



Tomas Bata University in Zlín
Faculty of Management and Economics

Doctoral Thesis

**The Impact of Corporate Social Responsibility and
Green Innovation on Enterprise Performance.
Empirical Evidence from Manufacturing
Enterprises in Emerging Economy**

**Dopad společenské odpovědnosti podniků a zelených inovací na
výkonnost podniků. Empirické důkazy z výrobních podniků v
rozvíjejících se ekonomikách**

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Zlín, January 2026

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Published by **Tomas Bata University in Zlín** in the Edition **Doctoral Thesis**.

The publication was issued in the year 2026

Keywords: *Corporate Social Responsibility, Green Innovation, Environmental management System 14001, Environmental Leadership, Enterprise Performance in Emerging Economy.*

Klíčová slova: *Společenská odpovědnost firem, zelené inovace, systém environmentálního managementu 14001, vedoucí postavení v oblasti životního prostředí, výkonnost podniku v rozvíjející se ekonomice.*

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ACKNOWLEDGMENT

I want to acknowledge those who have played an instrumental role in my academic journey, providing unwavering support, guidance, and encouragement throughout the research process. It is with profound gratitude that I acknowledge the contributions of several individuals and institutions that have significantly influenced both the completion of this work and my personal growth as a scholar. First and foremost, I extend my heartfelt appreciation to Professor Beata, my supervisor, and Ing. Martin Ph. D, whose expertise and insightful feedback have been invaluable in shaping the direction of this dissertation. Their commitment to academic excellence and their ability to challenge my thinking have pushed me to delve deeper into my research questions, fostering a rigorous analytical approach that has enhanced the quality of my work. Additionally, I would like to acknowledge the support of Professor Katerina from BOKU University in Vienna. Her encouragement and guidance have been pivotal in my academic pursuits. I am also immensely grateful for the financial support provided by the Czech Government, which has enabled me to pursue my research without the constraints of financial burden. The staff of the Faculty of Economics and Management has also played a pivotal role in facilitating my academic journey. Their dedication to providing administrative support and ensuring that the necessary resources are available has been instrumental in allowing me to focus on my research. As I dedicate this work to those who have supported me, I also recognise the broader academic community that values inquiry, critical thinking, and the pursuit of knowledge. This dissertation is a culmination of the shared efforts and contributions of many, and it stands as a reflection of the collaborative spirit that characterises the field of economics. I hope that the findings presented herein will contribute to ongoing discussions and inspire further research in the area.

ABSTRACT

Amid rising concerns about environmental sustainability and corporate social responsibility (CSR), industrial companies in developing countries are increasingly employing green innovation to improve their operational efficiency. Enterprises have proven to provide competitive benefits through the implementation of ecologically conscious goods, processes, and technology. Organisations can achieve cost savings and increased productivity by implementing green innovation (GIN), which involves optimising resource consumption, improving energy efficiency, and enhancing environmental health. Nevertheless, there is still a need for a more thorough grasp of the complex interaction among these variables. Further empirical evaluation is needed to clarify the unique processes by which CSR and GIN affect different aspects of firm performance, especially among manufacturing enterprises in emerging nations. To bridge the gap in literary assessment, this dissertation evaluated the impact of CSR and GIN on enterprise performance, focusing on environmental (ENP) and financial (FINP) factors. Another key element of sustainable development is the crucial contribution of environmental leaders (ENL) and environmental management systems (ISO 14001). To fully comprehend the relationship between these variables, the research bridges the gaps by examining the moderating and mediating effects among them.

To achieve the dissertation objectives, explanatory sequential designed was employed. A survey questionnaire was employed as data curation on managers and key individuals within the manufacturing sector in Ghana. The sample curation of 576 valid responses were utilised in the analysis of the research hypothesis developed from empirical investigation for the quantitative section of the dissertation. The qualitative section consists of ten (10) interviews with key selected managers and individuals through a purposive sampling approach. The Smart PLS 4 SEM technique was employed in the evaluation of the relationship between CSR, GIN, ENL, ISO 14001, ENP, and FINP.

