The Determinants of Environmental, Social, and Governance Performance

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Abstract

Promoting a Transformational Leadership style in business can fundamentally impact Environmental, Social, Governance (ESG) performance. This study examines determinants of ESG and uses Transformational Leadership, Digital Adoption, Organizational Innovation, and Firm Competitiveness as independent variables to analyze changes in ESG activities. The study explores the mediation effect of organizational innovation among Transformational leadership and ESG, as well as digital adoption and ESG. The main aim of this research is to identify elements that can contribute to environmental, social, or governmental performances. The paper uses qualitative research for the study and utilizes 114 valid questionnaires to conduct a comprehensive and empirical analysis. The questionnaire was collected in Georgia Tbilisi, and the existing hypothesis was tested by conducting structural equation modeling with the collected questionnaire. After controlling for firm ownership and firm size the results of the study indicate that all independent variables have a positive effect on ESG performance and the mediation effect is not significant. The paper used artificial neural networks(ANN) analysis, and the results show that the most important variable affecting ESG performance is Transformational Leadership. This study adds an understanding of the relationship between TL and ESG and expands the literature that Transformational Leadership is significant to implement ESG performance.

Keywords: Transformational Leadership, ESG Performance, Digital Adoption, Organizational Innovation, Firm Competitiveness

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1.Introduction

Nowadays, the world faces many challenges such as climate change, depletion of natural resources, pollution, and unemployment, which hinder the development of sustainability. The role of organizations is to implement activities that will reduce existing problems and eliminate the huge risk of workplace damage, impacting environmental, social, or governmental factors. Society's demand for environmental, social, and ethical responsibility in business has grown because of these environmental problems, hard working conditions, and the spread of corporate scandals (Zhu & Huang, 2023). In response to these issues, the ESG concept was created, uniting three of the most important elements: environment, social, and governance. It aims to promote sustainability from a long-term perspective (Aouadi and Marsat, 2018). Therefore, since the concept of ESG value is based on sustainable development and is necessary for businesses to achieve sustainable economic and social improvement, they should implement the ESG value concept (Zhu & Huang, 2023; Tarmuji et al., 2016; Buallay, 2019).

Based on a clear and fundamental comprehension of ESG, company employees should optimize their routine tasks within a framework that naturally applies changes and innovative activities for environmental improvement (Niu et al., 2022; Mohammad & Wasiuzzaman, 2021). In this way, companies can avoid harmful activities and engage in sustainability.

Transformational leadership is one of the styles where leaders push employees to work in the organization's interest. If organizations focus on ESG performance and preserving sustainability, leaders may become sources of inspiration for other workers and fill them with motivation to perform better for the company's values. This paper studies the effect of Transformational leadership style on ESG to analyze how organizations can contribute to a better environment, engage in social activities, and address governance issues. This study aims to underline the ESG value concept for organizations and present the contributory factors of these three dimensions.

As ESG performance is becoming a global issue, many researchers examine causal factors to find solutions. In this paper, the literature analyzes how changes can be implemented in ESG performance through transformational leadership and how it can lead to better environmental, social, and governance practices. This study fills the gap concerning the direct effect of transformational leadership on ESG performance, helping businesses reshape their operations into better practices.

2.Literature Review

2.1. ESG Performance

ESG is an abbreviation of three dimensions: environmental, social, and governmental (Zhu & Huang, 2023). It is a significant indicator of non-financial practices and exists to measure these elements in corporate management and investor portfolio decisions (Chen et al., 2023; Galbreath, 2012; Liang & Renneboog, 2021; Richardson, 2009). Factors of the ESG concept can influence a company's ability to implement its strategy and reinforce corporate values (Jebe, 2019; Niu et al., 2022). Therefore, as Hoepner et al. (2019) say, involving in ESG issues is a prerequisite for mitigating negative risks (Broadstock et al., 2021).

Aouadi and Marsat (2018) argued that ESG influences corporate values and sustainability in the long-term perspective. Thus, its integration into management will cause competitiveness, efficient operations, reputation, and mitigation of wastes that will optimize overall stakeholder value and company sustainability (Alsayegh, 2020; Niu et al., 2022). That leads researchers to test this term in several situations, such as increasing firm value (Yoon et al., 2018) or ESG as a financial risk reduction tool during the financial crisis (Broadstock et al., 2021). Furthermore, it is used to identify the effect of incorporation of ESG and digital transformation for enhancing sustainability in Chinese SMEs (Wang & Esperanca, 2023) and the impact of transformational leadership on ESG performance (Zhu & Huang, 2023).

