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Article

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MANAGEMENT OF INNOVATIONS IN THE ENVIRONMENTAL, SOCIAL, AND GOVERNANCE SCORES AND SUSTAINABILITY PERFORMANCE THROUGH ESG DISCLOSURE: EVIDENCE FROM EMERGING MARKETS

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Abstract: *Based on managerial accounting, Ratings for the environment, society, and governance (ESG) are now crucial measures for assessing how corporations behave with respect to sustainability. This study aims to present research in the managerial accounting and innovation field to determine how industrial firms' sustainability performance and associated ESG scores relate to one another. This study especially evaluates the management of innovations in the manufacturing industry in terms of Turkey's ESG performance ratings based on Refinitiv Eikon's listing. To examine the association between the management of innovations in industrial firms' overall sustainability performance and ESG scores, hypotheses were developed and tested. Cutting-edge Smart-PLS 4.0 software was used to carry out a rigorous partial least squares (PLS) analysis together with conventional bootstrapping to accomplish these goals. The results show that the management of innovations in Turkey's manufacturing sector's sustainability performance is strongly impacted by all ESG issues (social, governance, and environmental scores), which makes it a vital issue from the perspective of the managerial accounting field. The present research emphasizes the management of innovations as a crucial part of determining the sustainability of the industrial sector's environment. The assignment of goals when conducting planning and policy making should appropriately take into account ESG-related factors, according to the key findings of this study. Industrial firms can improve their overall sustainability performance and make good contributions to the well-being of innovations, the environment and society while upholding sound governance standards by incorporating ESG concepts into decision-making processes. For the purpose of developing strategies that balance economic growth with sustainable development objectives, this research offers insightful information to industrial executives and legislators.*
Keywords: ESG; sustainability performances; innovations; environmental; social; governance.

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1. Introduction. Investors employ the Environmental, Social, and Institutional Sustainability Standards as crucial benchmarks to assess the sustainability and societal effect of investments in publicly traded enterprises (Khalil & Nimmanunta, 2021). Both academics and practitioners are currently paying particular attention to sustainability research (Carter & Washispack, 2018; Rajeev et al., 2017; Carter & Liane Easton, 2011). Evaluating supply chain sustainability has a significant impact on an organization's financial performance as well as its ability to gain a competitive edge in the near future (Moktadir et al., 2018a, b; Carter, & Rogers, 2008). By incorporating ESG factors into their assessments and making more informed decisions regarding the long-term viability and impact of their investments, business owners and investors may improve their overall sustainability plans for greater financial success. Historically, shareholders have prioritized a company's capacity to generate income and capital gains over sustainability and social responsibility (Duque-Grisales & Aguilera-Caracuel 2019; Aouadi & Marsat 2018). However, as a result of recent tremendous expansion of the world economy, a number of businesses have expanded rapidly and are currently facing difficulties obtaining funding, which limits their potential to grow and become more efficient. Trade credit financing has grown in popularity as a substitute for bank loans for businesses that have difficulties obtaining funding from other institutions (Petersen & Rajan, 1997). It is imperative in this case to take the variables influencing trade credit financing into account. It is generally accepted that a company's ESG performance counts in addition to its financial performance when evaluating it. Stakeholders assess business investment strategies and their impact on sustainability and accountability through ESG analysis (Brogi & Lagasio, 2019). Since sustainability rating organizations (SRAs or rating agencies) evaluate companies and provide data on a range of ESG components, ESG ratings are a significant source of information on CSR-related processes, procedures and outcomes (Drempetic et al., 2020; Busch et al., 2016). Martins (2005) asserts that a company's perception, worth, and interactions with several key consumers are influenced by its ESG ratings. In light of this, it is unclear whether businesses' engagement in ESG practices can be seen as a value-relevant prerequisite linked to achieving better economic and financial results (Muller & Kolk 2010). Compared to traditional management of innovation, which focuses on enhancing efficiency and effectiveness in operations without taking social status or environmental effects into account, management of innovations in the environment was developed as a means of solving environmental problems and reducing waste as well as pollution (Balsmeier et al., 2017; Yurdakul & Kazan, 2020). In contrast to conventional innovation, which may have a negative impact on the environment, green innovation management improves a company's financial success and impact on the environment (Shvarts et al., 2018). Businesses may find success in the market by implementing eco-friendly practices, developing sustainable products and services with improved design, longer product lives, better recycling options, and lower energy and resource usage (Skordoulis et al., 2020). This might lead to an increase in the number of environmentally conscious customers, which would allow businesses to raise prices above industry standards (Delmas et al., 2016; Zhang et al., 2019). Businesses that invest more in environmental, social and governance (ESG) factors than their competitors may eventually gain a competitive advantage due to their commitments to all stakeholders. Therefore, the primary objective of this research is to investigate the correlation between industrial enterprises' ESG scores in Turkey and their sustainability performance. The remaining studies are arranged as follows: ESG performance and combined scores, sustainability performance, ESG scores, sustainability performance, literature review, theories, study techniques, findings, discussion, implications, findings and restrictions.

