governance. It is a framework utilized to evaluate a company's efficacy in domains that contribute to sustainability, including but not limited to environmental impact, social responsibility, and corporate governance practices.ESG criteria can be used by investors to make informed decisions about their investments, taking into account not only financial performance but also the social and environmental impact of a company [2].

The influence of Environmental, Social, and Governance (ESG) factors on supply chain management (SCM) is of great importance and continues to expand. Enterprises are progressively incorporating ESG standards into their purchasing and sourcing strategies, acknowledging the necessity of securing sustainable, socially responsible, and ethical supply chains. This entails tackling a spectrum of concerns, including human rights, labor standards, environmental impacts, and corruption [3].

By integrating ESG considerations into their SCM practices, companies can reduce their risk exposure, improve their reputation, and promote more sustainable and responsible supply chains. This can lead to benefits such as improved relationships with suppliers and customers, increased efficiency, reduced costs, and access to new markets. ESG has therefore become a key driver for companies to ensure that their supply chains are sustainable and resilient and to meet the expectations of stakeholders, who are increasingly concerned about the implications for business, society and the environment [2].

Environmental factors pertain to the environmental effects and risk mitigation approaches of an organization. These encompass both direct and indirect greenhouse gas discharges, the responsible management of natural resources by the leadership, and the company's comprehensive preparedness in the face of physical climate hazards such as climate change, floods, and wildfires. The environmental ramifications are conspicuously evident in all sectors. Notably, food and beverage corporations are vulnerable to the repercussions of climate change, given that shifts in meteorological patterns can substantially interrupt agricultural output [4].

By evaluating the robustness of supply chain resilience with respect to variables such as infrastructure, access to natural resources, financial capacity, and social welfare systems, among other factors, these enterprises can effectively surmount obstacles and cultivate enhanced supply chains [5].

The social pillar pertains to an entity's associations with its stakeholders. A business may be evaluated based on various factors, including human capital management metrics such as equitable remuneration and employee involvement, as well as the organization's influence on the communities it serves. Notably, the

expansion of social impact expectations beyond corporate boundaries to encompass supply chain collaborators, especially in developing nations where environmental and labor standards are comparatively weak, is a hallmark of ESG. Establishing an ethical supply chain is extremely important to ensure corporate social responsibility and adherence to a supplier code of conduct. It is imperative that the working environment for workers is congenial and does not violate fundamental human rights. As such reputable companies, which outsource their production of products to other countries for cheaper labor, have come under scrutiny in terms of working conditions and wages for their employees [6]. Consumers are increasingly articulating an amplified demand for transparency and traceability in supply chains, particularly when there are instances of social malfunctions. An instance is the emergence of forced and child labor in the manufacture of globally traded commodities [7]. Forced labor, defined as labor that is involuntary or coerced, is prevalent in diverse industries, frequently upstream in the supply chain, with a restricted degree of transparency [8] to buyers, customers and end-users [9].

Corporate governance pertains to the leadership and management of an organization. ESG analysts endeavour to gain deeper insight into the congruence between leadership's incentives and stakeholder expectations, the perception of shareholder rights and their adherence, and the nature of internal controls designed to foster transparency and accountability on the part of leadership. The practices of governance that are employed within global supply chains hold the potential to give rise to risks that may impact the sustainability of these supply chains. These risks may arise due to a combination of social and environmental factors. The notion of governance encompasses a set of guidelines and procedures that are applicable to both countries and corporations alike. Buyers tend to subject their respective supply chains to thorough scrutiny to ensure that appropriate governance practices are put in place. Such practices may include but do not remain limited to, aspects such as a company's purpose, the role, and composition of boards of directors, shareholder rights, and the methodology employed to measure corporate performance [10].

In this section, we have clarified the concepts and terms used, to clear up some of the confusion about them. The second section includes approaches to the concepts from the perspective of scientific works and beyond, to highlight the importance of our study. The third section includes the research design, the objective, the hypothesis, the way of data processing and the results of the study, presented in the table. The last section clarifies the applicability of the research and the development of the highlighted elements.