The main findings of the dissertation are a) CSR established a significant positive relationship with ENP and FINP. b) CSR had a direct positive link with GIN. c) The investigation produced a positive relationship between GIN, ENP, and FINP. d) Again, GIN had a positive complementary partial mediation on the affiliation between CSR and ENP and FINP. e) The evaluation of environmental leadership established a direct link with green innovation. Also, ENL served as a positive moderator on the affiliation between CSR and GIN. f) Finally, ISO

14001 was explored on GIN, which produced a negative relationship. g) ISO 14001 had a negative moderation link between CSR and GIN.

The qualitative outcome showed that GIN initiatives are driven by regulatory and cost-saving demands, with energy efficiency and new product lines as significant outputs. ENL prioritises transparency and employee engagement in sustainable practices, departing from traditional norms. ISO 14001 acceptance is driven by standardisation and compliance. CSR encompasses ethical operations and community involvement. Company values and risk mitigation motivate, while brand benefits include loyalty and investor appeal. The findings highlight the theoretical importance of the resource base view and shareholder theories application in emerging regions. Again, the research evaluation provides significant guidance to managers and policymakers in the development of sustainability policies.

ABSTRAKT

Uprostřed rostoucích obav o environmentální udržitelnost a společenskou odpovědnost firem (CSR) průmyslové společnosti v rozvojových zemích stále více zavádějí zelené inovace ke zlepšení své provozní efektivity. Podniky prokázaly, že poskytují konkurenční výhody prostřednictvím implementace ekologicky uvědomělého zboží, procesů a technologií. Organizace mohou dosáhnout úspor nákladů a zvýšení produktivity implementací zelených inovací (GIN), které zahrnují optimalizaci spotřeby zdrojů, zlepšení energetické účinnosti a zlepšení environmentálního zdraví. Nicméně stále existuje potřeba důkladnějšího pochopení složité interakce mezi těmito proměnnými. Je zapotřebí další empirické hodnocení, které by objasnilo jedinečné procesy, kterými CSR a GIN ovlivňují různé aspekty výkonnosti firem, zejména u výrobních podniků v rozvíjejících se zemích. Aby se překlenula mezera v existující literatuře, tato disertační práce hodnotila dopad CSR a GIN na výkonnost podniků se zaměřením na environmentální (ENP) a finanční (FINP) faktory. Dalším klíčovým prvkem udržitelného rozvoje je zásadní přínos environmentálních lídrů (ENL) a systémů environmentálního managementu (ISO 14001). Aby se plně pochopil vztah mezi těmito proměnnými, výzkum překlenuje mezery zkoumáním moderačních a zprostředkujících účinků mezi nimi.

Pro dosažení cílů disertační práce byl použit vysvětlující sekvenční přístup. Pro sběr dat o manažerech a klíčových osobách ve výrobním sektoru v Ghaně byl použit dotazník. Konečný vzorek sestával z 576 platných odpovědí použitých při analýze výzkumné hypotézy vyvinuté na základě empirického šetření pro kvantitativní část disertační práce. Kvalitativní část se skládá z deseti (10) rozhovorů s vybranými klíčovými manažery a jednotlivci prostřednictvím metody účelového výběru. Pro analýzu vztahu mezi CSR, GIN, ENL, ISO 14001, ENP a FINP byla použita technika Smart PLS 4 SEM.

Hlavní zjištění disertační práce jsou: a) CSR odhalila významnou pozitivní souvislost s ENP a FINP. b) CSR měla přímou pozitivní souvislost s GIN. c) Výzkum prokázal pozitivní souvislost mezi GIN s ENP a FINP. d) GIN opět měl pozitivní částečný vliv na souvislost mezi CSR a environmentální a finanční výkonností. e) Hodnocení environmentálního leadershipu prokázalo přímou souvislost se zelenými inovacemi. ENL také sloužil jako pozitivní moderátor souvislostí mezi CSR a GIN. f) Nakonec byla na GIN zkoumána norma ISO 14001, což prokázalo negativní souvislost. g) ISO 14001 měla negativní moderační vztah mezi CSR a GIN.

Kvalitativní výsledek ukázal, že iniciativy GIN jsou poháněny regulačními požadavky a požadavky na úsporu nákladů, přičemž významnými výstupy jsou energetická účinnost a nové produktové řady. ENL upřednostňuje transparentnost a zapojení zaměstnanců do udržitelných postupů a odchyluje se od tradičních norem. Přijetí normy ISO 14001 je poháněno standardizací a dodržováním předpisů. CSR zahrnuje etické operace a zapojení komunity.