1.1 ESG scores A business's profitability, dedication and effectiveness in regard to ESG concerns can be evaluated objectively and clearly by using Thomson Reuters' ESG ratings. These rankings evaluate performance based on ten key factors and the information provided by corporations: emissions, management of the innovation environment, resource usage, neighbourhood, human rights, product responsibility, employees, CSR strategy, the leadership team, and stakeholders. Any significant disagreements affecting ESG performance that have been documented for businesses are deducted in the overall scores of the ESG. Halbritter & Dorfleitner's (2015) research on the link between CSR and company outcome (performance) supported the findings of ESG evaluations of firms through the use of empirical evidence. Another study by Dorfleitner et al. (2015) analysed and evaluated various approaches to evaluating CSR while taking into account the degree of business ESG and the risk of changes to that level. They drew attention to a glaring flaw in the adoption of numerous ESG evaluation methods. According to a study on the impact of ESG performance on corporate profitability conducted by Balatbat et al. (2012), there is a marginally positive association between business performance and ESG ratings. Additionally, they discovered a weak negative relation between analyst forecasting errors and ESG rankings. Harjoto et al. (2015) revealed that board diversity is related to numerous CSR strengths and less CSR failure in their study that tested the effect of board variation on CSR outcomes (performance). The findings from the research, which support the idea of stakeholders, led

the researchers to the following conclusion: The capacity of companies to meet the needs of their larger groups of shareholders may be improved through diversity on boards. To assess an organization's relative ESG performance, commitment, and efficacy, Taliento et al. (2019) created the Thomson Reuters ESG score. They debuted in February of that year. Data from ten primary categories, covering emission levels, environmental creativity, utilization of resources, society rights for humans, product responsibility, workforce, the corporate social responsibility (CSR) approach, leadership, and stockholders, are used to evaluate an organization's success (Signori et al., 2021).

1.2 Sustainability Performance. Sustainability is described by Ali et al. (2018) and Dubey et al. (2017) as progress that satisfies current demands without endangering the capacity of the next generation to satiate their own demands. Assessing the adverse effects of economic activity on environments in both developing and developed nations forms the foundation of sustainability performance (Welford & Gouldson, 1993; Miras-Rodrguez et al., 2015). The intersection of companies' economic and social achievements and the environment is where organizational sustainability is found (Rajesh 2020; Rahdari & Rostamy, 2015). A contemporary research area focuses on building sustainability and resilience for organizations and their supplier systems. According to related research (Escrig-Olmedo et al., 2017; Mervelskemper & Streit, 2017), stakeholders are becoming increasingly aware of different sustainability issues. These ESG scores are calculated using the sum of the ESG scores, which reflect the way the business performed on ESG metrics, and the ESG controversies scores, which reflect any conflicts that companies may have had regarding their ESG performance throughout the period of research. The relationship between a company's environmental and social initiatives and its financial results throughout the supply chain was investigated in a study by Wang & Sarkis (2013). Comprehensive environmentally conscious supply chain management activities, which include supply chain management with regard to social and environmental factors, were found to be favourably connected with the profitability of enterprises, as assessed via return on assets and return on equity. Corporate governance indicators, CSR, and the environment—all of which are increasingly employed among investors to comprehend the inner workings and crucial elements of organizations—were compared to economic success in Docekalova & Kocmanova (2016). Using real data from the manufacturing sector, they demonstrated how firms' corporate governance and social and environmental standards of performance could improve their financial outcomes. Siew et al. (2013) investigated the effect of nonfinancial reporting on construction enterprises and their firm performance. A study performed by Chvatalova et al. (2011) examined the disclosures made by publicly traded construction firms on topics such as global warming, environmental management, sustainability, occupational safety and security for human resources, behaviour, and participation of stakeholders, governance, and others that could influence investors in institutions. In addition to examining governance, social, and economic performance, their study also examined corporate sustainability reporting activities. Eccles et al. (2012) admit that the major obstacle to stockholders and businesses using ESG performance data is the absence of criteria. In their study, they explained that sector-by-sector reporting criteria need to be imposed and that examples need to be provided to support their position. They also highlight new difficulties, such as determining precisely which ESG factor will help a company benefit its stakeholders and stockholders.

1.3 ESG scores and sustainability performances In addition to their performance in regard to governance, social responsibility, and the environment, companies need to pay attention to such issues and to incorporate these into their overall plans to try to either overcome such obstacles or, at least, to decrease their impact because the world is experiencing increasing environmental difficulties (Hassani & Bahini, 2022).

Using sustainability indices, businesses' ESG performance is monitored. In this way, within the bounds of sustainability criteria, firms with potential financial futures are evaluated and recognized. ESG requirements and investments are considered sustainable, as mentioned by Tian & Tian (2022). The ability to generate importance over the long term while managing hazards, possibilities, and the long-term shifting patterns of the world's economy are characteristics that define long-term businesses. Giving measurements of performance in the areas of CG, CSR, and the environment has become vital in this context (Dyllick & Hockerts, 2002). Therefore, business governance unquestionably contributes significantly to the effective use of monetary assets and promotes business rivalry between marketplaces. To boost the company's growth, governance also strives to draw in more financial resources (both domestic and international financing). Accordingly, studies stress how crucial corporate governance is for generating economic growth and preventing financial crises (Taliento et al., 2019). Corporate sustainability is the same as corporate continuity. Profit is a requirement for long-term corporate viability. If an organization wants to last, it must be profitable. Research shows that companies with an ESG rating have lower loan and equity costs, and sustainability initiatives can boost a company's financial performance while increasing public acceptance (Tian & Tian,

2022). Governance has an effect on some aspects of the operation of a business, including retaining employees, attracting investors and customers, and increasing reputation. Studies have revealed that ESG policies have a significant influence on organizations in terms of value and long-term performance. They also give businesses a potent tool to tackle sustainability issues and move toward a brighter future with social justice and equity. To build reliable and complete knowledge of their company's structure and its wider implications, firms must make significant decisions and consider potential consequences, both direct and indirect. Progress in the area of governance and social and environmental standards now tumles within the structure of the business growth curve due to the introduction of commitments from all major businesses to meet governance, social, and environmental standards as well as the extensive current initiatives of numerous additional businesses in this structure. According to the research, the results suggest that firms promote the triple governance of sustainability and that they support overseas investments that follow ESG standards. To correctly develop the principles of governance by hosting seminars, conferences and events, researchers, academics, and professional groups should give more consideration to the topic of governance.