2.2. Trasformational Leadership

Transformational leadership considers leaders who give motivation to their followers to be intertwined with organizations' interests to exceed performance (Grošelj et al., 2021; Greimel et al., 2023). It causes a transformation in followers, which reflects a change in their behavior or point of view, (Bakker et al., 2023). This term can be the main driving factor to increase the interest of employees in the organization by encouraging them, to identify themselves, for motivation, and to realize the organization's goals (Chang, 2016; Zhu & Huang, 2023).

Previous researchers have tested transformational leadership in the context of how effective leaders transform their followers (Bakker et al., 2023). Additionally, Burns (1978), and Greimel et al. (2023) say that transformational leadership allows leaders and their followers to facilitate each other to reach higher outcomes, which they examined in terms of the effect of transformational leadership on virtual teams to

improve their performances, while Zhu & Huang (2023) are using it to identify the relationship between this term and ESG in the context of SMEs. However, this term hasn't been tested against ESG to identify its direct effect on it, leading to the formulation of the following hypothesis:

H1: ***Transformational leadership positively impacts ESG performance***

2.3. Digital Adoption

Digital Adoption is related to organizations' nature in how they adopt digital technologies to implement digital transformation (Zhang et al., 2021a), by measuring how firms apply digital technologies to strengthen operational practices and consumer experience (Fonseka et al., 2022; Wang & Esperanca, 2023). Execution of digital transformation is crucial as it means merging the "digital world" and the "physical world" (Yoo et al., 2010). Zhang et al. (2021) used it as a tool to identify its effect on organizational sustainability, where researchers emphasize that this is a way to set companies in motion to deal with significant changes. Lashitew (2023) has tested the Digital adoption process to examine in what situations companies delve into digital transformation among SMEs during the pandemic, while others found variables that can have a vital impact on Digital adoption (Skare & Soriano, 2021).

The digitalization process carries out operations to become more flexible, and competitive, and have an advantage to be enlarged (Emara and Zhang, 2021), because this is a way to master a wide range of data in digital transformation, leading organizations to optimize their performances (Ciampi et al., 2021; Wang & Esperanca, 2023). According to all information, Digital Adoption is linked to ESG, as both focus on increasing a company's operational efficiency. This leads to the formulation of the following hypothesis:

H2: ***Digital Adoption positively impacts on ESG performance***

2.4. Firm Competitiveness

Competitiveness is crucial, which allows firms to manufacture products or services that completely meet market needs. In the case of firm competitiveness (FC), organizations should be aware of their value creation through digital transformation (Ghasemaghaei, 2021; Rahman et al., 2021) as it includes four elements: digital technology, strategy, capability, and culture, which positively impact firms' market performance (Wang & Esperanca, 2023). Previous researchers used firm competitiveness to determine if it can help firms achieve more successful performances (Le & Ikram, 2022). Additionally, some papers studied the relationship between firm competitiveness and sustainability innovations (Hermundsdottir & Aspelund, 2021) or business sustainability (Saunila et al., 2023).

To the best of the author's knowledge, prior studies have not measured the effect of firm competitiveness on ESG. Hence, the following hypothesis is formulated.

H3: ***firm competitiveness positively impacts on ESG performance***

2.5. Organizational Innovation

Moussa et al. (2018a) say that public sector organizations tend to be involved in organizational innovation more because of global competition and quick technological improvement to carry out ideas, solve problems, and create possible opportunities (Maqdliyan & Setiawan, 2023). Ahmad et al., 2022 say that organizational innovation is a strategy to escalate profitability, become competitive, and maintain interaction with customers (Chughtai et al., 2023; Hani, 2021). The main determinant of innovative behavior in firms is leader characteristics or leadership style (Arif and Akram, 2018), which can be a causal factor for transformational leadership to grow innovation in the public sector for more effectiveness (Demircioglu & Audretsch, 2017; Maqdliyan & Setiawan, 2023). Furthermore, Niu et al. (2022) describe organizational innovation as an integration of technologies into management and products or services, modifications in production methods, execution of new technological procedures, and adoption of new management systems, which are directly related to digital adoption.