2. Literature review

The development of frameworks and methods for measuring supply chain performance is addressed in various research papers, leading to different qualitative and quantitative models. Authors who have conducted comprehensive research on this topic have presented a classification system that allows mapping and evaluating research in this area. This addresses the need for a methodological and topological approach to creating frameworks and methodologies for supply chain performance assessment [11]. A comprehensive review was conducted to examine the literature on supply chain performance measurement and existing solutions. The study therefore aims to provide a summary of the different systems, approaches, techniques, and criteria used in this area. Findings from the literature review suggest that there remains significant potential for further research in the area of performance measurement in

the context of supply chains [12]. Within more contemporary methodologies that demonstrate the relevance of the topic, a scholarly article in this area fortifies previous investigations by providing an exposition and framework that elucidates how the newly established accounting scrutiny can be adapted and implemented at the supply chain level for sustainable supply chains and performance measurement. This preliminary investigation is a key study that holds substantial insights [13]. As the realm of Industry 4.0 technologies and their impact on supply chains burgeons exponentially, it offers invaluable insights yet also a considerable amount of fragmentation. A particular research group suggests that there still exists a dearth of systematic literature reviews (SLR) that (a) encompass multiple core Industry 4.0 technologies at once, (b) articulate their positive and negative effects on the overall supply chain performance, and (c) account for the crucial success factors that either facilitate or hinder these effects. As a result, this paper contributes to the establishment of an incremental knowledge base by conducting an SLR that synthesizes 221 published articles on 11 Industry 4.0 technologies from 2005 to 2021, and by integrating the outcomes into a comprehensive framework of Industry 4.0 supply chain performance. The result is presented in Figure 1 [14].

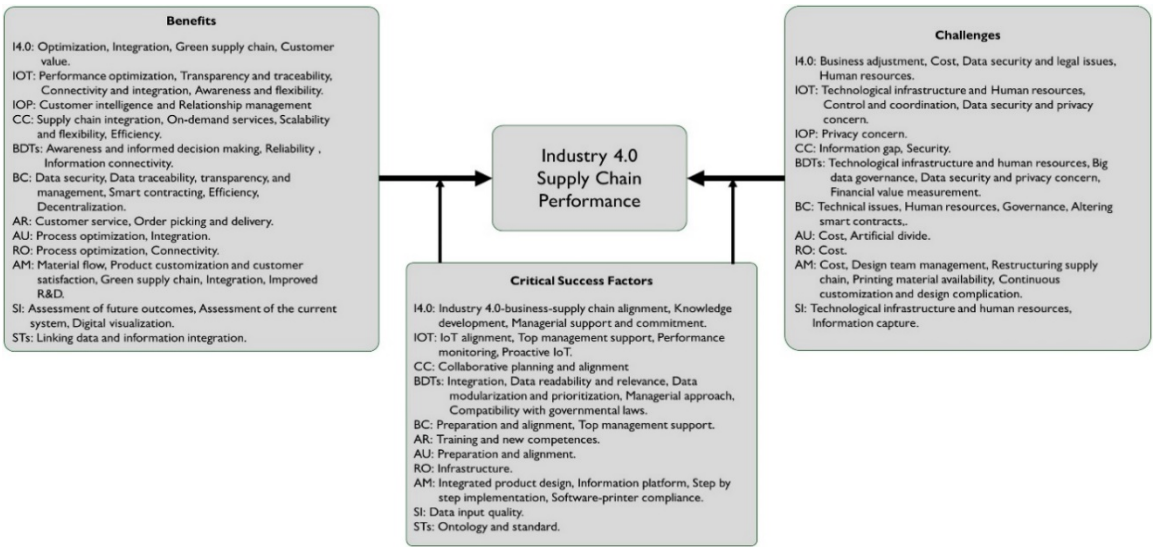

Figure 1: Framework of the benefits, challenges, and critical success factors regarding supply chain performance in Industry 4.0.
Source: [14]

