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FACTORS AFFECTING INTELLECTUAL CAPITAL AMONGST THE BEST RANKING ESG ECONOMIES: A PANEL DATA ANALYSIS.

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Abstract: Economies have widely accepted intellectual capital and the associated long-term gain of firms and industries. The ESG performance of the economies is the primary factor that affects the decision of any multinational corporation to invest in a country. It is essential to list out economies that have been outperforming their counterparts in terms of ESG rankings and evaluate factors impacting intellectual capital among those economies. Thus, the objective of the current research is to understand the factors affecting intellectual capital amongst the best-ranking ESG economies. An analysis of the factors affecting intellectual capital will be represented by a proxy variable, the Global Innovation Index (GII), over 10 years from 2011 to 2020. The essential factors that will be tested to have a significant effect will include ESG performance, internationalization, performance of human capital, and GDP growth. A secondary quantitative approach has been used in the study. 20 best ranking ESG countries are selected for the research. The data analysis technique used in the study consists of descriptive statistics, correlation analysis, and panel data regression. The outcome of the study is that individual GDP growth has a positive and significant impact. Whereas, HDI has a negative and significant impact on GII. On the other hand, collectively HDI, FDI, ESG score, and GDP growth can have a positive significant impact on the global innovation index (GII). However, the model has only 26% of the variability. Overall, a macroeconomic view of policies should be focus more on economic development policies that top ESG countries must follow to overperform in terms of innovation.
Keywords: *ESG score, Intellectual capital, Global innovation index, ESG performance*

1. Introduction

Investors and firms consider investing according to the sustainability principles for creating long-term value. In recent years, there has been an increase in the importance of environmental, social, and governance (ESG) among different countries. Consideration of ESG factors has increased among different countries. The European Union (EU) was the first economic community to introduce the requirements of ESG with the EU directive on Non-

Financial and Diversity Information (Park & Jang, 2021). Corporate ESG adoption can have different expected outcomes, which can include improving the firm value and promoting sustainability along with bringing positive impact on the employees' work, engagement, cost savings, customer loyalty, and differentiation and improving the productive behavior of the employees. It is observed that there is an increase in the importance of country sustainability because of the long-term economic prosperity (Wang, Yu & Zhong, 2023). An important aspect from the perspective of the policymakers is whether the country-level sustainability improvements support economic growth because of the associated production interruptions and implementation costs. It encourages examining the ways through which the country's sustainability improvement can influence economic growth. Further, the economies that are highly ranked concerning ESG are considerably more responsible and sustainable for the value creation in the long term.

One essential aspect overlooked is the country's intellectual capital. In a new economic era, organizations worldwide have recognized the importance of obtaining intangible assets, which can contribute to superior performance. Thus, in this context, evaluating the factors that can impact intellectual capital can be crucial. Further, the factors that can influence intellectual capital within the best-performing ESG economies can be crucial to identify as they can help provide insights related to driving long-term success, economic growth, and sustainable development.

There is enhanced interconnectedness between social responsibility, environmental factors, effective governance practices, and the capacity for long-term value creation. Identifying the factors that influence the intellectual capital among the best ESG economies can help provide insights, which can be beneficial for business practices and policymakers. For businesses that are successfully operating in the best ESG countries, there will be a better understanding of the factors that can impact intellectual capital, which can help in making better decisions, making strategies, and enhancing performance, sustainability, and competitiveness. Further, for policymakers, the results can help design interventions that can improve the country's intellectual capital. The results can also contribute to the literature on intellectual capital and the best-ranking ESG economies by providing more helpful insights. These contributions towards better business practices and policies motivate the study to continue to identify the factors.

This paper aims to understand the impact of factors such as ESG performance, internationalization, human capital performance, and GDP growth on the intellectual capital of economies ranking high in ESG. Answering this question will help countries enhance their intellectual capital and strengthen innovation effectiveness.

2. Literature Review

2.1 Best Ranking ESG Economies

The evaluations made by the ESG agencies and the sustainability indices related to the socially responsible behaviours of the firms play a crucial role in socially responsible investing (SRI) (Escrig-Olmedo et al., 2010). Similarly, the ESG performance of the economies also plays a crucial role in the decision-making for the multinational firms that are considering investment in the country. In this respect, Park and Jang (2021) stated that ESG elements are

crucial factors for investors in investment decision-making. The author pointed out that ESG management is one of the social issues both domestically and internationally.