Past research has generally overlooked the topic in various contexts; for example, Maqdliyan & Setiawan (2023) have identified predecessors of organizational innovation in the public sector, where they found out the direct effect of transformational leadership on organizational innovation. Chughtai et al. (2023) tested it to examine the influence of learning organizations on organizational innovation. However, Zhu & Huang (2023) used this term as a mediator between transformational leadership and ESG in SMEs. As a consequence, performances of transformational leadership and digital adoption for ESG performance increase through organizational innovation, which formulates the following hypothesis:

H4: ***Organizational innovation positively effects on ESG performance***

H5***: Organizational innovation mediates the effect of transformational leadership and ESG performance***

H6***: Organizational innovation mediates the effect of digital adoption and ESG performance***

3.Methodology

3.1. Sampling and Data collection

The study uses a questionnaire survey, distributed in Georgia, Tbilisi. The questionnaire was

disseminated among employees in 9 companies (5 private, 2 state-owned, and 2 foreign firms). The method of selecting respondents was non-probability, convenience sampling, where a total of 176 structured questionnaires were sent out to collect data, yielding 114 responses (a 65% response rate). Overall, the usable questionnaire acquired 51% female and 49% male. Only 1% of those aged 18-21 completed the survey, when from 21-25 filled 31%, 26-35 showed the highest number - 54%, and 36-45 filled 14%. From the existing sample, 7% hold a Doctoral diploma, 22% have a Master's diploma, 57% possess a Bachelor's diploma, and 14% have a High School diploma. There were 75% of private enterprises, 23% of State-owned enterprises, and only 3% of foreign enterprises. Enterprises with 1-50 employees represented 73 people, which accounted for 64% of our sample while enterprises with 50-200 represented 36% employees.

3.2. Variable Measurement

The study uses 4 independent variables, 1 dependent variable, and the mediating effect of organizational innovation. In total, there are 20 questions about measurement tools, with each tool having 4 questions, by using a 5-point Likert scale, with values 1–5, where 1 strongly disagrees and 5 strongly agrees.

Dependent variable: This study represents ESG as a dependent variable. The questionnaire measures all ESG dimensions with 4 questions. Some of the questions also contain information from the K-ESG index represented by the Ministry of Trade, Industry and Energy in 2021 (Niu et al., 2022).

Independent variables: The study measures firm competitiveness and digital adoption as independent variables, where all questions are assessed by Wang and Esperanca (2023). Previous researchers, Ghasemaghaei (2021) and Rahman et al. (2021) proved the reliability and validity of questions for firm competitiveness and Chatterjee et al. (2021) and Yu et al. (2021) for DA. Transformational leadership is also represented as an independent variable, and questions developed by various scholars.

Organizational innovation is represented as a mediating effect on ESG performance, with a total of 4 items. The reliability and validity were checked by Kantur & Iseri-Say 2015.

4. Data Analysis

4.1. Reliability and Validity

This paper analyses the reliability of the measures to identify how existing results are consistent from questionnaire to questionnaire. To measure reliability, the study applies Cronbach's alpha. As

Chaiyasoonthorn and Suksa-ngiam (2011), Habibi et al. (2014, Khoshtaria (2016) and Matin et al., 2020 say, postulate Cronbach's alpha with 0.7 is considered reliable, and values below number cannot prove reliability. For example, in this paper, Cronbach's alpha coefficients for ESG performance, transformational leadership, digital adoption, and organizational innovation are measured with the number of 3 items, and firm competitiveness is measured by the number of 4 items that equals 0.998, 0.937, 0.921, 0.994, and 0.948 respectively, that are more than 0.7, which shows each item in the questionnaire has a high degree of reliability (Khoshtaria et al., 2024; Matin et al., 2023 a; Matin et al., 2023 b; Matin et al., 2024; Mercan et al., 2020; Mercan & Kitesashvili, 2023)(see table 1)

Table 1. Reliability and Validity of Measurements Items

Variable	**Factor loadings**		**Cronbach`s alpha**
Transformational leadership	TL1	0.867	0.937
	TL2	0.776	
	TL3	0.755	
Digital adoption	DA1	0.809	0.921
	DA2	0.879	
	DA3	0.889	
Firm competitiveness	FC1	0.879	0.948
	FC2	0.873	
	FC3	0.884	
	FC4	0.864	
Organizational innovation	OI1	0.987	0.994
	OI2	0.993	
	OI3	0.980	
ESG performance	ESG1	0.896	0.998
	ESG2	0.895	
	ESG3	0.896	

Furthermore, the study applied factor loading to identify the validity of all variables, ensuring that the measurement tool accurately measures the variables it is intended to measure. Matin et al. (2020) accepted validity with factor loadings above 0.5, thus this paper uses the existing threshold and proves the validity of the variables, as the factor loadings are above 0.5 for all variables.