1.4 EGS performance and combined scores. According to Xie et al. (2019), ESG performance refers to a collection of evaluation standards relating to business performance (companies, firms, etc.). These criteria are used to determine how effectively governance manages its environmental and social repercussions. This approach makes it possible to evaluate an organization's sustainability in light of ESG factors. Investors can choose the finest trade safety measures by consulting reports on ESG and the investment process (Grim & Berkowitz, 2020). The ESG categories are covered by ESG reports, which are produced by outside parties and based on corporate disclosures (Ho & Park, 2019). Companies are often assessed yearly and frequently rated on a scale based on their exposure to ESG risks unique to the industry and their capacity to manage those risks. Then, companies market scores to investors. The ESG information supplied by businesses is gathered by rating organizations. The following sources of publicly accessible ESG data are used:

- CSR or sustainability reports;
- government databases;
- business periodicals; and
- publicly accessible business policies (i.e., website content).

The respective company and its procedures are then ranked using a number of different metrics. Several rating agencies frequently invite companies to evaluate and confirm their data as part of standard data verification. To improve or correct data, it is essential that businesses collaborate with these agencies. Figure 1 depicts the aspects of ESG that are incorporated into the environment, society, and governance components. According to Rajesh and Rajendran (2020), ESG scores can serve as a gauge of an organization's sustainable performance. Together, the many types of ESG scores paint a complete picture of a company's sustainability (Escrig-Olmedo et al., 2010). The ESG scores are created by firm disclosures in each of the three ESG categories. Environmental disclosures cover issues such as pollution, greenhouse gas emissions, used water, renewable energy, and waste disposal, whereas social disclosures concentrate on issues such as labour relations, diversity, product safety, safety and employee health, and community relations. Ethics, board diversity and composition, CEO reward, and stockholder rights are often the main governance metrics.

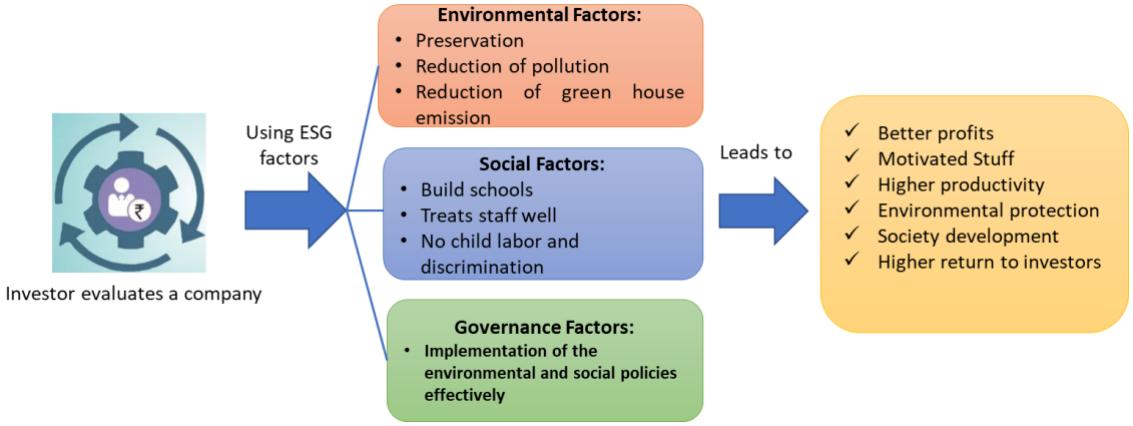

Figure 1. Factors of ESG are embedded within the environment, social, and governance components. Sources: developed by the authors.

2. Literature Review. Research has been conducted in the past to investigate the relationship between sustainability, profitability, and ESG ratings. When calculating ESG performance scores, a business's ESG performance typically has an equivalent impact. This implies that businesses should handle their ESG concerns equally if they want to improve their ESG results. ESG performance can also be financially advantageous for organizations, and social responsibility initiatives can improve their financial position over time by encouraging investors and shareholders to make sustainable stockholder decisions. Businesses' social responsibility and dedication to environmental conservation have become increasingly important in management in recent years. Taliento et al. (2019) define corporate social responsibility (CSR) as a company's approach to managing its industry and taking responsibility for its effects on society. Concerns about sustainability are becoming increasingly important for investors. This highlights the need for a recognized metric to evaluate the performance of sustainable firms. An organization's sustainability performance can be evaluated by examining its ratings in the ESG categories. According to a study by Rajesh and Rajendran (2020), there was an empirical relationship between business sustainability effectiveness and ESG scores. Five hypotheses were proposed to investigate the relationships between ESG ratings and the overall sustainability outcome (performance) of enterprises. Conventional bootstrapping, partial least squares (PLS) assessment, and variable analysis were carried out with Smart PLS 3.0 software. The results show that there are both direct and moderating effects on the latent factors influencing sustainability performance. All of these relationships are significantly and negatively impacted by ESG performance when considering how ESG performance is associated with ESG performance. Furthermore, it is critical to remember that investing in innovation management is seen as one of the most significant choices businesses must make to succeed (Khalil et al., 2022). Investigating the relationship between innovation management and the financial and ecological worth of companies is part of this. The basic models are evaluated using time fixed-effects panel regression with data collected from publicly traded companies in ten Asian economies. The company-level yearly ESG data for the years 2015 through 2019 are included in the sample material. The study's findings demonstrate that conventional innovation management only serves to boost a business's profitability while having no effect on the environment. Conventional innovation management greatly increases carbon emissions, which is a concern for the environment. However, it is also clear that funding innovations with an environmental focus benefit businesses' bottom lines as well as the environment.

