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Article

Exploring The Relationship Between Iso 14001 Ems and Esg Performance of Malaysian Companies

Sia Mal Kong[1], Yew Wong Chin[2,*], Tan Say Keat[1], Daniel Ong Zhang Jie[1] & Sia Wen Di[3]

[1]Faculty of Built Environment, Tunku Abdul Rahman University of Management and Technology, Jalan Genting Kelang, Setapak, 53300 Kuala Lumpur, Malaysia
[2]American University of Sovereign Nations, USA
[3]Gerimis Art Project, Kuala Lumpur, Malaysia

[*]Corresponding Author: vivienyew1963@gmail.com

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Abstract: Global environmental concerns have garnered significant attention in recent times. Concerns about encouraging more ecologically friendly production to lessen the effects of pollution have been raised by industrial operations that cause environmental pollution. The adoption of an environmental management system in Malaysian firms, however, has received little attention. This paper explores the mediating effect of Environmental, Social and Governance (ESG) framework on the relationship between ISO 14001 Environmental Management System (EMS) and ESG performance of Malaysian companies. Partial Least Squares Structural Equation Modeling (PLS-SEM) using SmartPLS 4 was employed to assess the relationship through a conceptual model developed for this purpose. A total of 86 completed responses were collected from the targeted respondents in Malaysia of different industries. With ESG framework as a mediator, ISO 14001 EMS has an insignificant relationship with ESG performance, and the R^2 value of ESG performance is 0.243. When the ESG framework is removed, ISO 14001 EMS has a significant relationship with ESG performance, and the f-square value is 0.176. This effect size is considered medium. The results provide an empirical proof for Malaysian companies to adopt the ISO 14001 EMS as a business tool, with ESG framework as a mediator in order to enhance their ESG performance. The study's conclusions highlight the implications of using ISO 14001 EMS as a tool for businesses in Malaysia to improve ESG performance.

Keywords: Business Tool; ESG Criteria; ESG Performance; ISO 14001; PLS-SEM; mediator

Introduction

The Earth we live in is plagued with numerous issues, among them are depletion of natural resources, environmental pollutions, climate change and the loss of biodiversity (Khan and Johl, 2019). Compounded by increasing world population, sustainability of our lives and our survival depends very much on good governance of these environmental and social issues. We have to sustainably develop our mother Earth so that she could meet the needs of future generations.

The use of environmental, social and governance (ESG) data in making investment decisions has become increasingly important (Cornell, 2020). The number of companies measuring and reporting ESG data has increased significantly. ESG data consist of the information regarding environment, e.g. emissions of carbon, waste generation and water consumption); social, e.g. customer related, employee and product; and governance, e.g. political advocacy and diversity on the anti-corruption board (Amel-Zadeh & Serafeim, 2017). ESG reporting has also been acknowledged as a new tool to analyse businesses that focus on

environmental, social and governance issues. Thus, a company with a solid overall record of environmental, social and governance practices is better operated, carries less risk, and has the potential to provide higher long-term financial returns (Syed, 2017).

The primary objectives of ESG criteria are similar to the objectives of the ISO 14001 environmental management system (EMS), which are to increase environmental performance, lower environmental expenses, lower risks, train staff, provide impact indicators, and maintain compliance with environmental legislation (Christini, Fetsko & Hendrickson, 2004). Additionally, ISO 14001 EMS is also a standard that can serve as a framework to manage sustainable development in businesses (Campos, de Melo Heizen, Verdinelli & Cauchick, 2015). Ronalter, Bernardo and Romaní (2022) verified the positive impacts of ISO 14001 EMS on ESG performance for all the three pillars. However, Ronalter, Poltronieri and Gerolamo (2023) lamented that there is a shortage of academic studies on management system standards with specific focus on sustainability issues. They suggested that empirical studies are needed to assess the impact of management system standards on sustainable development goal (SDG) achievement and ESG performance.

Several compelling conclusions from Ronalter et al.'s 2023 study, which examines ISO management system standards in the context of corporate sustainability, have drawn attention from academic studies. Specifically, the relationship between ISO 14001-based environmental management systems (EMS) and an organization's ability to continuously improve its environmental performance, especially through waste reduction and resource efficiency, gaining a competitive edge, and winning over stakeholders. Given this, the goal of this study is to investigate the influence of ISO 14001 EMS implementation on the ESG performance of Malaysian enterprises using SmartPLS 4.

The conceptual framework, which is based on the authors' research on a variety of literatures, including Altermaker (2015), Amel-Zadeh and Serafeim (2017), Amran and Ooi (2014), Arpit (2023), Babakri et al. (2004), Bansal and Bogner (2002), Bettinazzi and Zollo (2015), Boiral et al. (2017), Campos et al. (2015), Christini et al. (2004), Cornell (2020), Elleuch et al. (2018) and Elytus (2019) is then being used to explore the relationship between ISO 14001 EMS and ESG Performance is shown in Figure 1, with the ESG Framework as a mediator. The construct ISO14001 EMS is conceptualised as a higher order construct (HOC) consisting of three lower order constructs (LOCs). Similarly, the construct ESG Performance is conceptualised as a HOC consisting of three LOCs. Likewise, the construct ESG Framework is conceptualised as a HOC consisting of three LOCs.

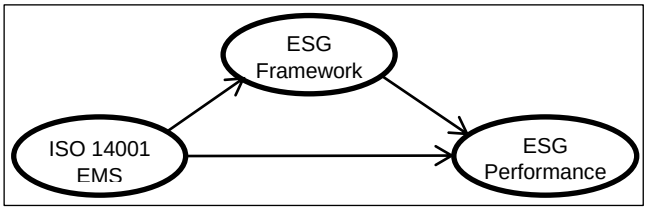

Figure 1. ESG framework as a mediator

Literature Review

1. Environmental, Social and Governance Framework

ESG information is vital for a company's management purpose. Access to ESG information can assist the management in making informed adjustment to their business plan and proactively implementing necessary changes in response to analysts' forecast (Greenwald, 2010).