4.2. Multi-collinearity test

In the paper tolerance for each variable is above 0.9 (above 0.1 threshold) indicating more than 90% of the variance in every variable is unique to its items and not impacted by other predictors in the model. Furthermore, the Variance Inflation Factor (VIF) is below the 10 threshold determining that there is no multi-collinearity issue in the model(see table 2)

Table 2. Multi- Collinearity Test

Model	Collinearity Statistics	
	Tolerance	VIF
TransLead	.941	1.062
DigitAdop	.989	1.012
FirmComp	.993	1.007
OrgInn	.931	1.074

4.3. Common method bias

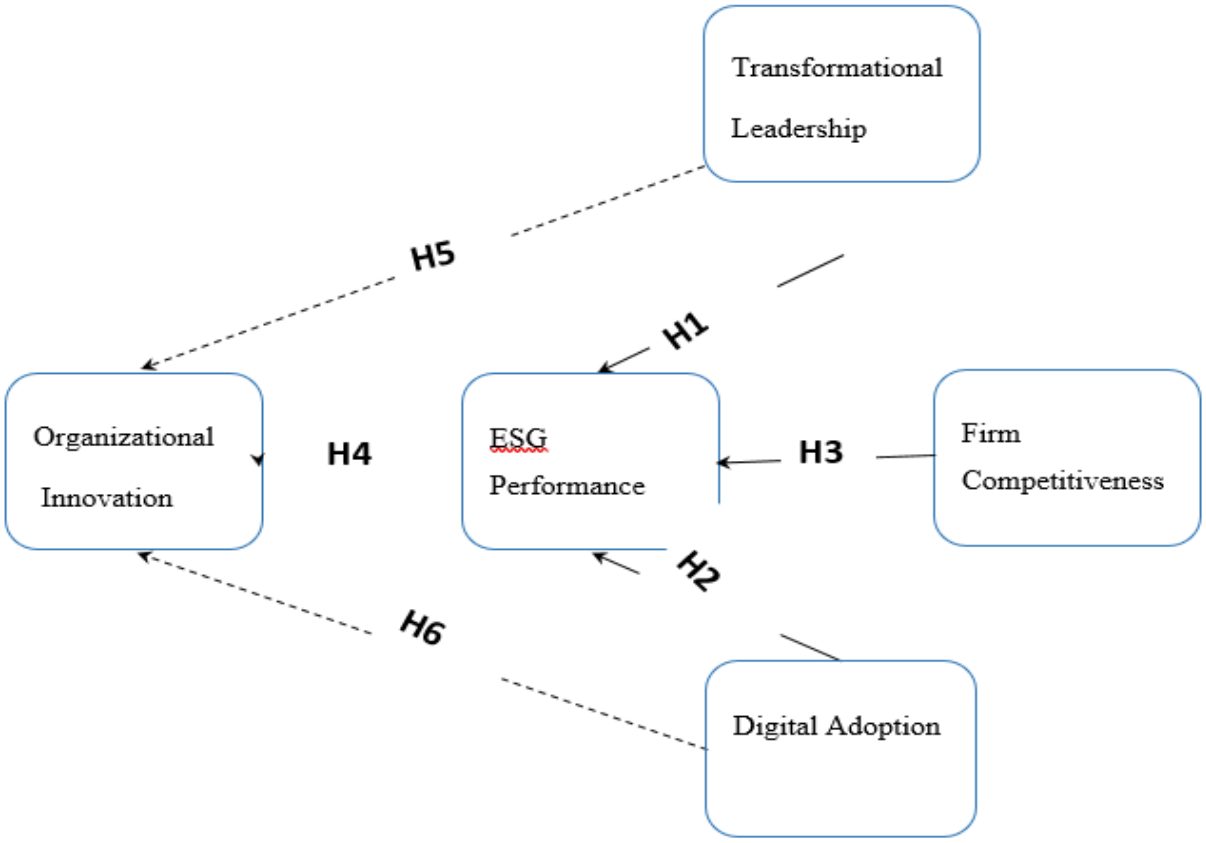
For testing common method bias, the study employed Herman`s single-factor test. The total variance of the single factor is calculated at 33.8% well below the 50% threshold. So we can conclude that there is not one underlying factor determining the variance in the whole model. As a result, there is a common method bias associated with the model.