The ESG disclosure compliance is different for the emerging countries and the developed countries. The ESG disclosure regulation influences the position of the country in the 50 largest economies and SDGI ranking (Plastun et al., 2020). In the case of developed countries, there is higher ESG disclosure compliance. Besides, the country that has more compliance with the ESG disclosure criteria has better rankings. Baldini et al. (2018) stated that empirical studies highlight that ESG disclosure varies between companies and countries due to the information disclosed by the managers.

2.2 Intellectual capital and ESG performance

Hsu and Wang (2012) highlight that intellectual capital consists of relational capital, human capital, and structural capital. In recent years, intellectual capital has captured the interest of many practitioners and researchers. One of the definitions of intellectual capital is "*Knowledge that can be converted into value*" by Edvinsson and Sullivan (1996) (Hsu & Wang, 2012). Innovation as a result of education, can help the countries in competing in the globalized market. There is a striking difference between the low-performing countries and the highest-scoring companies. Intellectual capital can mainly be measured by understanding innovation factors. Wesiak (2007) noted that renewal capital mainly highlights the capability of the country with respect to innovation, which shows future intellectual wealth.

Global Innovation Index (GII) can be used to consider innovation against the geopolitical and economic environment. In this respect, Nasir and Zhang (2024) highlighted that the Global Innovation Index is an index that can help track the innovation capabilities and efficiency level of various countries with the use of output and input criteria. The Global Innovation Index (GII) ranks the countries per innovation performance. On the other hand, Ali. et al. (2021) captured the multidimensional view of intellectual capital. The author noted that intellectual capital consists of intangible assets that can help provide a competitive advantage concerning knowledge, skills, technologies, experiences, and relationships. Further, the author highlighted that the synergy between achievement in innovation performance and intellectual capital has developed as a subject in economic growth studies. J. Chouaibi and S. Chouaibi (2020) have noted that intellectual capital helps companies to be motivated to adopt voluntary disclosure policies for better legitimacy and transparency. On a firm level, Pham, Liu, and Chen (2024) conducted a study to investigate the relationship between the intellectual capital and overall ESG performance of the firms for publicly listed organizations across 30 countries for 20 years. The resulting study highlighted that ESG performance positively correlates significantly with intellectual capital.

Wesiak (2007) conducted a study to observe the measurement of national intellectual capital among the EU countries. It is defined in the study related to intellectual capital that it includes the hidden values of enterprises, individuals, communities, institutions and regions, which are the potential and current sources of the wealth creation. The study has considered a measurement of human, rational, renewal and structural capital. Further, Yeh-Yun Lin and Edvinsson (2008) highlighted that national capital relates to the competencies of the individuals in realizing the goals of the nation. The variable taken in the study relates to the rate of literacy,

amount of skilled labour degree of employee training, the pupil-teacher, and the ratio of enrolment in the institution of higher education or public expenditure on education.

HI: ESG performance has a positive significant effect on Intellectual Capital

2.3 Factors Affecting Intellectual Capital

2.3.1 Internationalization

Elliott and Zhou (2013) observed the relationship between foreign direct investment and environmental regulation. The author highlighted that a greater stringency in environmental standards can increase strategic capital inflows. The study highlights that tighter environmental regulation can motivate capital inflows and improve total social welfare. Reza et al. (2021) noted that companies with higher intellectual capital can perform better in expanding their business in the international market. Further, the intellectual capital characteristics are also helpful in overcoming the challenges related to internationalisation. The author noted that the empirical studies on internationalisation focus on franchising, exporting, foreign direct investment (FDI), and licensing. Further, Korsakienė et al. (2021) opine that intellectual capital is one of the driving forces for internationalization. The study highlighted that the combination of structural, human, and relational capital is one of the significant contributors to organisations and the expansion of companies, mainly organizations in knowledge-based industries.

Andreeva et al. (2021) highlighted that intellectual capital studies are mainly related to the resource-based view of the firms, which is criticised for overlooking the external environment's role. It is noted that the institutional environment, mainly the country's legal framework, is relevant for the innovation efforts and knowledge base of the country. Michie (2001) highlighted the impact of foreign direct investment (FDI) on human capital enhancement in the case of developing countries. The author argues that the incoming foreign direct investment (FDI) enhances human capital development.