Hodnoty společnosti a zmírňování rizik motivují, zatímco výhody značky zahrnují loajalitu a přitažlivost pro investory. Zjištění zdůrazňují teoretický význam aplikace pohledu na zdrojovou základnu a teorií akcionářů v rozvíjejících se regionech. Hodnocení výzkumu opět poskytuje manažerům a tvůrcům politik významné vodítko při tvorbě politik udržitelnosti.

TABLE OF CONTENT

ACKNOWLEDGMENT.....	2
ABSTRACT	3
ABSTRAKT.....	5
TABLE OF CONTENT	7
LIST OF FIGURES	11
LIST OF TABLES	12
LIST OF ABBREVIATIONS.....	13
1. INTRODUCTION	14
1.1 Research background.....	14
1.2 Research Gaps and objectives	16
1.2.1 Research gaps	16
1.2.2 Research Objectives.....	18
1.3 Doctoral Thesis Outline	18
2. SCOPE OF THE STUDY AND CONCEPTUAL FRAMEWORK	20
2.1 Belief introduction of Manufacturing Enterprise in Ghana.....	20
2.1.1 Initiative in Ghana on green innovation, CSR, and enterprise performance	20
2.2 Theoretical lenses of the Research	24
2.2.1 Resource based view theory (RBV)	24
2.2.2 Stakeholders' Theory Perspective	26
2.3 Definition of terms.....	28
2.3.1 Corporate Social Responsibility	28
2.3.2 Green innovation	29
2.3.3 EMS ISO 14001.....	29
2.3.4 Environmental leadership	30
2.3.5 Conceptual framework	31
2.4 Hypothesis development.....	31

2.4.1 Corporate Social Responsibility, green innovation, and enterprise performance	31
2.4.2 Green innovation and enterprise performance mediating effect	33
2.4.3 Environmental leadership moderating effect.....	34
2.4.4 Environmental management system ISO 14001 moderating effect....	36
3. METHODOLOGY.....	38
3.1 Research Approach and Design.....	38
3.2 Population and Sampling Size Techniques	39
3.3 Data collection	40
3.4 Research Instrument and Measurement Scale	42
3.5 Data Analysis Techniques	45
3.6 Common method bias	47
3.7 Necessary condition analysis (NCA) and important performance evaluation (IMPA)	48
3.7.1 IPMA	48
3.7.2 Necessary condition analysis.....	49
4. EMPIRICAL EVALUATION	52
4.1 Descriptive outcome	52
4.2 Measurement model.....	55
4.2.1 Construct loading and VIF	55
4.2.2 Validity and reliability of outcome.....	57
4.2.3 Discriminate validity evaluation.....	57
4.2.4 Model Fitness indices – PLS SEM.....	61
4.3 Structural model.....	62
4.3.1 Direct path hypothesis evaluation.....	62
4.4 Mediating path hypothesis – PLS SEM.....	65
4.5 Moderating path hypothesis.....	66
4.6 Structural model assessment with control variables.....	69
4.7 Necessary condition analysis.....	69

4.7.1 Result of Necessary Condition Analysis effect sizes (d) - Environmental performance	69
4.7.2 Result of Necessary Condition Analysis effect sizes (d) -Financial performance	73
4.8 Important performance analysis	77
4.9 Linearity of the model (Quadratic effect).....	83
4.10 Unobserved heterogeneity	84
5. DISCUSSIONS	86
5.1 RO1. To assess the role of CSR in the attainment of enterprise performance (ENP and FINP)	87
5.2 RO2. To determine the influence of CSR activities on the development of GIN	88
5.3 RO3. To examine the mediating effect of GIN on the relationship between CSR and enterprise performance	89
5.4 RO4. The direct and moderating influence of ENL on the relationship between CSR and GIN.....	90
5.5 RO5. The direct and moderating influence of ISO 14001 on the association between CSR and GIN.....	91
5.6 Qualitative remarks from management.....	92
5.6.1 Green innovation.....	92
5.6.2 Environmental Leadership	101
5.6.3 ISO 14001 certification and implementation.....	109
5.6.4 Corporate social responsibility.	119
5.6.5 Summary of qualitative assessment.....	128
6. THEORETICAL AND PRACTICAL RELEVANCE	129
6.1 Theoretical relevance	129
6.2 Practical relevance	131
7. CONCLUSION, LIMITATIONS, AND FUTURE INSPECTION DIRECTIONS	133
7.1 Conclusion	133
7.2 Limitations and Future research	135