4.4. Model fit

The goodness of fit of the model was also tested. The results demonstrated that the model shows suitable fit. The thresholds were set for Goodness of Fit (GFI) at 0.9 and Parsimony Goodness of Fit (PGFI) at 0.5. Moreover, the Standardized Root Mean Square Residual (SRMR) threshold was set at 0.5 (Hu and Bentler, 1999; Mulaik et al 1989).

4.5. Research Mode

Figure 1. Research Model

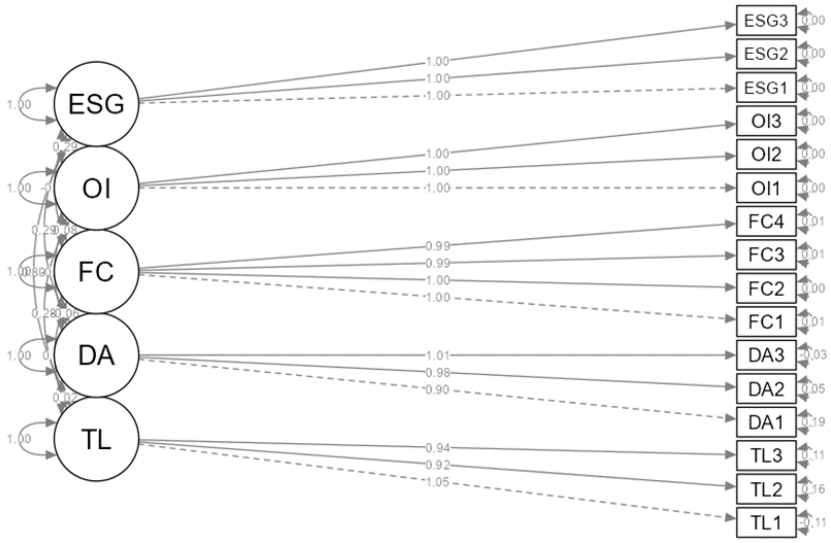


In this study, from the 5 scaled questions mean fluctuates between 3.2 - and 3.8 when the neutral value is 3. It shows that items mostly tended to have higher values above neutral as means for all variables are above 3. It indicates that there is moderate agreement, respondents tend to give positive answers but do not express a strong consensus. Additionally, SD is represented as $0.5 \leq SD < 1.0$, which indicates responses are spread out around the mean. Furthermore, as the data is considered normal if Skewness is between +2 and -2 and Kurtosis is between +7 and -7, results illustrated the normal distribution of the data.

4.7. Structural Equation Modelling

The study then utilized the Structural Equation Modeling (SEM) to test the hypotheses. The Data was analyzed utilizing Jamovi 2.3.38.

Figure 2. Structural Equation Model



The hypotheses were tested and the result indicated that Transformational Leadership, Digital Adoption, and Organizational Innovation positively impact ESG performance. While the effect of Firm Competitiveness on ESG performance was found to be insignificant.

Analyzing if hypotheses should be rejected or supported depends on the significance level, which is P value (0.05). From the given table, the first hypothesis H1 which checks the relationship between transformational leadership and ESGP, we can support as its significance lever is below 0.05 (β= 0.796 P=0.001), in the case of H2 digital adoption effect on ESG performance has been supported successfully (β=0.287 P=0.001), H3 which shows a link between firm competitiveness and ESG is rejected, because of significance level (β= -0.066 P=0.438), As for the H4 that evaluates correlation between organizational innovation and ESG is also supported (β= 0.289, P= 001). In the case of indirect effect, the study examines the mediation effect for H5, which checks organizational innovation mediation through transformational leadership on ESG performance by Sobel test which equals 1.861368, standard Error=

0.02911246, and P value which is above 0.05 (0.062). For the H6 mediation analysis, which evaluates organizational innovation mediation through digital adoption on ESG performance Sobel test 0.92442802, Standard error= 0.01971489 and P=0.335. As a result, from the analysis, the mediation effect is not significant at a 5% confidence interval but significant at 10%. According to that, we reject it for its insignificant effect.