Şeker & Şengur (2022) calculated the country means for the performance of ESG for 2009 firms from 35 different nations in their study, attempting to determine ESG ratings at the country level. According to the report, country rankings were determined based on overall and subdimensional ESG performance. An evaluation of the results revealed that companies in European Union countries had higher ESG rankings, while those in Far East countries had lower rankings. Akyildirim et al. (2022) used ESG data from the RepRisk database to assess how the market reacted to the ESG news of 55 businesses listed on Borsa Istanbul. The authors used the Event Study approach. Only 10% of bad ESG news about companies has shown abnormal returns. Even though sustainability and ESG news do not significantly affect anomalous returns, it is clear that Turkish investors continue to place greater emphasis on financial performance when making judgments regarding future prospects. In Sisman and Cankaya (2021), the authors used the panel regression approach to examine data from 26 airline firms between 2010 and 2017 to test how ESG scores affect business performance. The effects of ESG scores on returns on equity, ratios of Tobin's Q, and returns on assets were examined in this research. Only the link between return on assets and the overall ESG score was shown to be statistically significant. Additionally, it has not been proven that travel enterprises' ESG scores significantly affect their economic growth. Dincer et al. (2021) evaluated the data of BIST 100 and BIST Sustainability Index firms during their investigations, which covered the years 2016–2018, and examined the effect of sustainability on their economic performance. It was determined via regression that sustainability has positive impacts on the profitability of a business through the variables of size, leverage, and volatility, which cover 165 pertinent data points. The study's findings are consistent with the declaration that firms that employ sustainability principles operate more profitably. The overall sustainability and fiscal results of industrial businesses participating in the Borsa Istanbul Sustainability Index in 2015-2017 were compared in Ece Okmutlu and Kilic (2020). Economic, social and environmental factors were used to calculate the profitability scores of the businesses, and a sustainability score was then generated using these results. When total and financial sustainability scores were compared, it became clear that the firms' sustainability accomplishments were not entirely represented in their financial performance. Using the Hofstede technique, Keçeli & Çankaya (2020) investigated the association between the variation in annual ESG scores and the financial information of 105 firms between 2010 and 2020 and the variation in the price of shares. The financial indicators include ROE, ROA, the value-to-earnings proportion, industry capitalization, and the change in total assets rate. Panel

regression was utilized to examine Thomson Reuters data. The Eikon database revealed no evidence of a significant association between a shift in the price of stocks, as an independent variable, and the ESG, ROE, ROA, or P/E dependent variable. Market capitalization, variation in total assets, and stock shifts in prices proved to be statistically significantly, strongly and favourably correlated, respectively. In their investigations spanning the years 2013 to 2016, Sak & Dalgar (2020) examined the influence of firm sustainability actions on profitability using the quarterly financial data of 35 nonbank enterprises. Corporate sustainability measures were found to have a considerable and favorable effect on business performance by the research, which used the Driscoll-Kray resistance estimator as the model estimator. In Gurunlu's (2019) analysis of 55 nonfinancial companies between 2014 and 2018, panel data analysis examined the association between the independent variable size of assets, the leverage rate of growth in net sales, and the capital density percentage and between the dependent variable, Tobin's Q and the asset return ratio. Twenty-five of the 55 corporations are firms that are a part of the sustainability index. Part of the sustainability index has been shown to have a favorable and constrained impact on asset return rates. Tobin's Q ratios had no discernible impact. As a consequence of the study, it was found that investors do not give these companies' attempts to rank even in the sustainability index enough credit. The ESG performance of 30 companies traded on Borsa Istanbul was analysed by Duzer & Once (2018) and compared to financial performance. Panel data analysis revealed a connection between environmental and social performance and an enterprise's return on assets. Aras et al. (2018) used content analysis to test the reports of sustainability released in the banking system between 2009 and 2015 to measure the multidimensional firm sustainability performance of private and public banks in Turkey. The study's findings revealed that banks issued the most social dimension comments and that public financial institutions made more sustainability statements than private financial institutions did. Aras et al. (2016) evaluated the corporate sustainability performance of traditional banking and participatory banking, taking into account banks that had released a report on sustainability in 2013. The study's findings revealed that conventional banks and participating banks' performance scores on the basis of sustainability characteristics did not significantly differ from one another. It has also been emphasized that improving performance across all dimensions is necessary for a company to perform sustainably. Investors in Turkey continue to place greater emphasis on financial performance when making judgments about the future, while ESG and sustainability news have little influence on abnormal returns. Only the relationship between the ESG general score and ROA was identified as significant by Sisman & Çankaya (2021). In addition, it has not been established that airline businesses' ESG scores have a major influence on their economic performance.