H2: Internationalization has a positive significant effect on Intellectual Capital.

2.3.2 Human Capital Performance

El-Bannany (2008) conducted a study to identify the intellectual capital performance determinants. This research highlighted that human capital is one of the components of intellectual capital, which is considered a crucial resource for organisations to improve efficiency and efficacy and gain a competitive advantage. Human capital generates innovation through new services or products or the improvement of business processes. Vo and Tran (2023) conducted a study to measure the national intellectual capital and its significant impact on the competitiveness of the country. The author has considered human capital, relational capital, and structural capital to be the most crucial elements of intellectual capital. The study used various social and economic indicators as proxies for the intellectual capital component. The results of the research indicated that intellectual capital helps in enhancing the competitiveness of the country.

H3: Human capital performance has a positive significant effect on Intellectual Capital.

2.3.3 GDP growth

Pelinescu (2015) stated that as per the theory of economic growth, there is an emphasis on the importance of innovation and education, which are elements of human capital in

economic growth. The author has noted that as per the classical theory of economic growth, along with the new theories of economic growth, human capital plays a crucial role in the country's development. It is noted that among the OECD data from 1971 to 1998, increased education of schooling by one year can increase the GDP per capita by 6%. Results revealed that human capital has an impact on innovation and technology. Besides, Stevanović et al. (2018) have conducted a similar study highlighting the impact of national intellectual capital on economic growth in European countries. Technology, knowledge, and innovation, mainly intellectual capital, are the key drivers for national competitiveness and economic growth. Overall, research results highlight a positive and statistically significant correlation between the national intellectual capital measures and GDP per capita. The results reveal that an increase in research and development researchers, high-technology exports, and mobile phone subscribers has a significant and positive impact on economic growth.

H4: GDP growth has a positive significant effect on Intellectual Capital.

2.4 Research Gap

The literature shows that multiple studies depict the importance of intellectual capital and ESG performance. However, there is a gap in the study as most of the studies are focused on the firm level. There is a lack of studies conducted on the country level. Besides, a relevant study that can show the factors impacting intellectual capital among best-ranking ESG countries is not found. Multiple studies have been found on the factors impacting the intellectual capital of firms. However, only a few studies have shown the country-level impact. The literature review has identified several variables that can be considered proxies for the factors impacting intellectual capital. Although studies are revealing the significant factors that have an impact on intellectual capital, an appropriate study that can highlight those impacts among the best ESG-ranking countries has also not been found. Thus, there is an opportunity to identify the factors affecting intellectual capital amongst the best-ranking ESG economies.

3. Methodology

3.1 Research method

This research has considered quantitative data analysis methods, including empirical analysis and secondary data analysis.

The objective is to analyse the factors impacting the intellectual capital of the country. Thus, the research choice relates to using the quantitative approach. This research depends on correlational research by establishing a cause-and-effect relationship between the variables. The study is correlational research because of the use of two or more variables understanding the statistical relationship among factors impacting intellectual capital among best-ranking ESG countries.

The above section highlighted the variables and proxies. The next step is using a model, which can show the direction of the research. The regression analysis can form a linear equation. Random and fixed-effect models can be highlighted, and the Hausman test can be used to show that the fixed-effect model is more appropriate for the intellectual capital model. The benchmark regression model for this paper is shown below.

$$GII_{it} = \beta_0 + \beta_1 ESG_{it} + \beta_2 FDI_{it} + \beta_3 HDI_{it} + \beta_4 GDP_{it} + \mu_i + \lambda_t + \varepsilon_{it} \quad (1)$$

In the current research the time frame is 10 years, from 2011 to 2020. Data is analyzed through STATA software by including descriptive statistics, correlation analysis, and multivariate regression with the Hausman test.

3.2 Sample selection

This research is based on, which is secondary secondary data collection. The objective of the current study is to evaluate the factors impacting intellectual capital among the best-ranking ESG countries. For this purpose, the first aspect is identifying the top 20 best-ranking ESG countries. Further, a quantitative data analysis method is used where there is a selection of 20 countries that have the best ESG ranking. The 20 countries are selected from the "Robeco Report". The current ESG score data was available, revealing the best-ranking ESG countries. Country scores are from 0 to 100, where 0 highlights the lowest risk and 100 highlights the highest risk. Thus, as per the current data, the countries that have the lowest risk are Finland, Iceland, Norway, Sweden, Portugal, Italy, Switzerland, New Zealand, Australia, Denmark, Austria, Germany, Netherlands, Luxembourg, Estonia, Ireland, United Kingdom, France, Japan, Canada, Slovenia, and Belgium. The study has considered these for the purpose of analysis.