Environmental Criteria

The achievement of environmental sustainability has become a critical concern for companies seeking to improve their ESG performance and long-term values. One of the most important environmental criteria for companies is reducing greenhouse gas emissions. Implementing energy-efficient practices, such as using LED lighting, investing in energy-efficient equipment, and utilizing smart building technologies, can help companies to reduce their carbon footprint (Elytus, 2019). Additionally, companies can opt for renewable

energy sources, such as solar and wind power, or offset their emissions through carbon credits or other mechanisms. Effective waste and pollution management is also crucial for companies to achieve their environmental sustainability goals. In addition to reducing the negative impact of business operations on the environment, this can also lead to cost savings and improved operational efficiency (Elleuch, Bouhamed, Elloussaief & Jaghbir, 2018). For example, by adopting recycling programmes, companies can reduce the amount of waste generated and potentially lower the costs associated with waste disposal (RTS, 2020). By using environmentally friendly materials and implementing pollution control technologies, companies can reduce the risk of environmental liability and improve their reputations among customers and stakeholders (USEPA, 2018). Conserving natural resources can be achieved through sustainable sourcing practices, such as sourcing materials from certified sustainable sources, reducing water consumption through efficient processes and technologies, and minimizing the use of non-renewable resources such as fossil fuels (Nick, 2023). By conserving natural resources, companies can reduce operational costs, build resilience against resource scarcity, and contribute to sustainable development (NetRegs, 2023).

Corporate Social Criteria

A crucial aspect of achieving social sustainability is ensuring safe working conditions for employees. Research has shown that a company's focus on employee safety positively impacts both the employees' well-being and the company's financial performance (Janicak, 2015). Companies that prioritize employee safety are more likely to have motivated employees who have higher productivity and lower absenteeism rates. Respecting human rights is another important social criterion for achieving ESG (Vargas, 2018). Studies have shown that companies that prioritize human rights have better financial performance. Companies that respect human rights have higher employee satisfaction, which translates to lower employee turnover rates and higher productivity (Okafor, Adeleye & Adusei, 2021). Promoting diversity and inclusion is also a critical social criterion for achieving ESG. Companies must engage with the communities in which they operate and ensure that their operations do not negatively impact the local community (Malik, 2023a). Research has shown that companies that engage with their communities are more likely to have better financial performance (Arpit, 2023).

Corporate Governance Criteria

The governance dimension of ESG refers to the mechanisms through which companies are managed, directed and controlled, and the level of accountability and transparency in their decision-making processes. Transparency reporting involves disclosing relevant information to stakeholders about the company's operations, policies, and performance. Such reporting is crucial in building trust and credibility with stakeholders, including investors, customers, and regulators (Gupta & Kalia, 2022). Studies have shown that firms that provide more transparent information about their sustainability performance are more likely to attract socially responsible investors, enhance their reputation, and mitigate environmental and social risks (Amran & Ooi, 2014). Independent and diverse board membership is another important governance criterion that can contribute to achieving ESG goals. Board independence refers to the extent to which the board is free from conflicts of interest, while board diversity refers to the range of demographic and experiential backgrounds of board members (Malik, 2023b). Studies have shown that firms with robust risk management systems are more likely to achieve sustainability goals and create long-term value for all stakeholders (Nobanee, Al Hamadi, Abdulaziz, Abukarsh, Alqahtani, AlSubaey, Alqahtani & Almansoori, 2021).

2. Benefits of ISO 14001 Environmental Management Systems on ESG

Implementing an environmental management system in a business has become a widely adopted practice that can yield significant benefits. Effective environmental management has the potential to positively impact a company's performance by reducing costs and increasing differentiation (Tari, Molina-Azorin & Heras, 2012).

Benefits of ISO 14001 on Environmental

A meta-analysis by Maletic, Podpecan and Maletic (2015) on the environmental performance which have been influenced by the implementation of ISO 14001 in six different organizations located at Savinjsko-Šaleška revealed the positive impacts after implemented the ISO 14001 EMS. The result showed there is a strong agreement in the resource consumption (thermal energy, electricity, and water) in the last three years.

The term "waste" refers to inefficiencies within the production process, and its elimination can result in enhanced financial outcomes. This means that reducing waste can improve the overall profitability of a business or organization (Veleva, Bailey & Jurczyk, 2001). Nguyen and Hens (2015) found that the implementation of ISO 14001 led to significant enhancement in environmental performance across three sectors, namely recycling, hazardous waste, and management's environment awareness.

Furthermore, ISO 14001 also helps in improve the environmental performance through recycling materials. According to Rondinelli and Vestage's (2000) study on the ISO 14001 process at Mt Holly, the implementation of ISO14001 resulted in an increase in the number of ideas generated by employees for materials recycling, as well as a greater commitment to recycling.

Benefits of ISO 14001 on Social

The adoption of ISO 14001 by a company can have a positive influence on establishing a safe and healthy work environment for its employees. Providing a secure workplace is crucial to minimize internal environmental incidents and enhance productivity by reducing sickness absence. Employee training aimed at increasing environmental awareness helped in the implementation of ISO 14001 (Boiral, Guilaumie, Heras-Saizarbitoria & Tayo Tene, 2017).

Additionally, implementing ISO 14001 can improve a company's reputation. There is a growing need for environmentally friendly items as the general public's awareness of environmental issues grows. As a result, organizations that have received ISO 14001 certification may gain the respect and confidence of stakeholders. The primary benefit of ISO 14001's social impact, according to Boiral et al. (2017), is its influence on image, stakeholder relationships, and reputation, with 91% of positive benefits noted.

Benefits of ISO 14001 on Governance

According to Papagiannakis, Voudouris, Liokas and Kassinis (2019), implementing ISO 14001 can assist organizations in demonstrating their commitment to sustainability, improving their environmental performance, enhancing their reputation, and increasing stakeholder support. The ISO 14001 certification mandates businesses maintain a structured record-keeping system of their environmental components in addition to increasing stakeholder engagement.