Table 3. Variances and Covariances

				95% Confidence Intervals				
Variable 1	**Variable 2**	**Estimate**	**SE**	**Lower**	**Upper**	**β**	**z**	**p**
TL	ESG	0.83780	0.02555	0.78772	0.88788	0.79690	32.790	< .001
DA	ESG	0.25782	0.07483	0.11116	0.40447	0.28707	3.446	< .001
FC	ESG	-0.06571	0.08468	-0.23167	0.10025	-0.06601	-0.776	0.438
OI	ESG	0.28923	0.06949	0.15303	0.42543	0.28955	4.162	< .001

4.8. Artificial Neural Network

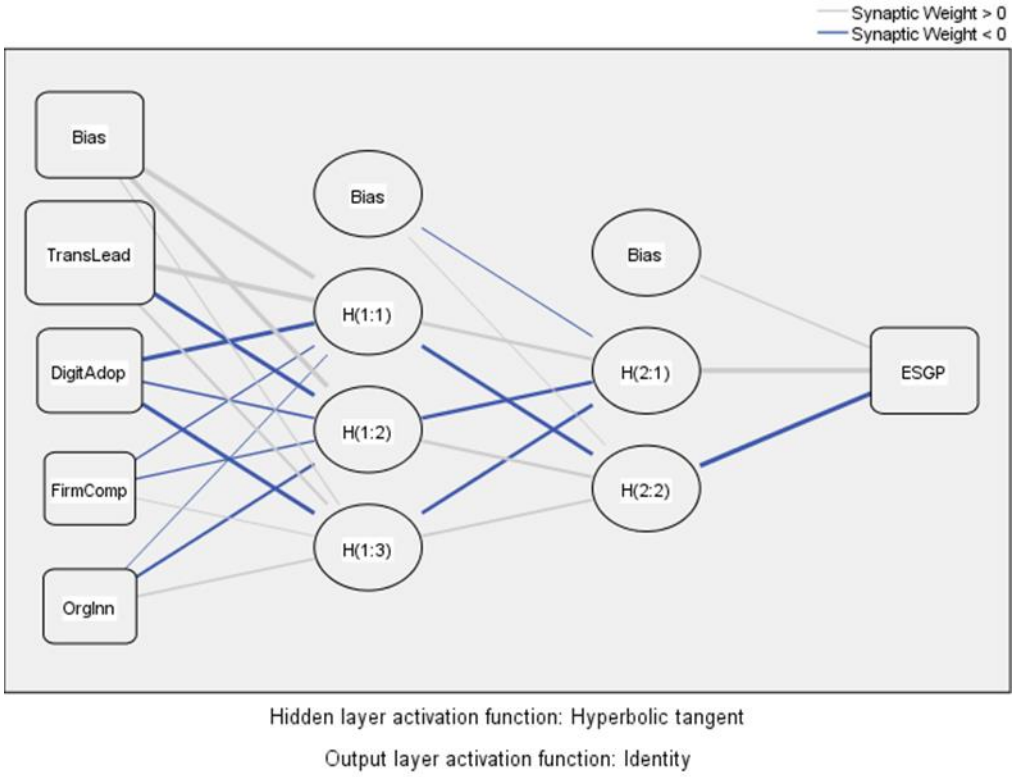
This paper analyzed neural networks for data analysis where a multilayer perceptron was used with two hidden layers to activate deep learning of data, and applied hyperbolic tangent technique to examine those hidden layers, which identify the output layer (see figure3).

According to the model summary, the relative errors for the training sample e=0.270 and the testing sample e=0.279. The discrepancy between them is 0.009, which explains that weights and biases for the training sample apply very closely to the testing sample when weights and biases for the network were calculated between the input, the hidden layers, and the output.

In this paper, R2 was used to compare variations in Structural Equation Modeling and neural networks. For both input and output functions, hyperbolic tangent generated the highest fit for the model with R2=0.73 by employing a cubic fit index, when in SME R2= 0.608, which emphasizes that correlation in a neural network is higher in variations on ESG than in Structural Equation Modeling.

Moreover, the fit for the residuals was calculated to ensure the residuals were not impacting the model in any meaningful way. The predicted value of the residuals showed R2= 0.000548, determining an insignificant value and confirming the fit for applying ANN to the model.