(Source: Robeco, 2024)

Figure 1: Best ESG ranking countries

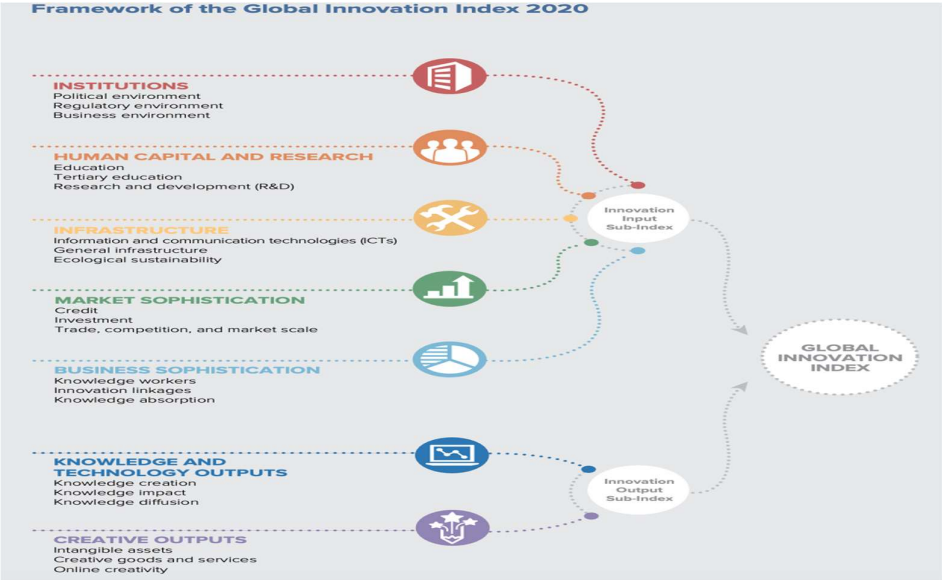
Thus, when the best-ranking ESG economies were identified, the next step was identifying the factors that can impact these countries' intellectual capital. For this purpose, it is crucial to identify the independent and dependent variables.

3.3 Variables Selection, proxies, and Data Sources

3.3.1 Dependent Variable

Intellectual Capital: Global Innovation Index (GII). A country's intellectual capital is considered a crucial source of productivity and competitiveness. Užienė (2014) highlighted that global organisations consider intellectual capital investment to be one of the crucial factors in the determination of the job creation, economic growth, and living standards. The literature review highlighted that intellectual capital can be measured mainly by understanding

innovation factors. Thus, Nasir and Zhang (2024) noted that the Global Innovation Index (GII) is an index that can help track the innovation capabilities and efficiency level of various countries using output and input criteria. Hence, GII is taken as a dependent variable. GII aims to consider the multidimensional facets of innovation.



(Source: GII, 2020)

Figure 2: Global Innovation Index

3.3.2 Independent Variables

ESG performance: ESG Composite Index. Each organization operates according to behavioural country-specific regulations and the diverse cultural, social, and behavioural characteristics of the individuals linked to the country. Understanding ESG indexes and ESG ratings is crucial for the assessment of best-ranking ESG economies. Pagano, Sinclair, and Yang (2018) observed that the term 'index' can be used to describe a rating, list, or ranking. ESG index is used to highlight the market capitalization-weighted index for ESG performance. ESG ratings are used to show the scoring framework of a country, company, or sector's performance on ESG factors, which are measured systematically by considering the combined ESG score.