The actions taken to improve environmental performance are related to compliance with regional environmental laws and regulations (Bansal & Bogner, 2002). This covers any aspects of their activities, goods, or services that may have an adverse effect on the environment. Kwon, Seo and Seo (2002) discovered that in Korea, businesses with ISO 14001 certifications had a lower percentage of environmental law violations than those without certifications. McGuire (2014) showed that ISO 14001 certification improved environmental disclosure quality and reduced the frequency of environmental infractions, both of which had a beneficial impact on regulatory compliance. ISO 14001 as a process standard offers businesses a framework within which to create their own long-term goals and objectives. Better management practices are ultimately intended to improve environmental performance (Kwon, Seo & Seo, 2002).

Organizations can improve their transparency and disclosure to stakeholders through implementing ISO 14001 into practice. To do this, businesses must be open with stakeholders and share data on their economic, social, and environmental performance, which is in line with the principles of good corporate governance (Said, Hj Zainuddin & Haron, 2009).

3. ESG Performance of Malaysian Companies

Environmental Performance

The environmental performance of a company is an indication of its ability to protect the environment.

Environmental performance is a crucial aspect of ESG performance for Malaysian companies, given the country's natural resource endowment and growing exposure to risks of climate change (Ong, Lee, Yeh & Magsi, 2019). Malaysia as one of the world's largest producers of palm oil has been associated with deforestation, habitat destruction, and greenhouse gas emissions. As a result, Malaysian companies have begun to adopt sustainability practices, such as sourcing sustainable palm oil and implementing renewable energy projects.

Social Performance

Social sustainability is a critical aspect of corporate sustainability, encompassing a range of factors such as working conditions, employee relations, health and safety, diversity, human rights, fair labour practices, community involvement, and charitable giving. Scholars have noted the importance of assessing a company's social sustainability performance to determine its level of commitment to social responsibility and its impact on stakeholders (Mustafa, Othman & Perumal, 2012). In Malaysia, social sustainability is particularly important due to the country's diverse population and significant social and labour rights issues. Malaysian companies have implemented various initiatives to address these issues and promote social sustainability. For instance, Telekom Malaysia Berhad has launched initiatives to support education, health, and community development, as well as efforts to promote digital inclusion and bridge the digital divide in Malaysia (Telekom Malaysia Berhad, 2021).

Governance Performance

Several Malaysian companies have implemented strong governance practices to ensure ethical and sustainable operations. Tenaga Nasional Berhad has implemented various governance initiatives to ensure accountability and transparency in its operations. The company has established a Board of Directors and various committees, including an Audit and Risk Management Committee and a Governance and Nomination Committee, to oversee the company operations and ensure compliance with relevant regulations (Lau, Choong, Ching, Wei, Senadjki, Chong & Seow, 2022). These initiatives have contributed to the company's sustainable success by ensuring adherence to high standards of corporate governance.

Methodology

Based on the literature review conducted, Table 1 summarises the LOCs and the indicators for the three HOCs. The ESG Framework construct is operationalized by the criteria for complying with each of the ESG pillars, and the ISO 14001 EMS construct is operationalized by the benefits of implementing ISO 14001 EMS according to each of the ESG pillars. Both the constructs are measured on a scale from 1 = strong disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree. On the other hand, the ESG Performance construct is operationalized by the initiatives taken by Malaysian companies to attain the ESG pillars, measured on a scale from 1 = extremely unsuccessful, 4 = unsuccessful, 3 = neutral, 4 = successful, and 5 = extremely successful. Figure 2 shows the reflective-reflective initial model.

A survey questionnaire, constructed based on the indicators identified for each of the LOCs as shown in Table 1, was developed and employed to collect the data for this study. Over a period of two months, spanning from 7 June 2023 to 20 August 2023, a total of 300 questionnaires in Google Forms were distributed through emails to the targeted respondents in Malaysia from various industries. However, only 86 completed responses were gathered and documented. Consequently, the response rate was 28.7%. Despite follow-up reminders, factors such as respondents' refusal to participate, their limited exposure to academic surveys and limited awareness of the research title may have influenced the low response rate. However, the sample size meets the 10 times rule.