REFERENCES.....	137
PUBLICATIONS BY CANDIDATE.....	150
CURRICULUM VITAE	153
APPENDIX A.	156
APPENDIX B	168
1. SECTION ON QUALITATIVE QUESTIONNAIRE	168
2. SECTION ON QUANTITATIVE SURVEY.....	174

LIST OF FIGURES

Figure 1. Graphical highlights of the thesis journey.....	19
Figure 2. Ministry of Trade, Industry, and EMIS Report (Source, Ministry of Trade)	23
Figure 3. Contribution of the manufacturing Sector to Ghana GDP (Source- Ministry of Trade)	24
Figure 4. Model development. (Source: author).....	31
Figure 5. Thesis design sequence.....	39
Figure 6. Data analysis steps.....	47
Figure 7. Moderating Charts - Simple slope analysis – ENL*CSR->GIN.....	67
Figure 8. Moderating Charts - Simple slope analysis – ISO x CSR -> GIN.....	68
Figure 9. Structural model evaluation (Source: Author analysis from Smart PLS 4)	69
Figure 10. NCA Ceiling line for CSR for ENP	71
Figure 11. NCA Ceiling line for GIN for ENP	72
Figure 12. NCA Ceiling line for ENL for ENP	72
Figure 13. NCA Ceiling line for ISO 14001 for ENP	73
Figure 14. NCA Ceiling line for CSR for FINP	75
Figure 15. NCA Ceiling line for GIN for FINP	76
Figure 16. NCA Ceiling line for ENL for FINP	76
<i>Figure 17. NCA Ceiling line for ISO 14001 for FINP</i>	<i>77</i>
Figure 18. IMPA for each construct – Environmental Performance	79
Figure 19. IMPA analysis for financial performance	80
Figure 20. IMPA for each construct – Environmental Performance (indicators map).....	82
Figure 21. IMPA analysis for financial performance (indicators map).....	83
Figure 22. Measurement model	156
Figure 23. Direct path without moderating effect	157
Figure 24. Structural model assessment with control variables	158
Figure 25. Mediation Analysis (Zhao et al., 2010).....	181
Figure 26. Ethical form obtains for Survey data curation	182

LIST OF TABLES

Table 1. Definition of variables and constructs	43
Table 2. Descriptive outcome	53
Table 3. Construct loading and VIF.....	55
Table 4. Validity and reliability outcome	57
Table 5. Heterotrait-Monotrait ratio (HTMT)	59
Table 6. Fornell-Larcker Criterion.....	59
Table 7. Cross Loadings	60
Table 8. R Square, Adjusted R Square, and Q ² predict	62
Table 9. Direct path hypothesis	63
Table 10. Mediating outcome	66
Table 11. Moderating outcome	67
Table 12. Ceiling lines- details-CEFDH (Environmental performance).....	70
Table 13. Bottleneck Tables-CEFDH- values -Percentiles (Environmental performance)	70
Table 14. Ceiling lines- details-CEFDH - (Financial performance)	74
Table 15. Bottleneck Tables-CEFDH- values -Percentiles	74
Table 16. Important performance analysis.	79
Table 17. Robustness evaluation - Linearity of the model (Quadratic effect) ..	84
Table 18. Robustness Evaluation - unobserved heterogeneity	85
Table 19. Summary of the Hypothesis developed	86
Table 20. Themes and subthemes on green innovation.....	92
Table 21. Themes and subthemes on ENL	101
Table 22. Themes and subthemes on ISO 14001.....	109
Table 23. Themes and subthemes on CSR	120
Table 24. Structural model assessment with control variables.....	157
Table 25. Qualitative survey output.....	159
Table 26. Indicator descriptive evaluation (N = 576).....	179

LIST OF ABBREVIATIONS

CSR – Corporate Social Responsibility

GIN – Green innovation

ENL – Environmental Leadership

FINP – Financial performance

ENP – Environmental performance

EMS ISO – Environmental Management System International Standard for Organisations