The practices pertaining to Environmental, Social, and Governance, can exert a notable influence on a company's supply chain management. For example, if a company adopts the use of child labour in its manufacturing process, it is likely to encounter a negative impact on its reputation when this is uncovered by consumers. The consequence of this could be a decrease in sales and a feeble financial performance overall. On the other hand, a company that adheres to strong ESG practices can cultivate a favorable reputation with customers, which can result in an increase in sales and the creation of long-term shareholder value 0. The investigation into the correlation linking ESG (environmental, social and governance) and green supply chain performance indicates that operational

performance bears the greatest significance. Subsequently, environmental performance trails as the second most pertinent factor, while profitability proves to be the least influential. These findings imply that it would be advisable for managers to prioritize governance and environmental considerations over short-term financial gains [16]. Some research presents a comprehensive supply chain assessment model that considers the financial and sustainability performance of organizations within supply chains, incorporating ESG indicators, and the model has the potential to be highly beneficial for small and medium-sized enterprises seeking growth opportunities and can be easily adopted by both financial institutions and individual companies [17]. Yaoyao Hua, shows that corporate ESG performance has a positive impact on green supply chain, and notes that government subsidies have a negative moderating effect, but points out that integrating ESG into the process can play a key role in balancing economic, environmental and social benefits, ensuring their equal consideration [18]. The evaluation of Supply Chain Management (SCM) holds a paramount status in public management and public policy, serving as an integral component of the performance management procedure. The escalating cognizance of matters concerning climate change, human resources, and corporate governance has prompted the prerequisite to encompass environmental, social, and corporate governance (ESG) performance metrics in the annual publications of public organizations [19]. The implementation of ESG performance indicators promotes socially responsible investment decisions among investors [20]. The correlation between environmental, social and corporate governance (ESG) performance indicators and financial performance measures in the public sector was shown. The findings indicate that service quality, program effectiveness, customer responsiveness and operations of public enterprises can be improved through performance measurement systems; however, it should be noted that such systems are not a panacea for all problems and challenges. Moreover, in the case of public organizations, the correlation between ESG indicators and financial performance is not directly and positively linked [21]. It is therefore essential to strike a balance between investment in environmental protection, social welfare and corporate governance and financial performance to ensure long-term stability [22]. Thus, it is found that ESG controversies do not have a direct effect on firm value, while the interaction seems to be very positive and significant [23].

By studying the literature and the elements covered so far, we aim to bring a simplified approach to measuring how ESG influences organization's supply chain.

3. Research

At the level of organisations, economic and financial performance measurement is abundant, but there are gaps in ESG measurement at the CS level [24]. Therefore, we believe that a new proposal to measure the most common indicators at the SC level using ESG elements would be useful to help investors interested in investing in companies, as well as strategic managers seeking to improve supply chain performance through an ESG perspective [25].

The aim of this study is to show the relationship between ESG factors and key operational indicators within an organisation.

We hypothesized that measuring supply chain performance through perfect order rate, lower costs, order fulfilment rate and shorter cash-to-cash cycle time can be improved with ESG indicators that can be grouped and highlighted.

3.1 Methods

Data collection process:

The data used for this study are qualitative secondary data obtained through literature review. The main interest being to identify the challenges faced by organizations when

seeking to gain a competitive advantage over other organizations by measuring the efficiency and effectiveness of the supply chain.

Data analysis techniques:

Qualitative data collected from the literature review was comparatively and deductive analysed, with the result of proposing a simplified model for measuring performance from an ESG perspective.

To begin with, based on information from the literature, which we considered in the previous part of the paper, we identified the most common components and subcomponents of the supply chain [14][25][26][27][28]. The identified links of the supply chain deserve special attention as they lead to organizational performance and hence to a competitive advantage over other organizations. We then added how the economic, social, and governance components interact with the supply chain indicators. Lastly, we came up with a proposal of some commonly encountered ESG sub-indicators that we believe affect the indicators that measure supply chain performance, which we grouped in a table for easier observation.

Figure 1 shows the supply chain and its components and most common.