2.1 Hypotheses. The influence of ESG aspects on companies' sustainability, profitability and financial outcomes is discussed in the following section. Rajesh and Rajendran (2020) showed how ratings of ESG criteria might be utilized to assess a firm's long-term profitability. Their findings show that ESG-related efforts and regulations should be prioritized because ESG performance considerably modifies all direct interactions, regardless of their link with ESG performance. The results also highlight the necessity for businesses to concentrate on enhancing ESG performance in areas where it is low or moderate while seeking balanced growth across all three categories. According to Tian & Tian (2022), enhanced ESG performance reduces operational threat as well as information risk, which increases corporate trade credit financing. Furthermore, their study showed that, in contrast to state-owned companies, nonstate-owned companies have a greater favorable link with trade-related financing. The beneficial effects of ESG ratings on corporations' sustainability performance were questioned by Clementino and Perkins (2021), who also added to discussions on the overall impact of ratings. The study also showed that company strategy is significantly influenced by managers' perceptions of the benefits of aligning with and performing well according to ESG ratings. According to Taliento et al. (2019), holding companies responsible for society, the environment, and government entities gives them a competitive edge. The research underlined the significance of the "distance" from the marketplace average, re-examining the notion of superiority in terms of sustainability, even when individuals' ESG scores may not directly influence the average. According to Khalil et al. (2022), environmental innovation is an essential investment approach that enables companies to gain advantages commercially from sustainable practices. Companies can gain enormous advantages by developing green brands and increasing their market share among consumers who care about the environment, especially in cutthroat green industries. Corporations in European Union nations often have higher ESG scores than do those in Far Eastern nations (Şeker & Şengur, 2022). When making judgments, Turkish investors continue to give financial performance precedence to sustainability and ESG news, according to Akyildirim et al. (2022), with little effect on atypical returns. Dincer et al. (2021) concluded that, while taking into account variables such as size, leverage, and fluctuation, sustainability has a beneficial impact on an organization's financial performance. These data lend credence to the idea that companies that practise sustainability typically fare

better financially. Ece Okmutlu & Kilic (2020) examined total sustainability and financial sustainability ratings and discovered that firms' financial performance did not accurately reflect their sustainability accomplishments. Keceli & Cankaya (2020) assessed the link between yearly ESG scores and financial data and found that there was little connection between ESG scores; ROA; ROE; P/E ratios; and variations in the price of stocks. According to Sak & Dalgar (2020), company sustainability initiatives have a considerable and advantageous impact on financial performance. According to Duzer & Once (2018), a company's return on assets is correlated with its social and ecological performance. According to Aras et al. (2018), public banks issued more sustainability declarations than did the private sector, with social dimension statements being the most prevalent in Borsa, Istanbul. According to Aras et al.'s (2016) analysis of performance scores according to sustainability parameters, financial institutions and participating banks did not perform significantly differently. The study's hypotheses were then supported by Şisman & Çankaya's (2021) discovery of a substantial link between the overall ESG score and ROA.

H1: There is a positive correlation between environmental scores and sustainability performance.

H2: There is a positive correlation between social scores and sustainability performance.

H3: There is a positive correlation between governance scores and sustainability performance.

3. Methodology and research methods. The present work aims to test the link between ESG scores and sustainability outcomes in Turkey's manufacturing sector. For 2022, data from the Refinitiv data stream of listed firms in the manufacturing industry were gathered using a cross-sectional qualitative study design. Twenty-four companies were included in the dataset and selected through the representative selection technique to guarantee the inclusion of well-known companies with strong sustainability indices. Refinitiv provided the data that were used to calculate ESG scores and sustainability indicators of performance, and these data are regarded as trustworthy and valid. The sustainability measures used were based on accepted criteria from the literature, while the ESG scores represent the attention given to ESG concerns by Turkish enterprises. The research investigates the complicated links between ESG criteria and sustainability performance using Smart-PLS 4.0 software and (PLS) analysis. Determining and applying variables, such as calculating ESG scores and sustainability performance indicators, will be part of the PLS analyses. Current scales or indices used in the evaluation will be properly cited, and in the context of the research, their reliability and validity will also be addressed. Potential confounding variables, including firm size, industry and financial performance, are considered control variables in this research to increase its robustness. This approach will make it easier to discern how ESG issues specifically affect sustainability performance. Several scholars have recognized smart-PLS as a developing multivariate data analysis method (Wong, 2013). This study provides detailed conclusions about the PLS analysis, interpreting both the statistical results and their real-world applications. The explanation also covers any research-related constraints, such as data accessibility and sample size, to provide readers with context for properly interpreting the findings. The goal of this work is to illuminate the critical role that ESG elements play in determining the sustainability of the environment for Turkey's manufacturing industry. This research provides legislators and industrial executives with insightful information that will enable them to integrate ESG principles into decision-making procedures and strike a balance between goals for growth in the economy and environmental sustainability.

4. Results. As a consequence of reliability as well as validity checks, which show that the findings are somewhat error free, reliable measurements over a range of equipment have been validated (Sekaran & Bougie, 2016). Cronbach's alpha and the composite reliability values, which are shown in Table 1, were utilized to evaluate the reproducibility of the measurement model. demonstrated satisfactory reliability; each of the values of Cronbach's alpha and the composite reliability exceeded 0.7 (Cronbach, 1951).