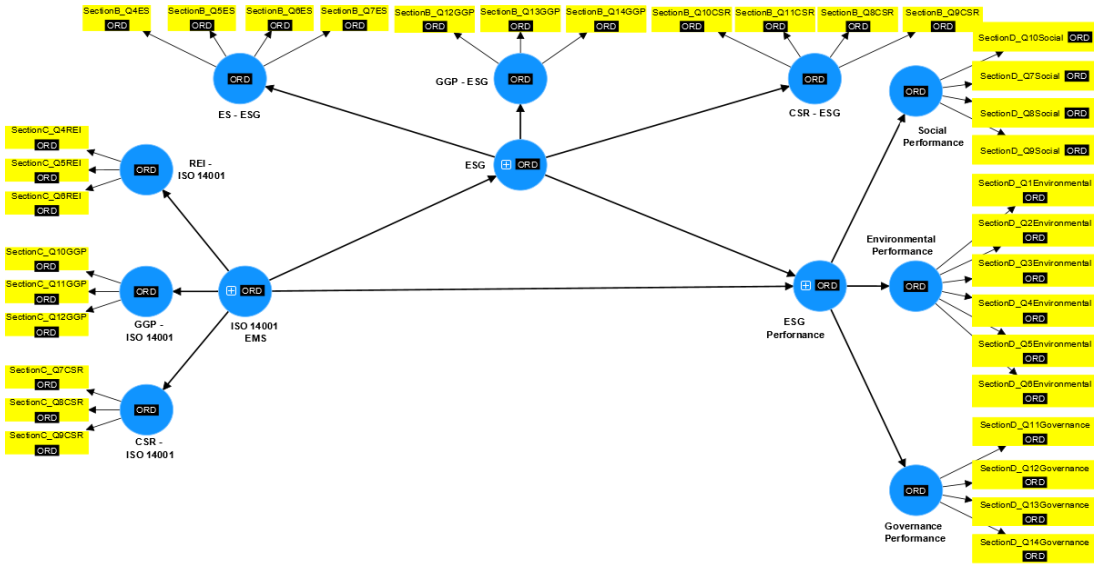

Figure 2. Initial model for this study

Table 1. Lower order constructs and indicators

LOC	Indicator	
	Code	Description
ES-ESG (Environmental Sustainability)	SectionB_Q4ES	Reducing greenhouse gas emissions
	SectionB_Q5ES	Managing wastes and pollution
	SectionB_Q6ES	Investing in renewable energy
	SectionB_Q7ES	Conserving natural resources
CSR-ESG (Corporate Social Responsibility)	SectionB_Q8CSR	Ensuring safe working conditions
	SectionB_Q9CSR	Respecting human rights
	SectionB_Q10CSR	Promoting diversity and inclusion
	SectionB_Q11CSR	Engaging in philanthropic activities
GGP-ESG (Good Governance Practice)	SectionB_Q12GGP	Transparent reporting
	SectionB_Q13GGP	Independent and diverse board members
	SectionB_Q14GGP	Effective risk management
REI-ISO 14001 (Reducing Environmental Impact)	SectionC_Q4REI	Reducing resources consumption
	SectionC_Q5REI	Reducing waste ratio
	SectionC_Q6REI	Recycle materials
CSG-ISO 14001 (Corporate Social Responsibility)	SectionC_Q7CSR	Health and Safety performance
	SectionC_Q8CSR	Improve reputation
	SectionC_Q9CSR	Changes in working culture
GGP-ISO 14001 (Good Governance Practice)	SectionC_Q10GGP	Improve stakeholder engagement
	SectionC_Q11GGP	Compliance with regulations
	SectionC_Q12GGP	Transparency and disclosure
EP (Environmental Performance)	SectionD_Q1Environmental	Implementation renewable energy project
	SectionD_Q2Environmental	Reduction of carbon footprint
	SectionD_Q3Environmental	Implementation of new policy
	SectionD_Q4Environmental	Implement energy-efficient technology
	SectionD_Q5Environmental	Reducing waste
	SectionD_Q6Environmental	Using sustainable materials
SP (Social Performance)	SectionD_Q7Social	Social programmes
	SectionD_Q8Social	Prevent forced labour
	SectionD_Q9Social	Promote ethical practice
	SectionD_Q10Social	Brings benefits to community
GP (Governance Performance)	SectionD_Q11Governance	Implement governance ethical practice
	SectionD_Q12Governance	Establish code of conduct
	SectionD_Q13Governance	Independent board of directors
	SectionD_Q14Governance	Accountability and transparency

Subsequently, since this study includes two types of data—lower-order constructs and higher-order constructs—it adopts the embedded two-stage approach in PLS-SEM to assess the model as explained below.

The Findings

1. Demographic Information of Respondents

Table 2 shows that the majority of the respondents are male, outnumbering the female respondents. There were 52 male respondents and 34 female respondents participating in the questionnaire survey.

Table 2. Gender of respondents

Gender	Frequency	Percentage
Male	52	60.5
Female	34	39.5
Total	**86**	**100.0**

Respondents' Designation in Company

Table 3 displays the respondents' designations. It is observed that of the 86 respondents, 25 of them are Senior Executives, 15 respondents are Managers, 12 respondents are Directors, and 1 respondent is a Consultant. The remainders comprise of 1 respondent who is a self-employed, 3 respondents who have retired, and 29 respondents who are Junior Executives. Thus it can be concluded that 53 respondents (61.6%) who actively participated in this survey hold high positions in their respective organizations, from Senior Executives to Directors and a Consultant.

Table 3. Designations of respondents

Designation	Frequency	Percentage
Consultant	1	1.16
Director	12	13.95
Manager	15	17.44
Senior Executive	25	29.07
Junior Executive	29	33.72
Self-employed	1	1.16
Retired	3	3.49
Total	**86**	**100.0**

Respondent's Working Experience in Industry

Table 4 shows the frequency distribution of the respondents' total years of experience in industries. It is noteworthy to mention that 51 respondents (59.3%) have more than 6 years or more of working experience. There are 35 respondents (40.7%) who have less than 5 years or less of working experience. This shows that the majority of the respondents have adequate knowledge and experience about the research areas in this study.

Table 4. Total years of experience

Total Years of Experience	Frequency	Percentage
21 years and above	17	19.77
16 – 20 years	6	6.98
11- 15 years	13	15.12
6 – 10 years	15	17.44
5 years and below	35	40.70
Total	**86**	**100.0**

Descriptive Statistics of Measurement Indicators

Table 5 shows the descriptive statistics of all the indicators in Figure 2. All the indicators are within the normality range because kurtosis values with skewness values between -2 and +2 are acceptable (George & Mallery, 2019).

2. Assessment of Model Using Embedded Two-Stage Approach in PLS-SEM

According to the embedded two-stage approach, the lower-order constructs connected directly ISO 14001 EMS, ESG Performance and ESG Framework are analyzed first. After lower-order construct reliability and composite validity are established in the first stage, the next stage is to create higher-order constructs using their respective latent variable scores.