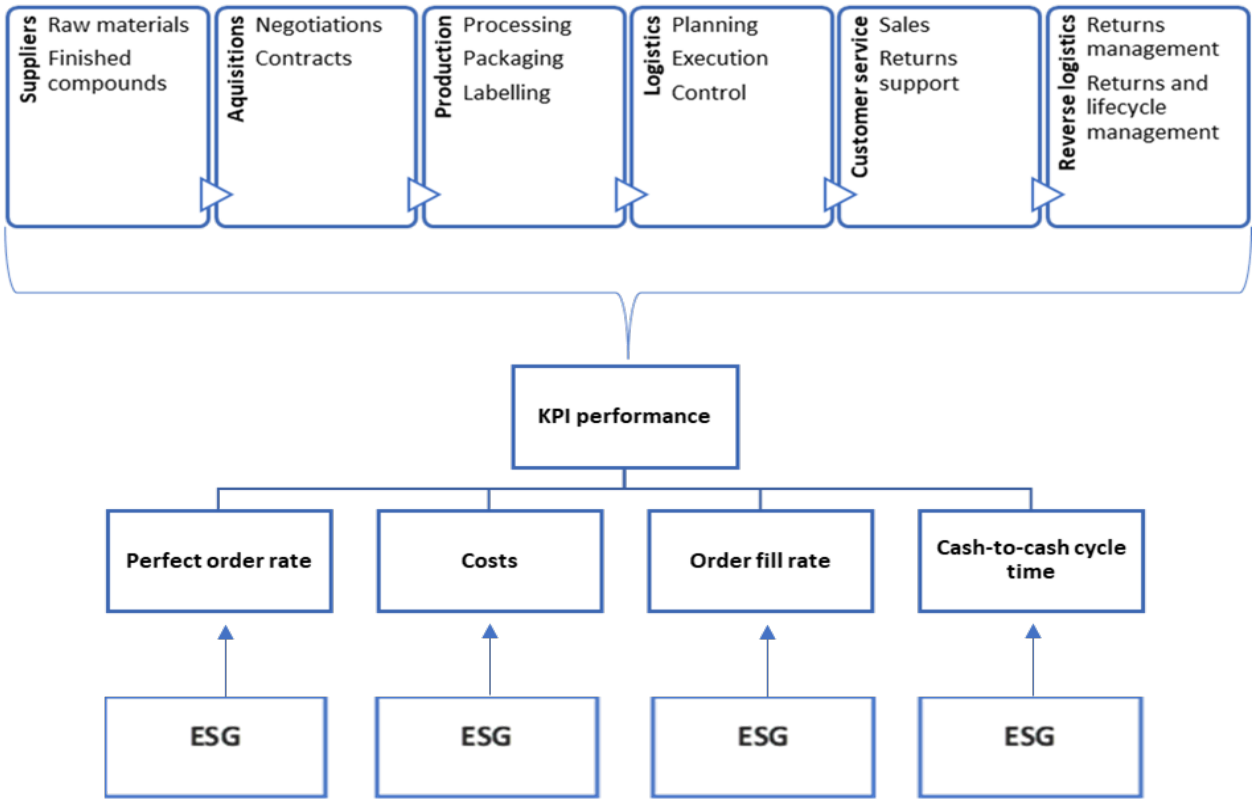

Figure 2: Components and subcomponents of SC and most common KPI -ESG affecting KPI indicators of SC.
Source: Author's

In this figure, we have an overview of the components of the Supply Chain but also common indicators measuring it. In Table 1, we present some proposals for assessing supply chain performance from the perspective of using ESG sub-indicators grouped by business areas. We point out that sub-indicators can be used either in this way in research by taking qualitative data for example in an interview, or they can be given values through different measurement scales in which the data are

converted quantitatively.