VIF – Variance Inflation Factor

HTMT - Heterotrait-Monotrait ratio

NCA – Necessary Condition Analysis

IMPA – Important Performance Analysis

PLS – SEM – Partial Least Square - Structural Equation Modelling

RBV – Resource Based view

SMEs – Small and medium enterprises

GSS – Ghana Statistical Service

RO – Research objective

1D1F – One district one factory

1. INTRODUCTION

1.1 Research background

In the face of growing concerns over environmental sustainability and increasing environmental externalities, manufacturing enterprises in emerging economies are increasingly embracing an ecological approach as a strategy to enhance their enterprise efficiency (Kraus et al., 2020; Thao & Xie, 2023). In recent decades, the notion of corporate social responsibility (CSR) has garnered significant acknowledgement, as enterprises increasingly recognise their obligations beyond profit maximisation. CSR has been transformed into a strategic business practice that organisations utilise to elevate their corporate reputation, promote community involvement, and increase organisational efficiency (Marietza & Ilhami, 2023; Nsiah et al., 2023). CSR currently includes a wide array of programs, such as ethical labour practices, ecological sustainability, and community development.

Green innovation (GIN), which consists of the adoption of ecologically sustainable products, processes, and technologies, has been shown to confer significant competitive advantages to firms (Pham et al., 2023). Through the adoption of GIN, organisations can maximise resource efficiency, increase energy efficiency, and strengthen environmental health and safety, resulting in cost reductions and improved production. Existing assessment has depicted a positive relationship between GIN and enterprise efficiency, including growth, profitability, and market competitiveness (Pham et al., 2023; Yu et al., 2022). GIN can enable firms to develop new green products that are more appealing to sustainable conscious consumers, thereby boosting their market share and financial efficiency. Additionally, the implementation of green process innovations can lead to enhanced resource efficiency, reduce waste, and improve cost structures, further contributing to an enterprise's effectiveness (Li et al., 2023; Yu et al., 2020). CSR has also been identified as a favourable factor appreciating the link between GIN and enterprise performance (Thao & Xie, 2023). Firms that integrate environmental ethics and stakeholder considerations into their strategic decision-making are more probable to invest in GIN and reap the associated benefits.

Again, one aspect of sustainable development is the significant role of environmental leaders (ENL). According to Awan et al. (2023), leaders with knowledge of the environmental externalities and pollution-related issues developed strategic policies that align with the enterprise goals. In order to

depreciate ecosystem challenges, small and medium enterprises (SMEs) must appoint ecological leaders to comply with sustainability and climate policies. Recent studies have highlighted the importance of sustainable leadership in adopting environmentally friendly innovation and enhancing business efficiency. Scholars have noted the characteristics of sustainable leadership, such as making decisions with the long-term in mind, considering social and environmental repercussions, and considering organisational success beyond just financial measures (Ur Rehman et al., 2023). Although green innovation and business performance increasingly recognise sustainable leadership as a key driver, significant obstacles remain. Hu et al. (2023) assessed the relationship effect of a sustainable leader in the development of innovative products. The investigation of ninety innovative manufacturing enterprises demonstrated that sustainable leaders significantly influence the development of environmental innovation technologies. Again, Niazi et al. (2024) investigation on green transformational leadership indicated that moderating leadership on innovation development had a favourable impact on enterprise performance.

While existing research has highlighted the positive affiliation between GIN and enterprise performance and the role of CSR in this dynamic, there remains a need for a more inclusive evaluation of the complex interplay between these factors (Takyi et al., 2024; Li et al., 2023). Specifically, additional empirical research is necessary to clarify the precise mechanisms by which CSR and GIN affect different aspects of organizational efficiency, especially within manufacturing enterprises in developing communities. First, there is a need to better understand the drivers of GIN adoption within manufacturing firms in emerging markets. Existing literature has identified factors such as environmental ethics, stakeholder pressure, and consumer demand as potential drivers of green innovation. However, the relative importance and interplay of these factors remain underexplored, especially in the perspective of emerging communities where institutional and market conditions may differ significantly from developed markets. Second, it's crucial to look more closely at how ENL and EMS ISO 14001 help GIN strategies work. ENL and ISO 14001 have been suggested as critical in overcoming the technological and organisational challenges associated with GIN (Awan et al., 2023; Ofori et al., 2023). Nonetheless it is yet unclear what extent these factors influence the link between GIN and CSR, particularly in the manufacturing enterprises in emerging regions. Third, the differential nature of enterprise performance, encompassing both

financial and environmental outcomes, necessitates a more nuanced investigation.