Table 5. Descriptive statistics of indicators

HOC	LOC	Indicator	Mean	SD	Excess Kurtosis	Skewness
ESG	ES - ESG	SectionB_Q4ES	3.686	0.781	0.429	-0.121
		SectionB_Q5ES	4.035	0.841	0.562	-0.663
		SectionB_Q6ES	3.860	0.824	0.077	-0.241
		SectionB_Q7ES	3.802	0.819	1.690	-0.780
	CSR - ESG	SectionB_Q8CSR	4.151	0.946	0.809	-0.980
		SectionB_Q9CSR	4.058	1.016	-0.116	-0.729
		SectionB_Q10CSR	3.802	0.860	0.831	-0.494
		SectionB_Q11CSR	3.698	0.953	-0.054	-0.338
	GGP - ESG	SectionB_Q12GGP	3.953	0.987	0.759	-0.865
		SectionB_Q13GGP	3.686	0.931	0.672	-0.560
		SectionB_Q14GGP	4.058	0.907	1.022	-0.879
ISO 14001 EMS	REI - ISO 14001	SectionC_Q4REI	3.965	0.855	0.185	-0.500
		SectionC_Q5REI	4.174	0.917	0.076	-0.817
		SectionC_Q6REI	4.151	0.946	-0.041	-0.813
	CSR - ISO14001	SectionC_Q7CSR	4.314	0.893	0.928	-1.168
		SectionC_Q8CSR	4.105	0.928	0.005	-0.746
		SectionC_Q9CSR	3.988	0.934	-0.362	-0.500
	GGP - ISO 14001	SectionC_Q10GGP	3.884	0.895	-0.217	-0.361
		SectionC_Q11GGP	3.977	0.952	-0.203	-0.611
		SectionC_Q12GGP	3.872	0.925	-0.361	-0.368
ESG Performance	EP	SectionD_Q1Environmental	2.674	1.156	-0.694	0.208
		SectionD_Q2Environmental	2.640	1.180	-0.769	0.220
		SectionD_Q3Environmental	2.814	1.186	-0.839	-0.099
		SectionD_Q4Environmental	2.767	1.138	-0.848	-0.106
		SectionD_Q5Environmental	3.128	1.189	-0.661	-0.463
		SectionD_Q6Environmental	2.872	1.189	-0.833	-0.086
	SP	SectionD_Q7Social	3.012	1.206	-0.831	-0.185
		SectionD_Q8Social	2.791	1.080	-0.771	-0.134
		SectionD_Q9Social	2.907	1.226	-0.855	0.027
		SectionD_Q10Social	3.000	1.276	-1.061	-0.171
	GP	SectionD_Q11Governance	2.802	1.199	-0.877	-0.103
		SectionD_Q12Governance	2.826	1.133	-0.705	-0.137
		SectionD_Q13Governance	2.837	1.256	-0.971	-0.080
		SectionD_Q14Governance	3.035	1.156	-0.618	-0.345

Note: Excess kurtosis = kurtosis – 3. If excess kurtosis = 1.690, kurtosis = 4.690

First Stage: Assessment of Lower Order Constructs

Table 6 summarises the outer loadings, construct reliability and validity of the LOC in the initial measurement model, where the outer loadings which ranges from 0.781 to 0.952 are well above the threshold. The composite reliability values of the constructs are higher than the recommended value of 0.700. Similarly, average variance extracted values surpassed the threshold of 0.500.

However, the Fornell-Larcker criterion in Table 7 shows that the square root of the AVE for the Environmental Performance construct (0.905) is less than its correlation with the Governance Performance

construct (0.913), indicating there is no discriminant validity between these two constructs. In addition, Table 8 shows that there are 5 HTMT values which are greater than 0.900, indicating no discriminant validity between the following constructs, namely between GGP-ESG and CSR-ESG, GP and EP, REI-ISO 14001 and CSR-ISO14001, REI-ISO 14001 and GGP-ISO 14001, and finally between SP and GP.

Table 6. Outer loading, construct reliability and validity of initial model

LOC	Indicator	Outer Loading	Cronbach's alpha	Composite reliability (Rho_a)	Composite reliability (Rho_c)	Average variance extracted (AVE)
ES - ESG	SectionB_Q4ES	0.781	0.854	0.858	0.901	0.696
	SectionB_Q5ES	0.868				
	SectionB_Q6ES	0.821				
	SectionB_Q7ES	0.864				
CSR - ESG	SectionB_Q8CSR	0.917	0.893	0.900	0.926	0.758
	SectionB_Q9CSR	0.891				
	SectionB_Q10CSR	0.861				
	SectionB_Q11CSR	0.820				
GGP - ESG	SectionB_Q12GGP	0.912	0.868	0.872	0.919	0.791
	SectionB_Q13GGP	0.883				
	SectionB_Q14GGP	0.874				
REI - ISO 14001	SectionC_Q4REI	0.882	0.897	0.900	0.936	0.829
	SectionC_Q5REI	0.925				
	SectionC_Q6REI	0.924				
CSR - ISO14001	SectionC_Q7CSR	0.952	0.886	0.897	0.930	0.816
	SectionC_Q8CSR	0.913				
	SectionC_Q9CSR	0.842				
GGP - ISO 14001	SectionC_Q10GGP	0.920	0.880	0.882	0.926	0.807
	SectionC_Q11GGP	0.901				
	SectionC_Q12GGP	0.873				
EP	SectionD_Q1Environmental	0.909	0.955	0.956	0.964	0.819
	SectionD_Q2Environmental	0.913				
	SectionD_Q3Environmental	0.932				
	SectionD_Q4Environmental	0.914				
	SectionD_Q5Environmental	0.831				
	SectionD_Q6Environmental	0.926				
SP	SectionD_Q7Social	0.900	0.940	0.940	0.957	0.848
	SectionD_Q8Social	0.920				
	SectionD_Q9Social	0.937				
	SectionD_Q10Social	0.925				
GP	SectionD_Q11Governance	0.945	0.936	0.937	0.954	0.840
	SectionD_Q12Governance	0.909				
	SectionD_Q13Governance	0.917				
	SectionD_Q14Governance	0.894				

Table 7. Fornell-Larcker criterion of initial model

LOC	CSR - ESG	CSR - ISO 14001	ES - ESG	EP	GGP - ESG	GGP – ISO 14001	GP	REI - ISO 14001	SP
CSR - ESG	**0.871**								
CSR - ISO 14001	0.634	**0.903**							
ES - ESG	0.758	0.402	**0.834**						
EP	0.401	0.199	0.381	**0.905**					
GGP – ESG	0.850	0.639	0.686	0.421	**0.890**				
GGP - ISO 14001	0.577	0.769	0.343	0.183	0.614	**0.898**			
GP	0.416	0.194	0.368	0.913	0.428	0.175	**0.916**		
REI - ISO 14001	0.665	0.827	0.454	0.381	0.669	0.844	0.338	**0.910**	
SP	0.506	0.202	0.409	0.825	0.472	0.177	0.845	0.383	**0.921**

Table 8. HTMT of initial model

LOC	CSR - ESG	CSR - ISO 14001	ES - ESG	EP	GGP - ESG	GGP – ISO 14001	GP	REI - ISO 14001	SP
CSR - ESG									
CSR - ISO 14001	0.705								
ES - ESG	0.860	0.458							
EP	0.433	0.223	0.423						
GGP - ESG	0.957	0.724	0.791	0.465					
GGP - ISO 14001	0.646	0.867	0.392	0.199	0.693				
GP	0.455	0.213	0.414	0.965	0.478	0.193			
REI - ISO 14001	0.738	0.923	0.516	0.416	0.753	0.946	0.372		
SP	0.554	0.221	0.458	0.870	0.523	0.194	0.901	0.419	

Table 9 summarises the cross-loadings of all the indicators for the 9 constructs. A few indicators in Table 9 with cross loadings < 0.100 have caused noncompliance of the initial model with the Fornell-Larcker criterion and the HTMT requirements discussed above.