Table 1. Proposed ESG sub-indicators for measuring Supply Chain performance

SC-KPI	ESG-KPI
Perfect Order Rate	Economic: Supply chain efficiency, production capacity
	Social: Quality control processes, employee training
	Governance: Management practices, performance metrics
Costs	Economic: Input prices, labor costs
	Social: Employee benefits, workplace safety
	Governance: Cost management, supply chain practices
Order Fill Rate	Economic: Customer demand, sales and marketing
	Social: Customer service, brand reputation
	Governance: Sales strategy, management practices
Cash-to-Cash Cycle Time	Economic: Inventory management, payment terms
	Social: Supplier relationships, vendor management
	Governance: Financial reporting, risk management

Source: Author's

In terms of achieving a flawless order rate, the ideal orderliness quotient can be influenced by a multitude of economic and social factors. The efficiency of the supply chain and production capacity plays a crucial role in determining the perfect order rate. Companies that have adeptly designed and optimized supply chains, along with a robust production capacity, are more likely to achieve a higher perfect order rate. Moreover, social factors such as quality control processes and employee training can also affect the perfect order rate. Companies that have implemented effective quality control processes and have well-trained. employees are more likely to produce high-quality products that meet customer expectations. Governance factors, such as management practices and performance indicators, can also impact the perfect order rate by providing a framework for continuous improvement. Costs represent a crucial factor that can exert a significant influence on a company's profitability and competitiveness. Among the economic factors that can affect costs, noteworthy mentions include input prices and labour costs. Companies that can skilfully manage input costs and optimize their labour productivity are more likely to achieve cost reductions. On the other hand, social factors such as employee benefits and workplace safety can also impact costs. Companies that provide attractive employee benefits and maintain a safe workplace tend to have highly motivated and productive employees who are less likely to miss work due to illnesses or injuries. Furthermore, governance factors, including cost management and supply chain practices, can also exert an influence on costs. These factors enable companies to efficiently control spending and manage relationships with suppliers. The measure of the percentage of customer orders that are filled and shipped within a specified time frame is referred to as the order fill rate. Economic factors that may have an impact on the order fill rate are customer demand, sales, and marketing efforts. Companies that effectively evaluate customer demand and implement strategies that are effective in sales and marketing are more likely to have a higher order fulfillment rate. Social factors that may have an impact on order fulfillment rates include customer service and brand reputation. Companies that provide exceptional customer service and

have a strong brand reputation are more likely to retain customers and generate repeat business. The duration of the cash-to-cash cycle time is a metric that gauges the time a business requires to convert its inventory investments and other assets into revenue from customer sales. Factors that can affect the cash-to-cash cycle time from an economic perspective are inventory management and payment terms. Companies that efficiently handle their inventory levels and secure favourable payment terms from suppliers are more likely to have a shorter cash-to-cash cycle time. Social aspects that can impact the cash-to-cash cycle time involve supplier relationships and vendor management. Companies that cultivate robust relationships with their suppliers and skilfully manage their vendors are more likely to have an uninterrupted supply chain and a shorter cash-to-cash cycle time. Governance factors, such as financial reporting and risk management, also have a bearing on cash-to-cash cycle time by offering insight into cash flow and playing a role in managing financial risks.

4. Conclusions

The analysis suggests that supply chain efficiency, production capacity, quality control processes, employee training, management practices and performance indicators are key factors in improving the perfect order rate. Meanwhile, input prices, labour costs, employee benefits, workplace safety, cost management and supply chain practices have a significant impact on cost reduction. For order fulfilment rates, customer demand, sales and marketing, customer service and brand reputation are crucial factors. Finally, inventory management, payment terms, supplier relationships, vendor management, financial reporting and risk management all play a significant role in improving cash cycle time. The table above confirms the hypothesis of the study and highlights the relationship between SC indicators and ESG sub-indicators in the context of business operations. The findings indicate that economic, social and governance factors can have a significant impact on the performance of the presented indicators perfect order rate, costs, order execution rate and cash-to-cash cycle time. At the same time, we believe that the qualitative model of measuring SC through grouped ESG factors, represented by the table in the previous section, confirms that the proposed objective has been achieved. Future research could explore other ESG indicators that can be transformed into independent variables, such as environmental factors, technological advances, and cultural differences, on the performance of SC performance indicators that can be considered for use as dependent variables. In addition, longitudinal studies could be conducted to track changes in the performance of dependent variables over time and to identify factors contributing to these changes. Finally, research could be conducted to identify the most effective strategies for improving SC performance based on the identified ESG element.