1.2 Research Gaps and objectives

1.2.1 Research gaps

As global awareness of environmental issues intensifies, organisations are closely admitting the substance of integrating CSR into their operational strategies. This integration not only addresses societal expectations but also enhances financial performance (FINP) and environmental sustainability. Research depicts that enterprises with robust CSR practices tend to allocate more resources towards green innovations, which can lead to upsurge financial outcomes and acquiescence with environmental regulations (Elia et al., 2020; Kraus et al., 2020). Emerging economies present unique challenges and opportunities for the implementation of CSR and GIN. These markets often face resource constraints, which can limit the capacity SMEs to invest in sustainable practices. However, studies suggest that when these enterprises engage in green innovation, they can fulfil their CSR obligations more effectively, thereby enhancing their performance (Yu et al., 2022; Nsiah, 2023). The link between CSR and FINP is complex, with literary supporting both direct and indirect pathways. For instance, firms that prioritise CSR are often perceived more advantageously by consumers, leading to upsurge brand loyalty and, consequently, better FINP (Padilla-Lozano et al., 2024; Liu et al., 2020).

Notwithstanding, literary work has extensively assessed the link between CSR and FINP, there is a scarcity of empirical evidence specifically addressing how these relationships manifest in manufacturing enterprises within emerging economies. Novitasari and Tarigan (2022) highlight the influence of CSR on FINP; their study principally focuses on the food and beverage sector in Indonesia, leaving a broader understanding of manufacturing enterprises unaddressed. In Ghanaian setting, Takyi et al. (2024) assessed GIN and financial efficiency, not considering the effect of the environmental performance (ENP) of manufacturing enterprises. Furthermore, the nuances of how GIN interacts with CSR to affect financial outcomes in these contexts remain underexplored.

Moreover, the role of ENL as a moderating construct in assessing the affiliation between CSR and GIN is inadequately addressed in the literature. While some inspection suggest that sustainable leadership can influence environmental performance through mechanisms such as frugal innovation (Iqbal

et al., 2021), the specific ways in which environmental leadership can enhance or diminish the effects of CSR and GIN on FINP and ENP in manufacturing settings are yet to be fully understood.

The ISO 14001:2015 standard, recognized for its role in enhancing environmental management practices, also presents a gap in research concerning its moderating effects on the link between CSR and GIN. While several studies acknowledge the impact of ISO 14001 on ENP (Bravi et al., 2020; Arana-Landín et al., 2025), there is limited empirical evaluation on how this certification interacts with CSR initiatives and green innovation to influence financial performance in manufacturing firms. For example, while Lawton et al. (2025) discuss the motivations for adopting ISO 14001, they do not delve into its potential as a moderating factor in the broader context of CSR and GIN. Additionally, the existing literature often overlooks the unique challenges faced by manufacturing enterprises in emerging economies, such as resource constraints, regulatory environments, and market dynamics, which can significantly influence the efficacy of CSR and green innovation strategies. The studies conducted by Labella et al. (2025) emphasise the critical factors for implementing ISO 14001 in developing countries, yet they do not specifically address how these factors may interact with CSR and GIN to affect firm performance.

Furthermore, the literary evaluation regarding the link between ENP and FINP in the context of manufacturing firms is still inconclusive. While some assessment demonstrates a positive affiliation between improved environmental practices and financial outcomes, the mechanisms through which these relationships operate, particularly in emerging economies, remain inadequately explored (Gangaraju et al., 2025). To close the theoretical gaps in the above, the resource-based view and stakeholder theories were employed to investigate the association between the variables in the Ghanaian manufacturing sector. RBV posits that a firm's resources and capabilities, including environmental management systems like ISO 14001, can lead to competitive advantages and upsurge FINP through enhanced operational efficiencies and reputation (Lawton et al., 2025; Labella et al., 2025). The adoption of ISO 14001 is linked to better environmental performance, which can translate into financial benefits as firms align their operations with stakeholder expectations (Niazi et al., 2023). Stakeholder Theory emphasises the importance of addressing the needs and expectations of various stakeholders, including customers, employees, and the community, in driving CSR initiatives and green innovation (Hang et al., 2022).