Table 9. Cross loadings of initial model

Indicators	LOC								
	CSR - ESG	CSR - ISO 14001	ES - ESG	EP	GGP - ESG	GGP - ISO 14001	GP	REI - ISO 14001	SP
SectionB_Q4ES	0.540	0.238	**0.781**	0.321	0.549	0.241	0.334	0.251	0.354
SectionB_Q5ES	0.690	0.421	**0.868**	0.294	0.648	0.395	0.308	0.480	0.314
SectionB_Q6ES	0.652	0.301	**0.821**	0.376	0.557	0.236	0.323	0.384	0.431
SectionB_Q7ES	0.637	0.366	**0.864**	0.282	0.530	0.261	0.267	0.383	0.271
SectionB_Q8CSR	**0.917**	0.655	0.733	0.426	**0.827**	0.571	0.451	0.676	0.482
SectionB_Q9CSR	**0.891**	0.646	0.701	0.265	0.779	0.600	0.282	0.635	0.356
SectionB_Q10CSR	**0.851**	0.443	0.657	0.392	0.669	0.377	0.406	0.490	0.480
SectionB_Q11CSR	**0.820**	0.440	0.532	0.309	0.673	0.446	0.305	0.495	0.449
SectionB_Q12GGP	0.752	0.584	0.617	0.387	**0.912**	0.583	0.396	0.595	0.435
SectionB_Q13GGP	0.668	0.440	0.532	0.420	**0.883**	0.378	0.416	0.473	0.436
SectionB_Q14GGP	**0.838**	0.665	0.671	0.323	**0.874**	0.656	0.336	0.702	0.391
SectionC_Q4REI	0.616	0.687	0.461	0.426	0.621	0.696	0.368	**0.882**	0.384
SectionC_Q5REI	0.582	0.760	0.362	0.366	0.609	0.804	0.330	**0.925**	0.354
SectionC_Q6REI	0.619	0.808	0.423	0.256	0.601	0.798	0.231	**0.924**	0.313
SectionC_Q7CSR	0.642	**0.952**	0.412	0.240	0.622	0.733	0.242	0.826	0.259
SectionC_Q8CSR	0.527	**0.913**	0.312	0.087	0.531	0.753	0.128	0.751	0.098
SectionC_Q9CSR	0.547	**0.842**	0.365	0.216	0.583	0.588	0.151	0.655	0.189
SectionC_Q10GGP	0.526	0.694	0.312	0.218	0.640	**0.920**	0.221	0.776	0.220
SectionC_Q11GGP	0.530	0.712	0.317	0.154	0.475	**0.901**	0.135	0.802	0.116
SectionC_Q12GGP	0.499	0.667	0.295	0.118	0.540	**0.873**	0.112	0.691	0.140
SectionD_Q1Environmental	0.329	0.165	0.304	**0.909**	0.368	0.148	0.814	0.334	0.715
SectionD_Q2Environmental	0.265	0.099	0.285	**0.913**	0.309	0.123	0.811	0.286	0.692
SectionD_Q3Environmental	0.376	0.152	0.359	**0.932**	0.390	0.115	**0.872**	0.327	0.779
SectionD_Q4Environmental	0.382	0.204	0.385	**0.914**	0.354	0.218	0.847	0.362	0.762
SectionD_Q5Environmental	0.414	0.272	0.354	**0.831**	0.428	0.242	0.779	0.422	0.745
SectionD_Q6Environmental	0.407	0.192	0.376	**0.926**	0.435	0.151	0.831	0.340	0.782
SectionD_Q7Social	0.462	0.201	0.334	0.757	0.427	0.184	0.778	0.357	**0.900**
SectionD_Q8Social	0.473	0.169	0.387	0.738	0.417	0.115	0.770	0.323	**0.920**
SectionD_Q9Social	0.448	0.128	0.374	0.762	0.448	0.133	0.772	0.319	**0.937**
SectionD_Q10Social	0.479	0.245	0.410	0.780	0.445	0.218	0.791	0.412	**0.925**
SectionD_Q11Governance	0.320	0.118	0.278	**0.874**	0.356	0.108	**0.945**	0.278	0.772
SectionD_Q12Governance	0.456	0.209	0.440	**0.834**	0.431	0.174	**0.909**	0.320	0.776
SectionD_Q13Governance	0.339	0.138	0.319	**0.857**	0.363	0.118	**0.917**	0.277	0.773
SectionD_Q14Governance	0.414	0.251	0.314	0.780	0.421	0.245	**0.894**	0.366	0.775

Assessment of Final Model

To comply with the Fornell-Larcker criterion as well as HTMT requirements (less than 0.90), the following indicators have to be removed, namely SectionB_Q8CSR, SectionB_Q14GGP, SectionC_Q5REI, SectionC_Q6REI, SectionD_Q3Environmental, SectionD_Q11Governance, SectionD_Q12Governance and SectionD_Q13Governance. The final model is given in Figure 3.

Table 10 shows that the composite reliability values are higher than the recommended value of 0.700. Similarly, average variance extracted values surpassed the threshold of 0.500. The Fornell-Larcker criterion in Table 11 show that the square root of the AVE for each of the construct is more than its correlation with the other construct, indicating there is discriminant validity between the constructs.