References List

[1] Flora Meredith. *Supply Chain Performance: Key Metrics to Track & How to Improve It* 2022. Available from: https://www.shipbob.com/blog/supply-chain-performance/ Accessed: 04.05.2023.

[2] Pensions & Investement. *The Institutional Investor's Guide to ESG Investing.* Available from: https://www.pionline.com/ESG-guide? 2022. Accessed: 05.03.2023.

[3] Ferriani Fabrizio, Natoli Filippo. *ESG Risks in Times of Covid-19, Applied Economics Letters*, 2021, 28, 18, 1537-1541.
Doi: https://doi.org/10.1080/13504851.2020.1830932

[4] Goncalves André. *Supply Chains Cause 90% Of Companies' Environmental Impacts. How Can They Be Improved?* ,Youmatter, 2019. Available from: https://youmatter.world/en/sustainability-supply-chain-27935/, Accessed: 06.02.2023

[5] Guthrie Doug *Building Sustainable and Ethical Supply Chains* Forbes. Available from: https://www.forbes.com/sites/dougguthrie/2012/03/09/building-sustainable-and-ethical-supply-chains/#1f6315334179, 2012. Accessed: 05.02.2023.

[6] International Labour Organization. *ACCEL Africa Regional Conference: Knowledge Sharing for Partnerships on the Elimination of Child Labour in Supply Chains*, 2023.Available from: https://www.ilo.org/africa/technical-cooperation/accel-africa/WCMS_867133/lang--en/index.htm. Accessed: 08.02.2023.

[7] Painter Marcus. *An inconvenient cost: The effects of climate change on municipal bonds. Journal of Financial Economics*, 135(2):468-482, 2020. Doi: https://doi.org/10.1016/J.JFINECO.2019.06.006

[8] Know the chain. *Applicable on Paper Only? Why ICT Companies Need to Address Forced Labor Risks in Lower Supply Chain Tiers.* 2022. Available from: https://knowthechain.org/ict-companies-need-to-address-forced-labor-risks-further-down-their-supply-chains/Accesed: 08.05.2023.

[9] S&P GLOBAL. *What is the "G" in ESG?* 2020. Available from: https://www.spglobal.com/en/research-insights/articles/what-is-the-g-in-esg. Accessed: 08.02.2023.

[10] Faust Jennifer. *How Does ESG & Sustainability Affect Supply Chain Management?* FAUST GLOBAL PARTNERS, 2022. Available from: https://www.faustglobal.com/how-does-esg-sustainability-affect-supply-chain-management/. Accessed: 07.04.2023.

[11] Nedaa Agami, Mohamed Saleh, Mohamed Rasmy, *Supply Chain Performance Measurement Approaches: Review and Classification*. 2012. 1-20. doi: https://doi.org/10.5171/2012.87275

[12] Hasan Balfaqih, Zulkifli Mohd, Nopiah , Nizaroyani Saibani , Malak T. Al-Nory.*Review of supply chain performance measurement systems.* Computers in Industry. 2016. 82:135-150. Doi: https://doi.org/10.1016/J.COMPIND.2016.07.002

[13] Xu Tian , Joseph Sarkis*Expanding green supply chain performance measurement through emergy accounting and analysis.* International Journal of Production Economics; 2020. 225:107576. Doi: https://doi.org/10.1016/J.IJPE.2019.107576

[14] Fakhreddin F. Rad , Pejvak Oghazi, Maximilian Palmié, Koteshwar Chirumalla, Natallia Pashkevich, Pankaj C. Patel, Setayesh Sattari. *Industry 4.0 and supply chain performance: A systematic literature review of the benefits, challenges, and critical success factors of 11 core technologies.* Industrial Marketing Management; 2022.105: 268-293. Doi: https://doi.org/10.1016/j.indmarman.2022.06.009

[15] Huiling Zeng,Rita, Yi, Man Li, Liyun Zeng. *Evaluating green supply chain performance based on ESG and financial indicators*. Front. Environ. Sci; 2022. 10:982828. Doi: https://doi.org/10.3389/fenvs.2022.982828