Table 1. Reliability test

Variables	No. Items	VIF (variance inflation factor)	Cronbach's alpha	Composite Rehabilitee
Envi-Score	3	2.978	0.897	0.936
Soci-Score	4	1.905	0.710	0.741
Gov-Score	3	2.377	0.815	0.878

Sources: developed by the authors.

The Cronbach's alpha test results showed that the outcomes of the key constructs used were supported. The model is considered internally reliable if its Cronbach's alpha approximation is 0.7 or above (Pallant, 2001). The values of Cronbach's alpha for the three elements of ESG varied from 0.710 to 0.897, which is regarded as excellent according to George & Mallery (2003) and Nunnally (1980). Confirmation factor analysis (CFA),

a technique that might be used with SEM, checks both the measurement models' indications and the quantity of component or constructs that make up those models. All variables or items that were observed in this study's factor loadings, which ranged from 0.70 to 0.82, were deemed acceptable. Regression estimates or factor loadings for latent observed variables should be more than 0.50 (Byrne, 2001). All the constructs pass the construct validity test, which means that they are all valid. The breakdown of the variables that are both independent and dependent is shown in Table 2.

Table 2. Descriptive analysis

	Mean	Min	Max	Standard-D
ESG-Sust	67.82	21.60	88.73	18.72
Env-Sco	69.11	1.63	97.69	27.11
Soci-Sco	78.73	37.16	98.63	17.77
Gov-Sco	53.66	12.63	91.69	20.55

Sources: developed by the authors.

The descriptive statistical results show that, for the dependent variable, Turkish manufacturing firms had an overall sustainability score of 67.82% and a standard deviation of 18.72%, indicating sustainability performance. The sustainability performance rates of the Turkish manufacturing companies ranged from 21.6% at the lowest end to 88.73% at the highest. The statistical analyses for the independent variable (ESG scores) show that the mean environmental value for the entire sample is 69.11%, with a standard deviation of 27.11. The sampled organizations' mean social score is 78.73%, with a standard deviation of 17.77. Additionally, the findings for the sampled firms' governance scores reveal a mean of 53.66% and a range with a standard deviation of 20.55%. The variables that are independent according to the research are shown in these graphs.

Hair et al. (2010) asserts that there is a decreased link between a particular indicator and other measures that do not evaluate a similar concept or variable; this is referred to as discriminant validity (Heeler & Ray, 1972). This demonstrates how unique an idea is in comparison to other constructs. Discriminant validity is assessed utilizing a variety of elements in the SEM-PLS evaluation. Specifically, the degree of correlation between every concept and its average square root (AVE) should increase. To achieve discriminant validity. The correlations of the other components are contrasted with the variations in the AVE of the square root. (Fornell, & Larcker, 1981). Table 3 displays the relationships between the dependent variable, sustainability performance, and the independent variables, three elements of ESG performance. The findings show a strong correlation between sustainability performance and each of the independent variables, including outcomes for the environmental score of 0.867, the governance score of 0.873, and the social score of 0.821.

Table 3. Discriminant validity

	ESG-Sust	Envi-Score	Govern-Score	Soci-Score
ESG-Sust	1.000			
Envi	0.867	1.000		
Govern	0.873	0.638	1.000	
Soci	0.821	0.757	0576	1.000

Sources: developed by the authors.

The assessment was performed to verify the structural framework, and the R2 coefficient test was used as the criterion. The endogenous variable's R2 value for the current research was 0.569, indicating that each of the independent variables might be responsible for sustainability performance, which had a variance of 95%. Table 4 displays the variance that the endogenous construct has been able to clarify.

Table 4. Variance Explained

Endogenous Construct		No. Items
Exogenous Variables	Endogenous (sustainability performance)	0.951

Sources: developed by the authors.

Table 5 shows the outcomes of the model and hypotheses generated via Smart-PLS and T values of all paths with 5000 resamples. According to Table 5, the first hypothesis is significant ($\beta = 0.269$, $p < 0.05$), which means that the links between environmental scores and sustainability performance are positively and strongly

connected. The coefficient of the study is significant (p< 0.01).

Table 5. Path coefficients

	Original sample	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values	Results
Envi-Score–ESG-Sust	0.269	0.276	0.086	3.114	0.002**	Supported
Soci-Score–ESG-Sust	0.351	0.349	0.102	3.343	0.001***	Supported
Govern-Score–ESG-Sust	0.487	0.495	0.069	7.026	0.000***	Supported

*Note: P values are *p 0.05 (t = 1.605), **p 0. 01 (t = 2.33), *** P 0. 001 (t = 3.33).*

Sources: developed by the authors.

The second hypothesis showed significant results (β= 0.351, p> 0.05), which reflects that the link between social scores and sustainability performance is positively related. The coefficient of the social score is significant (p> 0.05). Additionally, the third hypothesis was also significant (β= 0.487, p< 0.05), which shows that the links between governance scores and sustainability performance are positively related. The coefficient is significant at p< 0.05. Sustainable performance is positively correlated with the social, governance and environmental scores, each of which had a path coefficient and factor loadings according to Smart-PLS analysis, as shown in Figure 2.