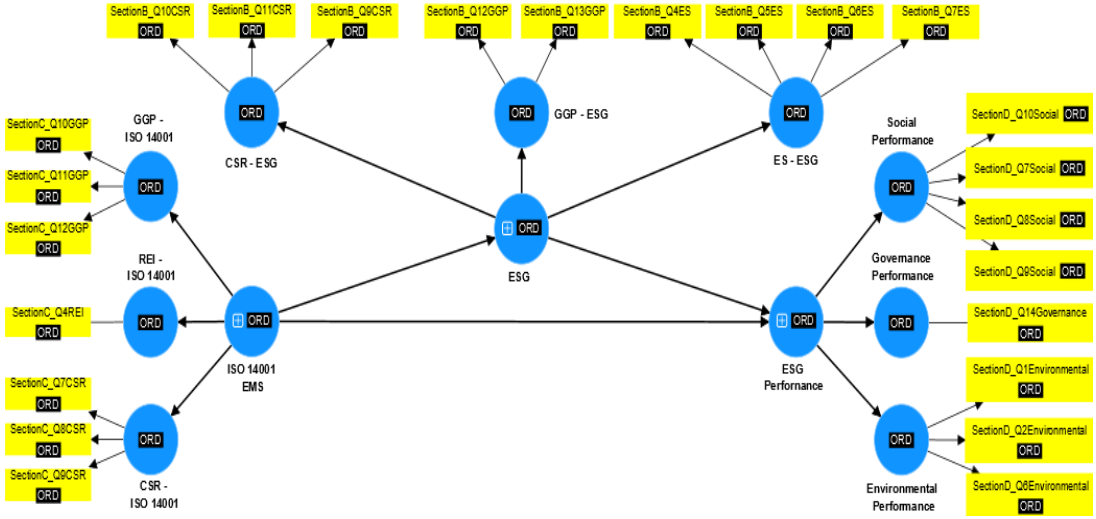

Figure 3. Final model with ESG framework as a mediator

Table 10. Construct reliability and validity of final model

	Cronbach's alpha	Rho_a	Rho_c	AVE
CSR - ESG	0.838	0.840	0.902	0.755
CSR - ISO 14001	0.886	0.895	0.930	0.816
ES - ESG	0.854	0.856	0.901	0.696
EP	0.943	0.943	0.956	0.814
GGP - ESG	0.861	0.864	0.935	0.878
GGP - ISO 14001	0.880	0.882	0.942	0.807
SP	0.940	0.940	0.957	0.848

Table 11. Fornell-Larcker criterion of final model

LOC	**CSR - ESG**	**CSR – ISO 14001**	**ES - ESG**	**EP**	**GGP - ESG**	**GGP - ISO 14001**	**GP**	**REI - ISO 14001**	**SP**
CSR - ESG	**0.869**								
CSR - ISO 14001	0.591	**0.903**							
ES - ESG	0.729	0.400	**0.834**						
EP	0.368	0.207	0.379	**0.902**					
GGP - ESG	0.729	0.550	0.616	0.427	**0.937**				
GGP - ISO 14001	0.548	0.769	0.342	0.195	0.518	**0.898**			
GP	0.371	0.250	0.313	0.776	0.392	0.245	**1.000**		
REI - ISO 14001	0.600	0.687	0.460	0.420	0.559	0.697	0.342	**1.000**	
SP	0.491	0.202	0.410	0.820	0.465	0.178	0.775	0.384	**0.921**

Table 12 shows that all the HTMT values now are less than 0.900, indicating there is discriminant validity between all the LOCs.

Table 12. HTMT of final model

LOC	CSR - ESG	CSR – ISO 14001	ES - ESG	EP	GGP - ESG	GGP – ISO 14001	GP	REI – ISO 14001	SP
CSR - ESG									
CSR - ISO 14001	0.681								
ES - ESG	0.855	0.458							
EP	0.414	0.233	0.423						
GGP - ESG	0.856	0.631	0.718	0.474					
GGP - ISO 14001	0.635	0.867	0.392	0.213	0.590				
GP	0.405	0.262	0.339	0.800	0.422	0.259			
REI - ISO 14001	0.652	0.729	0.497	0.433	0.602	0.742	0.295		
SP	0.555	0.221	0.458	0.871	0.516	0.194	0.800	0.396	

Second Stage: Assessment of Structural Model with Latent Variable Scores

Figure 4 shows the structural model with the latent variable scores for the HOCs. It is used to establish the quality criteria for the structural model.

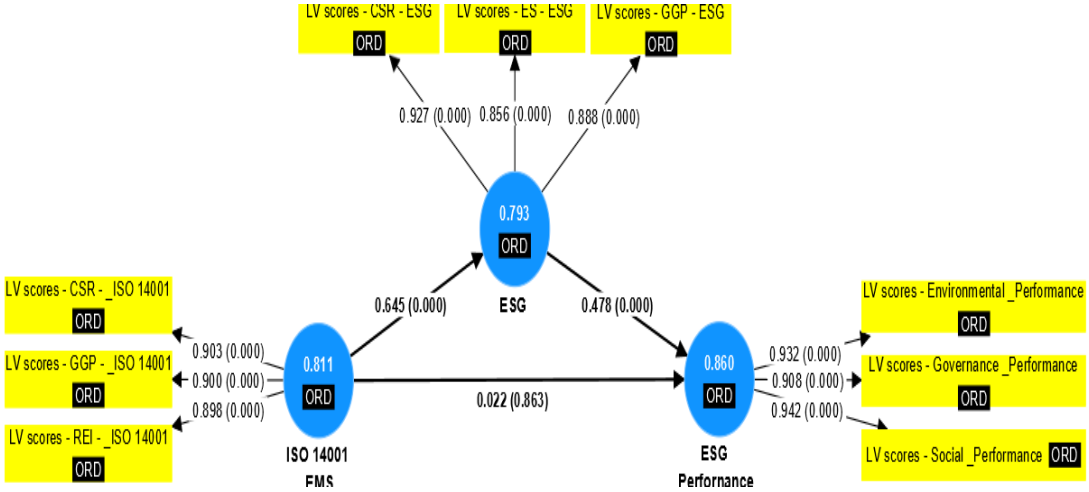

Figure 4. Structural model with latent variable scores

Table 13 shows that the composite reliability values for the structural model are higher than the recommended value of 0.700. Similarly, average variance extracted values surpassed the threshold of 0.500. The Fornell-Larcker criterion in Table 14 shows that the square root of the AVE for each of the HOC in the structural model is more than its correlation with the other HOC, indicating there is discriminant validity between the HOCs. The HTMT values in Table 15 show that there is discriminant validity between the HOCs.