Effective environmental leadership fosters a culture of sustainability that aligns with stakeholder interests, thereby enhancing both ENP and FINP (Sarwar et al., 2023; Toha et al., 2020).

Finally, there is methodological gaps in the literary evaluation employing the PLS-SEM to assess the link between CSR and GIN on enterprise performance from Ghanaian manufacturing perspective. With the robustness of the PLS-SEM, the direct and indirect link was investigated to bring to light the serial moderating effect of ENL, and ISO 14001.

1.2.2 Research Objectives

The purpose of the dissertation was to examine CSR and GIN on enterprise performance on SMEs in the manufacturing sector in Ghana.

To achieve this the researchers developed specific objectives of the dissertation.

RO1. To assess the role of CSR initiatives in the attainment of enterprise performance.

RO2. To determine the influence of CSR activities in the development of GIN.

RO3. To examine the mediating effect of GIN on the relationship between CSR and enterprise performance.

RO4. To investigate the role of ENL and ISO 14001 on GIN development in manufacturing enterprises.

RO5. To evaluate the moderating influence of ENL and ISO 14001 on the relationship between CSR and GIN.

1.3 Doctoral Thesis Outline

The thesis was structured into seven sections. Figure 1 exhibited the pictorial steps for the dissertation. The dissertation's initial section introduces the dissertation topic, research problem, and gaps. This was followed by the development of the dissertation objectives and significance with its contribution to the body of academic discussion. The next section explored the literature with both the theoretical and empirical prior literature on the dissertation variables. The method and the econometric analysis techniques were followed. This covered the design, sampling, data curation, and analytical methods suitable for the dissertation. The results and the discussions sections were then followed. Finally, the theoretical and practical contribution of the dissertation was presented, and the conclusion was the limitation of the direction of future evolution.