Environmental, social, and governance (ESG) data has been gathered from the World Bank for this study**.** For taking the ESG score, a composite score was obtained from the World Bank. Under environment, there are different variables like emission & pollution, environment/climate risk & resilience, energy use & security, and others. Under governance factors, variables include economic environment, gender, human rights, innovation, government effectiveness, etc. Social variables include education & skills, access to services, employment, demography, health & nutrition, and others. For this study, a composite score has been calculated by considering a few variables. The indicators or variables selected are as follows:

Environment: CO_2 emission and Energy use

Social: Unemployment, total (% of the total labour force), and literacy rate, adult total (% of people ages 15 and above)

Governance: Government Effectiveness: Estimate and School enrollment, primary and secondary (gross), gender parity index (GPI)

Internationalisation: Foreign Direct Investments (FDI). Reza et al. (2021) highlighted that the empirical studies on internationalization focus on franchising, exporting, foreign direct investment (FDI), and licensing. Foreign Direct Investment (FDI) is considered the independent variable for internationalisation. The study shows that Foreign Direct Investment (FDI) can impact the intellectual capital of the countries. FDI is the net inflow of investment to purchase a management interest in a firm that operates in an economy other than that of the investors. It means that FDI is a reinvestment of earnings, equity capital, short-term capital or long-term capital that are highlighted in the balance of payments. Net FDI data is calculated through the net FDI inflows, which are liabilities, and net FDI outflows, which are assets. The data is directly taken from the World Bank. FDI enhances economic growth in the host countries, mainly through the transfer of knowledge and technology. Thus, FDI can be an essential factor in revealing the internationalization of the countries.

Human capital performance: Human Development Index (HDI). Human Development Index (HDI)- The Human Development Index (HDI) has been created to highlight that people and their capabilities are the essential criteria for evaluating the development of the country rather than economic growth. HDI is a summary of the major dimensions of human development, which can be being knowledgeable, having a long and healthy life, or having a decent standard of living that is decent.

3.3.3 Control variable

GDP growth. Pelinescu (2015) has highlighted the importance of human capital in economic growth by considering the variable gross domestic product per capita. Similarly, in the current research, GDP growth has been considered to be the control variable for the study. The objective is to identify whether GDP growth can have an impact on the intellectual capital of the countries selected.

3.4 Data sources

GII: GII data from 2013 and 2020 has been gathered from the World Bank for the 20 best-ranking ESG countries (The World Bank Group, 2024d). The data source is the Global Innovation Index (GII). For 2011 and 2012, data was gathered from the report published by the Global Innovation Index. GII consists of various components, including institutions, infrastructure, creative outputs, human capital and research, knowledge and technology output, business sophistication, market sophistication, and others (GII, 2020).

ESG Score: ESG data was collected from Sovereign ESG Data Portal: World Bank (The World Bank Group, 2024a). The World Bank provides a wide range of ESG data for financial market participants, policymakers, and academic researchers. The above-mentioned variables were used to build a composite ESG score through the aggregate ESG score builder. This composite score is one of the popular ways to evaluate countries' ESG performance.

FDI: The World Bank has gathered FDI data for 20 countries for 10 years. Data for “Foreign Direct Investment, net (BoP, current US$)” has been collected for the study (The World Bank Group, 2024c).

HDI: Data for HDI have been gathered from the official website of the United Nations Development Programme (United Nations Development Programme, 2024). The data is

gathered from composite indices time-series data links. Further, only the 20 best ESG countries' HDI indexes are considered from 2011 to 2020.

GDP growth: GDP growth data for 20 countries for 10 years has been gathered from the World Bank. Data for "GDP growth (annual %)" has been collected for the study (The World Bank Group, 2024c).

4. Empirical Results and Analysis

4.1 Descriptive Analysis

Descriptive analysis is used to summarise the data used in the current research. The descriptive table shows the mean, observations, minimum, standard deviation, and maximum.

Table 1: Descriptive Statistics

Variable	*Observations*	*Mean*	*Standard Deviation*	*Minimum*	*Maximum*
Global Innovation Index (GII)	200	55.62	4.9	42.9	68.4
ESG Score	200	.45	.15	.04	.75
HDI	200	.92	.019	.871	.96
GDP growth	200	1.69	2.96	-10.35	24.47
FDI	200	-.08	11.10	-102.33	51.41

(Appendix 1)