Figure 3. Neural Network Analysis



4.9. Importance of Variables

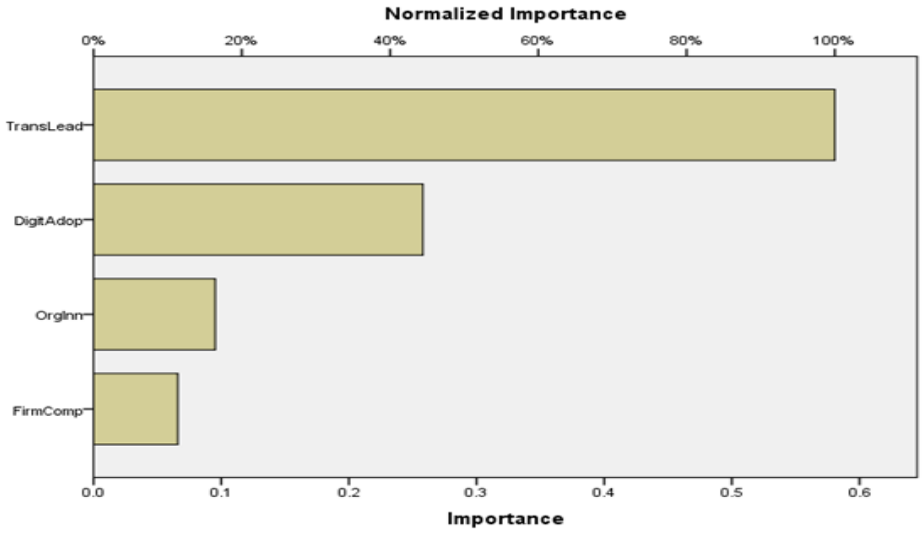
Utilizing ANN analysis, this study estimated the importance of variables. It generated which variable expresses the highest importance for ESG performance. As the study showed the most important variable impacting ESG performance was revealed to be transformational leadership, followed by digital adoption, then organizational innovation and last is Firm competitiveness which is the least important for ESG performance (see figure 4).

4.10. Decision tree analysis

To test and compare ANN analysis with other machine-learning methods. The current study utilizes the decision trees as another form of priority analysis. The ESG performance was set as the outcome of the analysis similar to ANN and Chi-Squared Automatic Interaction Detection (CHAID) was employed for the model. The testing and training sub-samples were once again selected at 80% and 20% accordingly, to avoid overfitting. The minimum number of cases for the parent node was defined as 100 and for the child node at 10. Furthermore, the tree was pruned to maximum difference in standard error at 1 to eliminate

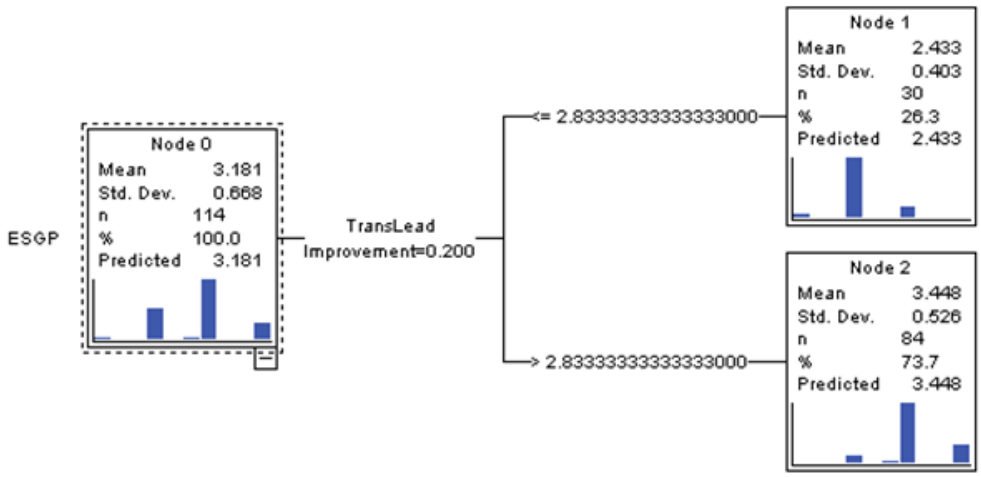
overfitting. The risk estimate was calculated at 0.243 generating roughly 76% predictability of the model by the CHAID analysis. The result is in line with ANN analysis showing transformational leadership as the main driver of ESG performance among firms surveyed.

Figure 4. Importance of Variables



As can be observed from the analysis, 73% of the sample falls within the second node of transformational leadership above the 2.83 cutoff value with a mean of 3.44, and 30% is classified under 2.83 with a 2.43 mean(figure5)

Figure 5. Decision Tree (CHAID)



5. Discussion

This study enhances the knowledge and perception about how ESG performance can be strengthened by transformational leadership. Due to the lack of information in this perspective, the study examines the consequences of existing ESGP, which is caused by different reasons. The paper underlines interactions among Digital adoption, organizational innovation, firm competitiveness, transformational leadership, and ESG performance.