Table 13. Construct reliability and validity of structural model

HOC	Cronbach's alpha	Rho_a	Rho_c	AVE	R-squared (R^2)
ESG	0.870	0.886	0.920	0.793	0.416
ESG Performance	0.919	0.932	0.948	0.860	0.243
ISO 14001 EMS	0.884	0.895	0.928	0.811	---

Table 14. Fornell-Larcker criterion of structural model

HOC	ESG	ESG Performance	ISO 14001 EMS
ESG	0.891		
ESG Performance	0.492	0.927	
ISO 14001 EMS	0.645	0.331	0.900

Table 15. HTMT of structural model

HOC	ESG	ESG Performance	ISO 14001 EMS
ESG			
ESG Performance	0.544		
ISO 14001 EMS	0.721	0.358	

Table 16 shows the path coefficients in the structural model. There is a significant relationship between ESG Framework and ESG Performance. Similarly, there be is a significant relationship between ISO 14001 EMS and ESG Framework. However, the relationship between ISO 14001 EMS and ESG Performance is insignificant.

Table 16. Path coefficients

Path	Coefficients	T Statistics	Result
ESG → ESG Performance	0.478	3.643	Significant
ISO 14001 EMS → ESG	0.645	4.862	Significant
ISO 14001 EMS → ESG Performance	0.022	0.172	Insignificant

Table 17 shows the total effects, the total indirect effect and the specific indirect effect of the structural model in Figure 4 are all significant. The total effect is the effect of exogenous construct on endogenous construct. The total indirect effect is the effect of ISO 14001 EMS on ESG Performance without ESG Framework as a mediator. The specific indirect effect is the effect of ISO 14001 EMS through ESG Framework on ESG Performance. There is only one mediator in this study. Hence, the total indirect effect is the same as the specific indirect effect.

Table 17. Total effects, total indirect effect and specific indirect effect

	Path	Effect	T Statistics	Result
Total Indirect Effect	ISO 14001 EMS → ESG Performance	0.309	2.651	Significant
Specific Indirect Effect	ISO 14001 EMS → ESG → ESG Performance	0.309	2.651	Significant
	ESG → ESG Performance	0.478	3.643	Significant
Total Effects	ISO 14001 EMS → ESG	0.645	4.862	Significant
	ISO 14001 EMS → ESG Performance	0.331	3.178	Significant

Table 18 shows the effect size f-square for the structural model. The model fit for the structural model is given in Table 19.

Table 18. Effect size

	ESG	ESG Performance	ISO 14001 EMS
ESG	---	0.176	---
ESG Performance	---	---	---
ISO 14001 EMS	0.714	0.000	---

Table 19. Model fit

	Saturated model	Threshold
SRMR	0.068	
d_ULS	0.207	
d_G	0.165	
Chi-square	87.466	
NFI	0.845	

Discussion

Online surveys are increasingly being employed in numerous investigations due to its cost-effectiveness and potential reach. However, low response rates continue to play an important role in the overall quality of outcomes. On this study, a well-designed online survey research on Google Form, combined with repeated reminders from the research assistant to respondents, resulted in a 28.7% response rate. The response rate is considered acceptable because responses from mail surveys are typically low (Sekaran, 2003), but it is significantly higher than the standard 20% acceptable mail survey response rates, and the distribution of Google Form to respondents is considered via email with attached questionnaire.

For future studies, the authors recommend using more than one recruitment strategy to improve response rates, such as making personal contact with people who could help with survey distribution, explaining the research and how important their assistance is to recruitment, and increasing their willingness to support the research work. Additionally, adding a personal touch by sending emails to each individual participant rather than multiple recipients.

The study's minimum sample size required for a PLS-SEM test to attain a satisfactory degree of power is contingent upon the effect size linked to the route coefficient being examined. In order to examine the mediating role that the ESG framework plays in ESG performance, this study linked the ESG framework with ISO 14001 EMS. The following discussion validates the external validity of the study findings, even with the small sample size.

According to Ronalter et al. (2023), ISO 14001 connects the EMS to 12 out of the 17 SDGs in the ESG framework, and the science mapping revealed strong relations of keywords for the environmental pillar, with concurrences of some keywords for the social and governance pillars. The results in Table 17 reveal the strong effect of ISO 14001 EMS on ESG, which is 0.645. ISO 14001 has a high total indirect effect on ESG performance too, which is 0.309. The total effect of 14001 EMS on ESG performance is only 0.311 with ESG Framework as a mediator, because the path coefficient is insignificant at 0.022 ($p = 0.863$) as shown in Table 16. The results in Table 17 imply that the adoption of ISO 14001 EMS actually enhances the impact of ESG framework on ESG performance, which was confirmed by Ronalter et al. (2022)

The R^2 value of ESG performance is 0.243 as shown in Table 13. This is the variance in ESG Performance as explained by both the ISO 14001 EMS and EMS Framework. From Table 16 and Table 17, when ESG Framework is removed as a mediator, ISO 14001 EMS has a significant relationship with ESG performance, with a path coefficient of 0.351 ($p = 0.001$). The f-square value is 0.176, which is solely attributed to ESG Framework, as shown in Table 18. Therefore, the variance in ESG Performance as explained by ESG Framework alone is 17.6%. This effect size is considered medium. The variance in ESG Performance as explained by ISO 14001 is only 6.7%. The results imply the need to adopt ESG framework for Malaysian companies to enhance their ESG performance when these companies are certified with ISO 14001 EMS.

Conclusion

The model used to investigate the mediating effect of ESG Framework on the relationship between ISO 14001 EMS and the ESG Performance has a good model fit as shown in Table 19. The literature review revealed many initiatives have been implemented by Malaysian companies to comply with the ESG criteria in order to enhance their ESG performance in their efforts to achieve their sustainable development goals. This study confirms the research by Ronalter et al. (2022) on ISO 14001 EMS as a business tool to enhance ESG performance. Theoretical frameworks such as the stakeholder, legitimacy, and signalling theories have also been used to analyse the relationship between social sustainability and environmental, social, and governance performance (Zhang, Loh & Wu, 2020).

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