The above table shows that the GII measure reveals that the mean value is 55.62 showing that 20 countries have moderate innovation. Some country has low innovation at 42.9, and some have high innovation at 68.4. The SD of 4.9 reveals that the GII scores are moderately varying from the average value, which means that the innovation among the best-ranking ESG countries can have some differences. With respect to ESG score, it is observed that there is a high difference as some country has a low score of .04 and some have .75. The minimum and maximum values show that among the 20 countries, some countries are highlighting the variability in ESG ratings of the countries. The HDI measure shows that the mean value is 0.87, indicating that among the best-ranking ESG countries, there is a high level of human development. Further, only 0.02 of standard deviation reveals that there is minor variability in HDI among best-ranking ESG countries in the sample. GDP growth shows that there is high SD showing significant variability, where some countries in the sample are growing rapidly, and some have negative growth. Further, the growth range of -10.35 to 24.47 indicates that in the economic performance of the countries, there is a wide range. Similarly, FDI shows some have low investment, and some have high inflows. In the case of FDI, there is a negative mean, which shows that there is a large number of outflows in the foreign capital of the sample countries, which indicates disinvestment. Besides, the minimum value of -102.33 and maximum of 51.41 indicates that there is substantial variability among the sample countries with respect to FDI.

4.2 Correlation analysis

Pearson correlation analysis is used in the research as a statistical technique to measure the level to which the variables move with each other. This research used correlation to understand the relationship between the dependent variable, intellectual capital, and the independent variables. Pearson correlation analysis can be helpful in measuring the association between the variables in the current research. When there is a positive correlation, it means that an increase in one variable shows an increase in another variable.

Table 2: Correlation analysis

	Global Innovation Index (GII)	***ESG Score***	***HDI***	***GDP growth***	***FDI***
Global Innovation Index (GII	1.00				
ESG Score	0.02	1.00			
HDI	0.42	-0.24	1.00		
GDP growth	0.05	0.11	0.00	1.00	
FDI	-0.04	0.00	0.019	0.05	1.00

(Appendix 2)

The above table shows that the ESG score (0.02) has a weak positive correlation with GII. It means that there is a slight link between the innovation level and ESG performance of the countries. It indicates that the countries that have slightly better ESG scores can have slightly higher innovation. There is a negative correlation between ESG and HDI, showing that there is no significant correlation between HDI and ESG performance of countries. On the contrary, HDI has a moderate positive correlation with the Global Innovation Index (GII). It shows that among the best-ranking ESG countries, the countries that have a high level of human development are more likely to have higher innovation levels and better intellectual capital. However, there is a weak negative correlation of GII with FDI (-0.04). It means that the countries that have high innovation show that there can have high innovation show that there can be a low level of FDI. On the other hand, GDP growth (0.05) has a weak positive correlation with GII. It shows that there is some link between economic growth and innovation/intellectual capital. Further, the countries that have higher GDP growth can have better ESG scores. Overall, the above table shows that there is a weak positive correlation between the variables.

4.3 Panel Data Regression

The regression analysis has been used, which includes the fixed effects and random effect model for evaluating the influence of the dependent variables on the independent variables.

Table 3: Regression analysis

	Fixed effects	***Random effects***

ESG Score	-1.42	-.25
HDI	-45.76**	-22.14
GDP growth	.186**	.171**
FDI	0.005	.004
CONS	98.31	75.96
R-squared	26%	22%

(Appendix 3)

The above table shows the results for both random effects and fixed effects models. The Hausman test (appendix 3) shows that the fixed effects model will be selected for interpreting the results. The dependent variable is intellectual capital, and the proxy is taken as GII. The results from the fixed effect model show that there is a positive and significant relationship between GII and GDP growth. It means that for every GDP growth unit increase, there can be an increase in the dependable variable. Further, there is a negative significant relationship between HDI and GII. It means that with the increase in HDI, there can be a decline in intellectual capital.

Results show that ESG score and FDI have no significant relationship with intellectual capital. However, when considering all the independent variables together (prob>F= 0.0026), there can be a positive significant impact on GII. Thus, HDI, FDI, ESG score, and GDP growth collectively can have a positive significant impact on the global innovation index (GII). The variables are determinants of GII at a 5% significance level. Further, the R-squared value is 26%, which depicts that the model has 26% variability. This means that 84% of the variables that can influence intellectual capital are not considered in the study. Overall, considering individuals the results highlight that GDP growth has a positive significant impact on Intellectual capital among best-ranking ESG economies, and HDI has a negative significant correlation with Innovation/intellectual capital.

Analysis

Hypothesis

HI: ESG performance has a positive significant effect on Intellectual Capital

Analysis shows that ESG Score does not a have significant relationship with intellectual capital.

H2: Internationalization has a positive significant effect on Intellectual Capital

Analysis shows Internationalization does not have a significant relationship with intellectual capital.

H3: Human capital performance has a positive significant effect on Intellectual Capital

Analysis shows human capital performance has a negative significant relationship with intellectual capital.