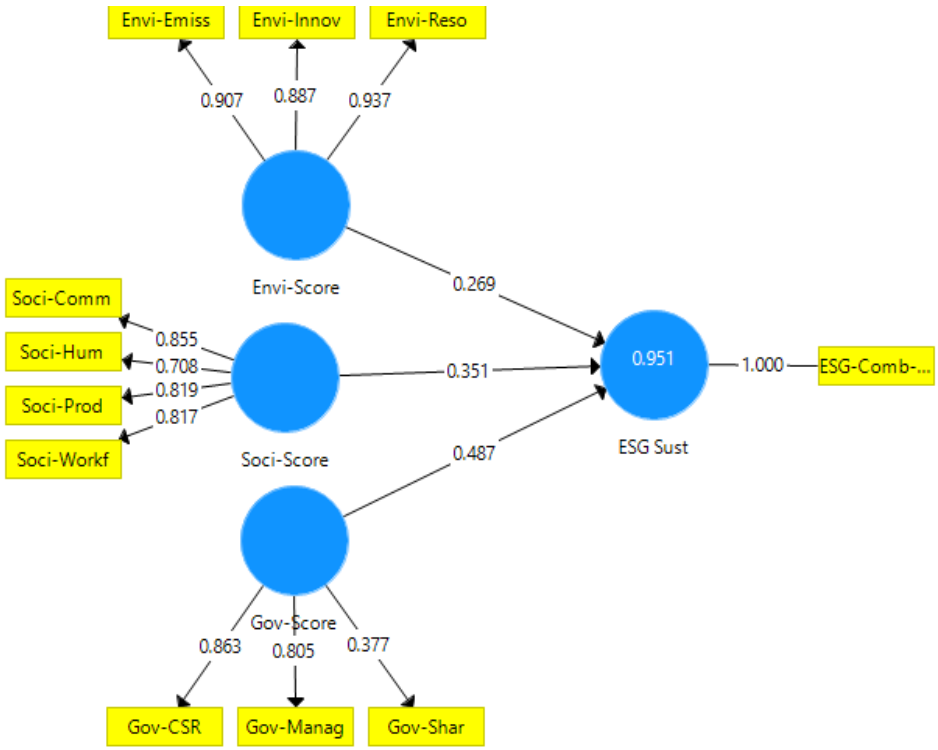

Figure 2. Model Results

Sources: Developed by the authors based on Smart-PLS.

5. Discussion. Previous ESG rating studies have mainly examined the statistical connection between a company's social responsibility and profitability, as evaluated by different ESG criteria and financial results. Given the growing international business environment, evaluating a company's sustainability and profitability is more important than ever (Rajesh & Rajendran, 2020). By providing modern businesses with a fresh source of competitive advantage, environmental, social, and governance obligations today represent dynamic capacities (Taliento et al., 2019). Companies are taking steps to represent the interests of all stakeholders, particularly consumers, workers, vendors, communities, and investors, in addition to carrying out their primary business obligations. As a result, to achieve successful economic results and help the local area and

society at large, businesses must include societal welfare objectives in their targets, activities, and strategies. The regression analysis results indicate a strong positive correlation (R2 = 0.269, p 0.05). between environmental scores and sustainability performance. These findings support those of other studies in Turkey by Saygili et al. (2022) and Zehir and Aybars (2020), who found that environmental scores are correlated with greater sustainability performance. According to hypothesis H2, social scores and sustainability performance are positively correlated. When the link was significant at P >.5 (0.351), the path of the hypothesis was supported. However, this outcome is consistent with earlier research in the field, such as that by Alsayegh et al. (2020), who discovered a strong and positive connection between social performance and economic sustainability. Likewise, according to a study by Alkaraan et al. (2022), businesses with strong ESG performance are more committed to transforming their businesses to conform to Industry 4.0 disclosure standards and perform better. Additionally, Ye, Song, and Liang's study from 2022 demonstrated the significant role that social dimensions of performance have in generating long-term stock returns. The predicted positive relationship between governance scores and sustainability performance was confirmed (P >.5, = 0.487). This important finding is in line with earlier related research, such as that of Carnini Pulino et al. (2022), who discovered a favourable correlation between ESG disclosure and profitability. The same large positive link between ESG performance and corporate sustainability was shown by Ahmad et al. (2023). Our interpretation of this finding is that the application of ESG scores results in advantages that increase overall sustainability efficacy. Stakeholders, particularly investors, stress the significance of sustainability, which makes it necessary to measure and assess corporate performance in this area. The assessment of sustainable performance by Thomson Reuters includes ESG metrics that cover a wide variety of indicators, encompassing more than 10 different schemes and more than 400 evaluation components. ESG therefore shows a company's overall performance score on different ESG metrics. This research provides important new information about the connections between ESG ratings and sustainability profitability in the context of Turkish manufacturing companies. The strong correlations between ESG scores and sustainability profitability highlight how crucial it is to incorporate ESG factors into business plans to promote profitable business practices and satisfy stakeholder needs. The relevance of ESG elements in influencing corporate sustainability and generating favourable outcomes for both enterprises and society is highlighted by these findings, which are consistent with other research undertaken in Turkey and throughout the world.