[16] Domenico Sardanelli, Lucilla Bittucci, Francesco Mirone & Stefano Marzioni. *An integrative framework for supply chain rating: from financial-based to ESG-based rating models, Total Quality* Management & Business Excellence; 2022. Doi: https://doi.org/10.1080/14783363.2022.2069557

[17] Angelina Nhat Hanh Le, Tessa Tien Nguyen, Julian Ming-Sung Cheng. *Enhancing sustainable supply chain management performance through alliance portfolio diversity:*

the mediating effect of sustainability collaboration. International Journal of Operations & Production Management; 2022. 41(10):1593-1614.
Doi: https://doi.org/10.1108/IJOPM-08-2020-0505

[18] Yaoyao Hua. *How corporate ESG performance affects green supply chain management*. *BCP* Business & Management; 2022. 25, 550–559.
Doi:https://doi.org/10.54691/bcpbm.v25i.1881

[19] Amelia Bilbao-Terol, MarArenas-Parra, Susana Alvarez-Otero, and Veronica Cañal-Fernández, *Integrating corporate social responsibility and financial performance*, Management Decision; Vol. 57 No. 2, 2019. pp. 324-348.
Doi:https://doi.org/10.1108/MD-03-2018-0290

[20] De Lucia Caterina, Pasquale Pazienza, and Mark Bartlett. *Does good ESG lead to better financial performances by firms? Machine learning and logistic regression models of public enterprises in Europe*. Sustainability; 2020. 12, 5317.
Doi:https://doi.org/10.3390/su12135317

[21] Domanovic Violeta. *The Relationship between ESG and Financial Performance Indicators in the Public Sector: Empirical Evidence from the Republic of Serbia. Management:* Journal Of Sustainable Business And Management Solutions In Emerging Economies*;* 2022. 27 (1), 69-80.
Doi: https://doi.org/10.7595/management.fon.2021.00

[22] Emel Yontar, Ersöz Süleyman,. *Closed loop supply chain management performance evaluation criteria*; 2019. 3(4):157-167.
Doi: https://doi.org/10.31127/TUJE.503959

[23] Amal Aouadi, Marsat Sylvain. *Do ESG Controversies Matter for Firm Value? Evidence from International Data*. Journal of Business Ethics; 2018. 151(4):1027-1047.
Doi: https://doi.org/10.1007/S10551-016-3213-8

[24] Minculete Gheorghe, Sebastian Emanuel Stan, Lucian Ispas, Ioan Virca, Leontin Stanciu, Marius Milandru, Gabriel Mănescu, and Mădălina-Ioana Bădilă. *Relational Approaches Related to Digital Supply Chain Management Consolidation* Sustainability; 2022. 14, no. 17: 10727.
Doi:https://doi.org/10.3390/su141710727.

[25] Omid Narimissa, Ali Kangarani-Farahani., Saber Molla-Alizadeh-Zavardehi. *Evaluation of sustainable supply chain management performance: Indicators.* Sustainable Development; 2020. 28(1):118-131.
Doi: https://doi.org/10.1002/SD.1976

[26] Seock-Jin, Hong., Hossein, Najmi. *The Relationships between Supply Chain Capability and Shareholder Value Using Financial Performance Indicators*. Sustainability; 2020. 12(8):3130.
Doi: https://doi.org/10.3390/SU12083130

[27] Asiri Mohammed, Abdulrahman, Y., Liu, Cheng., Liu, Xiangdong, Alotaish, Mohammed, Saud, M. *Key Performance Indicators of Supply Chain Retail Training Manpower Development and Employee Performance in an Organisation*; 2020. 3(12):899-910. Doi: https://doi.org/10.36349/EASJEBM.2020.V03I12.001

[28] Endang, Prasetyaningsih., C, R, Muhamad., S, Amolina. *Assessing of supplychain performance by adopting Supply Chain Operation Reference (SCOR) model*. 2020. 830(3):032083.
Doi: https://doi.org/10.1088/1757-899X/830/3/032083