H4: GDP growth has a positive significant effect on Intellectual Capital.

The analysis supports H4, showing that GDP growth has a positive and significant relationship with intellectual capital.

The above section shows that the ESG performance of the countries cannot be considered a factor that can impact the intellectual capital of the country. In previous studies, it was noted that on a firm level, the ESG performance of companies has a significantly strong

positive correlation with intellectual capital. However, this study has considered country-level data, which indicates that the ESG performance of the countries does not have a significant positive relationship with intellectual capital. Next, the results of this study show that Internationalization does not have a significant relationship with intellectual capital. For internationalisation, FDI has been considered as the variable. The descriptive statistics revealed that there is a negative mean, revealing that there are a large number of outflows in the foreign capital of the sample 20 countries showing disinvestment. Further, there is a substantial variability among the sample countries in respect of FDI. Thus, it can be observed that FDI may not be a good indicator of internationalization. Next, it is observed that human capital performance has a negative significant relationship with intellectual capital. Considering the previous studies, it is observed that Pelinescu (2015) noted classical theory of economic growth, along with the new theories of economic growth, shows human capital playing a crucial role in the development of the country. However, this research adds a new finding showing that HDI can have a negative impact on the intellectual capital of the sample countries. Lastly, the research results highlight that GDP growth has a positive and significant relationship with intellectual capital. Previous research by Stevanović et al. (2018) noted that innovation is considered to be an important source of competitiveness. Technology, knowledge, and innovation, mainly intellectual capital, are the key drivers for national competitiveness and economic growth. Similarly, the results from this research have revealed that the economic growth of countries (best ranking in terms of ESG), is also one of the factors that can affect intellectual capital. This shows that the results from this study can contribute to the academic literature as new findings have been raised. This research reveals that the economic performance of the country can impact intellectual capital.

5. Conclusions and Policy Recommendations

This research focused on the objective of evaluating the factors affecting intellectual capital amongst the best-ranking ESG economies. For this purpose, a secondary quantitative approach has been used in the study. There is a selection of 20 countries that have the best ESG ranking for 10 years from 2011 to 2020. These countries are best best-ranking ESG countries in comparison to their counterparts. The dependent variable used in the study was intellectual capital and the proxy used for the same is the Global Innovation Index (GII). Independent variables taken are internationalization (proxy: FDI), human capital performance (proxy: human development index), and ESG performance (proxy: ESG score). The control variable selected is GDP growth.

Descriptive analysis shows that the HDI measure mean value is 0.87, indicating that among the best-ranking ESG countries, there is a high level of human development. Correlation shows that HDI has a moderate positive correlation with the Global Innovation Index (GII). There is a weaker positive correlation of GII with ESG score and GDP growth. However, there is some link between internationalization and economic growth with innovation/intellectual capital. Regression analysis shows that, individually, only GDP growth has a positive and significant relationship between GII and GDP growth. Further, HDI has a negative significant relationship with GII. However, collectively HDI, FDI, ESG score, and GDP growth can have a positive significant impact on the global innovation index (GII). However, the model has only 26% of the variability.

As per the above findings, there can be different policy recommendations for enhancing the intellectual capital of the countries. First, it is observed that there is a negative relationship between HDI and intellectual capital. However, despite that, it is important for the countries to have proper investment in the healthcare department, education, skills and training for enhancing the overall human development. Thus, the recommended policies can be focused on promoting learning in the country, enhancing education and providing good quality health care within the countries. Further, it is noted that GDP growth has an impact on intellectual capital. Thus, the policies can be dependent upon encouraging technological advancement, digitalization and innovation in the countries that can overall impact the intellectual capital. It may include providing incentives to the firms that are considering the integration of innovation in their business or doing more research and development for developing new innovative products. This way, there can be encouragement to include technology and innovation that can impact the overall GDP growth and intellectual capital of the countries. Another important finding in the study is that there is a significant outflow of foreign capital. Thus, it is crucial to analyze the impact on quality of the foreign investments. For example, the policy recommendation can provide incentives for foreign direct investment that can include innovation, research and development, and skills development. This way, there can be better strategies related to foreign direct investment for the countries. This research can be crucial for business practitioners, policymakers, and academic researchers. For business practitioners, strategic decisions can be dependent upon considering social responsibility or the promotion of environmental factors, where an economic focus can indirectly give support to intellectual resource development. There can be a focus on the economic development policies, which can help in guiding the innovation-focused long-term growth.