The current study demonstrates that if leaders inspire their followers, it will affect an organization's performance to increase motivation and perception of a company among employees. Furthermore, one of the leadership styles that consider organizational innovation is focusing on management style, developing technologies, and finding profitable perspectives causing fundamental implications for ESG performance, which also involves firm competitiveness, which causes another change in ESG activities. Moreover, external factors such as digital transformation play a vital role in environmental, social, and also governmental factors.

First, to compare our results to previous researchers, they found a positive significant link between transformational leadership on ESG performance, this study also proves that the relationship between those 2 variables is vital. However, studies about transformational leadership and ESG were examined in the context of SEMs, (Wang and Esperanca 2023) drivers of organizational innovation (Chen et al. 2016), or sources of motivation and inspiration for work engagement. (Bakker et al., 2023). This study is considered an important contribution to the existing literature as it provides a perspective on the effects of transformational leadership style on environmental, social and also governmental performances.

Second, this study demonstrates that digital adoption is a crucial factor that effectively promotes ESG performance, which is a valuable addition to previous research. Some of the papers identify ways to improve ESG for better operational activities. As Wang and Esperanca (2023) tested, digital adoption is one of the intermediary variables to develop ESG performances, while this paper draws a significant direct effect of digital adoption on ESG performances.

Third, this study adds knowledge about organizational innovation as a mediator role between Transformational leadership and Digital adoption on ESG, where there is no significant effect. However, in the case of direct effect, there is an essential link, that has been explored in previous researchers too.

Furthermore, this paper rejects firm competitiveness as a significant driver for ESG performance. This is the paper that is giving information about the direct effect of firm competitiveness and ESG when other researchers don't test the link between that 2 variables, but Wang and Esperanca (2023) found that firm competitiveness positively affects ESG through an indirect way.

Lastly, the paper provides a road map for other research for the future in this area. Researchers can further build on this model to investigate other outcomes and reasons for ESGP changes. This study provides a clear understanding of causal factors for environmental, social, and governmental factors that are considered one of the main crucial aspects for managers in organizations.

5.1. Limitations

This study uses a non-probability type of sampling method and represents convenience sampling. According to that, there is a limitation of lack of generalization. Additionally, the sample is collected only from Georgian employees, and for the accuracy of the results, it is better to conduct a study in different areas not to have any area limitations and inexact findings. Furthermore, this study uses only 114 people for sampling, which can be considered a low number of people. For a more comprehensive analysis can use a larger sample size, because it is possible that the existing sample doesn't represent whole populations and there will be a limitation of the findings to the broader population.

5.2. Conclusion and Recommendation

As ESG is considered one of the main three dimensions, that should be paid attention to, researchers testing it in different contexts to examine the gap. The term is associated with competitiveness, more efficient operations and reputation, and waste mitigation, which will surely improve the overall value of the stakeholders and the sustainability of the company. The paper is presented with 6 hypotheses, where there are 4 independent variables Transformational Leadership, Digital Adoption, Organizational Innovation, and Firm Competitiveness, and 1 dependent variable, which is ESG performance and the mediating effect of organizational innovation. The study aims to find out the direct relationship between Transformational Leadership and ESG performance, as a result, it tests the hypothesis and uses a convenience sampling method for data collection. After collecting data successfully, the study applied Cronbach`s alpha and factor loading to prove reliability and validity, where all variables resulted in more than 0.7 for reliability and 0.5 for validity.

Furthermore, for deeper knowledge study uses Structural Equation Modeling, where the result showed

that the transformational leadership, digital adoption, and organizational innovation direct effect on ESG is significant and supported, while the hypothesis about firm competitiveness's direct effect on ESGP is rejected, as P value for this variable showed more than 0.05 number.According to our analysis mediation effect is also rejected, as it isn't considered significant by 5%.

In the study, we used ANN analysis, where R2 was calculated and compared with the results of structural equation modeling. Results found that correlation in neural networks is greater in variations on ESGP than in Structural Equation Modeling. Additionally, the study explores residuals and hidden layers applies an advanced understanding of a more accurate algorithm, and determines the predicted value. According to all analysis and information, this research identifies transformational leadership as the most important variable, that has the highs significant effect on ESG performance, while the least important is Firm competitiveness.

As the questionnaire for this study is collected in Georgia, Tbilisi, The future recommendation for researchers will be to apply similar studies in other geographic areas. Furthermore, I recommend researchers to test the model using probability sampling.

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