For a variety of all parties involved, such as shareholders, workers, consumers, nongovernmental groups and others in the community, the implications of this research are highly valuable. Making knowledgeable choices requires a combination of nonfinancial and financial data, especially pertaining to ESG. Organizations have started using stakeholder-oriented strategies for maximizing social value, as responsible shareholders take a firm's performance in terms of ESG elements into account when making investment decisions. The results of the research offer crucial information for stakeholders, politicians, legislators, academics, and scientists, as they are aware of the impact of ESG disclosure on businesses' sustainability and profitability, together and separately across various pillars. Additionally, the beneficial correlation between the disclosure of ESG ratings and the sustainability profitability of businesses provides an important direction for future studies on the ESG elements that affect company financing and sustainability. Shareholders who want to make educated choices that enhance social value and fit with stakeholder-oriented initiatives must have access to this information. The study's findings will support the creation of financial strategies that prioritize ESG factors, encourage sustainable business practices and have a positive influence on society. The conclusions drawn from this study will eventually inspire businesses to concentrate on incorporating ESG factors into their operations and decision-making procedures. By doing so, businesses are more prepared to satisfy stakeholder demands and expectations, foster long-term sustainable growth and encourage gratifying interactions with stakeholders, including consumers, workers, and the public. These findings can also be used by governments to push for stricter ESG reporting guidelines and regulations and encourage responsibility and transparency in business operations. In general, this research has important ramifications for improving the understanding of how ESG disclosure relates to the sustainability outcome of businesses. The findings not only assist diverse stakeholders in making wise choices but also serve as a foundation for further study into the influence of ESG elements on corporate sustainability and investment choices. Encouraging businesses to adopt more ethical and sustainable practices can help society and the environment, thereby enhancing the societal impact of stakeholder-oriented approaches.

6. Conclusions. ESG disclosure has become a vital and essential component of economic sustainability during the past 20 years, especially in light of the manufacturing industry's overall performance. ESG considerations are predicted to have an enormous impact on corporate success in terms of sustainability and investment. Despite the fact that numerous studies have examined the link between sustainability outcomes

and the disclosure of ESG scores, it is notable that there has not been much actual empirical data supporting this association. The present research fills this gap by carefully analysing whether firms perform more effectively when they have greater ESG scores using data from Turkey. The results of this work demonstrate strong positive correlations between governance, social, and environmental factors and businesses' sustainability performance. Among the three ESG factors, governance ratings show the strongest positive correlation with ESG disclosure, followed by social and environmental profitability. The findings also suggest that the environmental, community, and governance scores on the three ESG dimensions contribute equally to the overall sustainability of business operations. To effectively improve overall sustainability performance, organizations must understand the interdependence of various ESG variables and prioritize them. This study has ramifications for professionals as well as academics. The study contributes actual data to the current discussion on how ESG factors affect companies' sustainability performance and financial decisions. To maximize sustainable outcomes and draw ethical investors, practitioners should integrate ESG factors into their company plans and processes. These findings can be used by policymakers to support and build strong ESG reporting regimes that encourage higher levels of transparency and accountability in the business community. In view of the significance of ESG variables in determining economic sustainability within the industrial sector, this study provides significant insight into the relationship between business sustainability outcomes and disclosures of ESG scores. The need for companies to implement comprehensive strategies that prioritize ESG performance is shown by the significant links between ESG indicators and sustainable performance. This approach will improve firm sustainability performance and advance the larger objectives of sustainable development.

This study was carried out on Turkey's manufacturing sector, where only listed firms in the manufacturing industry were targeted. Hence, the results might be relevant only for sustainability performance, the environment, society, and governance. It is thus necessary to carry out further research on ESG scores and sustainability performance in combination with other emerging economies to provide broader findings. Future studies could also extend to large-scale manufacturing and technology firms in other parts of emerging markets. Furthermore, future studies could use qualitative approaches.

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Менеджмент інноваціями в контексті оцінювання екологічної, соціальної та управлінської ефективності, та сталого розвитку з урахуванням ESG-ефектів: дослідження країн, що розвиваються

Рейтинги компаній за рівнем екологічної, соціальної та управлінської ефективності (Environment, Social, and Governance, ESG) стали визначальними показниками для оцінки поведінки корпорацій у контексті досягнення цілей сталого розвитку. Метою даної статті є розгляд взаємозв'язків між ESG-ефектами та сталим розвитком підприємств, зокрема в контексті управлінського обліку та інновацій. Авторами проаналізовано ефективність управління інноваціями промисловими підприємствами Туреччини, враховуючи ESG-рейтинг на основі даних Refinitiv Eikon's listing. Для перевірки висунутих гіпотез використано метод часткових найменших квадратів (Partial Least Squares, PLS) із бутстрепінгом. Емпіричні розрахунки здійснено з використанням програмного забезпечення Smart-PLS 4.0. Результати дослідження підтвердили, що управління інноваціями в промисловому секторі Туреччини має статистично значущий вплив на сталий розвиток компаній та рівень екологічної, соціальної та управлінської ефективності. Це свідчить про важливість цього питання у контексті управлінського обліку. Дослідження підтверджує, що управління інноваціями є необхідною умовою для досягнення сталого розвитку промислових компаній. З огляду на це, менеджмент компаній повинен враховувати екологічні, соціальні та управлінські аспекти при формулюванні цілей, завдань, плануванні та розробці стратегій розвитку. Автори акцентують, що врахування основних принципів ESG-концепції у процесі прийняття рішень створює передумови для досягнення визначених цілей сталого розвитку. Результати дослідження можуть бути корисними для керівників промислових підприємств та уряду країни при формуванні стратегій, спрямованих на одночасне забезпечення економічного зростання та досягнення цілей сталого розвитку.

Ключові слова: ESG; ефективність; сталий розвиток; інновації; екологічний; соціальний; управління.