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Appendices

Appendix 1: Descriptive Statistics

```
. summarize GlobalInnovationIndexGII ESGScore HDI GDPgrowth FDIchange
```

Variable	Obs	Mean	Std. Dev.	Min	Max
GlobalInno~I	200	55.62625	4.984241	42.9	68.4
ESGScore	200	.44665	.1513168	.04	.75
HDI	200	.925965	.019265	.871	.962
GDPgrowth	200	1.694774	2.967529	-10.3599	24.47525
FDIchange	200	-.0892962	11.10837	-102.3324	51.41715

Appendix 2: Correlation Analysis

```
. correl GlobalInnovationIndexGII ESGScore HDI GDPgrowth FDIchange
(obs=200)
```

	Global~I	ESGScore	HDI	GDPgro~h	FDIcha~e
GlobalInno~I	1.0000				
ESGScore	0.0246	1.0000			
HDI	0.4204	-0.2418	1.0000		
GDPgrowth	0.0585	0.1151	0.0042	1.0000	
FDIchange	-0.0464	0.0081	0.0190	0.0585	1.0000

Appendix 3: Regression analysis

```
. hausman fe re
```

	Coefficients (b) fe	(B) re	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
ESGScore	-1.420753	-.2573176	-1.163435	.2890842
HDI	-45.76158	-22.14884	-23.61274	6.44416
GDPgrowth	.1863113	.1710611	.0152502	.
FDIchange	.0056408	.004819	.0008218	.

```
                b = consistent under Ho and Ha; obtained from xtreg
 B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

                chi2(4) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                        =       13.04
              Prob>chi2 =      0.0111
              (V_b-V_B is not positive definite)
```

```
. xtreg GlobalInnovationIndexGII ESGScore HDI GDPgrowth FDIchange, fe

Fixed-effects (within) regression               Number of obs     =       200
Group variable: CountryName                     Number of groups  =        20

R-sq:                                           Obs per group:
     within  = 0.0882                                         min =        10
     between = 0.2593                                         avg =      10.0
     overall = 0.1187                                         max =        10

                                                F(4,176)          =      4.25
corr(u_i, Xb)  = -0.5305                        Prob > F          =    0.0026

------------------------------------------------------------------------------
GlobalInno~I |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    ESGScore |  -1.420753   1.515939    -0.94   0.350    -4.412511    1.571005
         HDI |  -45.76158   20.91601    -2.19   0.030    -87.04004   -4.483127
   GDPgrowth |   .1863113   .0518098     3.60   0.000     .0840628    .2885597
   FDIchange |   .0056408    .012293     0.46   0.647    -.0186198    .0299013
       _cons |    98.3192   19.80989     4.96   0.000     59.22371    137.4147
-------------+----------------------------------------------------------------
     sigma_u |    5.252331
     sigma_e |    1.832141
         rho |    .8915211   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0: F(19, 176) = 52.84                     Prob > F = 0.0000

. est store fe

. xtreg GlobalInnovationIndexGII ESGScore HDI GDPgrowth FDIchange, re

Random-effects GLS regression                   Number of obs     =       200
Group variable: CountryName                     Number of groups  =        20

R-sq:                                           Obs per group:
     within  = 0.0822                                         min =        10
     between = 0.2222                                         avg =      10.0
     overall = 0.0543                                         max =        10

                                                Wald chi2(4)      =     12.79
corr(u_i, X)   = 0 (assumed)                    Prob > chi2       =    0.0124

------------------------------------------------------------------------------
GlobalInno~I |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    ESGScore |  -.2573176    1.48812    -0.17   0.863    -3.17398    2.659345
         HDI |  -22.14884   19.89854    -1.11   0.266   -61.14927    16.85159
   GDPgrowth |   .1710611   .0525059     3.26   0.001     .0681514    .2739708
   FDIchange |    .004819   .0125349     0.38   0.701    -.019749     .029387
       _cons |    75.96075   18.86748     4.03   0.000     38.98118    112.9403
-------------+----------------------------------------------------------------
     sigma_u |   4.2391484
     sigma_e |    1.832141
         rho |   .84260693   (fraction of variance due to u_i)
------------------------------------------------------------------------------

.
.
. est store re
```