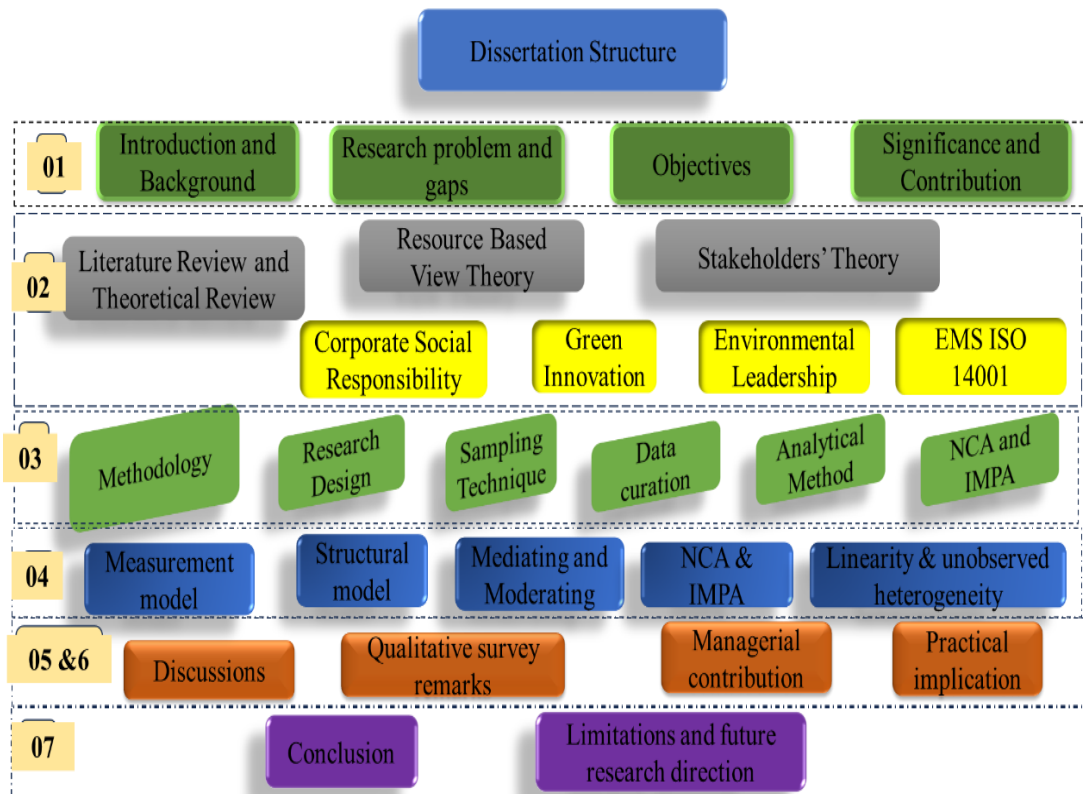


Figure 1. Graphical highlights of the thesis journey

2. SCOPE OF THE STUDY AND CONCEPTUAL FRAMEWORK

2.1 Belief introduction of Manufacturing Enterprise in Ghana

The strategic shift towards industrialisation and value-added production has been a major catalyst for the momentum gained for manufacturing enterprises in Ghana. Ghana is betting big on manufacturing, and its commitment to industrialisation is most visible in the ‘One District, One Factory’ (1D1F) flagship program, which aims to transform Ghana’s economic outlook by creating local industrialisation that is driven by industry-orientated labour and goods. The Ministry held one of the events that directly responds to the need of the nation to diversify its economy, creating jobs, and relieving regional income disparities through the 1D1F project, which was launched in 2017. Moreover, this initiative goes beyond the manufacturing sector and establishes an indispensable bridge between rural economic development and enterprise growth. The 1D1F is an initiative that wants to see at least one factory in each of the 276 districts of Ghana, thus creating a whole network of production centres throughout the country. This framework places local resources to manufacturing enterprises by creating employment opportunities for communities that in the past have been largely dependent on agricultural or small-scale trade. By providing both existing and new factory support, the 1D1F initiative lessens the impacts of industrial focus in urban centres and the effects of rural town migration, leading to economic self-sufficiency in each district. The 1D1F project had to focus on agro processing as one of the most prominent manufacturing subs sectors. The government puts enterprise resulting from processing of local crops like cocoa, maize, palm oil and cashew nuts into finished goods for local and export markets, considering Ghana’s agricultural strength. Investing in these agro-processing facilities a stead appetite for farmers produce, helps to reduce post-harvest losses, improves food security and diversifies the country's export base. They have direct positive impact for small scale farmers, such as bridging them to the regular markets, yielding constant and comfortable income and promoting sustainable agriculture among many others.

2.1.1 Initiative in Ghana on green innovation, CSR, and enterprise performance

The manufacturing sector in Ghana plays a pivotal role in the nation's economic initiative, contributing significantly to employment, GDP, and the

diversification of the economy. SMEs dominate this sector, accounting for over 70% of manufacturing entities and contributing approximately 10% to Ghana's GDP (see Figure 2). This substantial presence emphasises the importance of SMEs in driving economic growth, poverty alleviation, and job creation. Furthermore, the manufacturing sector's evolution is increasingly intertwined with GIN and CSR, which are essential for sustainable development and competitive advantage in today's global market. Green innovation in Ghana's manufacturing sector is gaining traction as firms recognise the need to adopt environmentally sustainable practices. Research indicates that sustainable leadership within manufacturing firms fosters an environment conducive to creativity and innovation, which is crucial for developing green products (Banahene, 2024). As encapsulated in the assessment of Nsiah et al. (2023) product innovation a vital point for SMEs to employ the dynamic capabilities available to the enterprise to achieve sustainable goal. In Ghana, the Greater Accra Region, which houses over 80% of the country's manufacturing firms, serves as a critical hub for this intersection of CSR and GIN (Bonsu et al., 2023). The empirical evidence supports the notion that CSR activities not only improve a firm's reputation but also lead to better financial performance, particularly among ISO 9001-certified manufacturing firms (Gyekye, 2023). This correlation highlights the dual benefits of CSR and green innovation, as firms that prioritise these areas tend to achieve superior market value and profitability.

The challenges faced by SMEs in accessing financial support further complicate the landscape of green innovation in Ghana. Many SMEs struggle to secure funding for innovative projects, which hinders their ability to implement sustainable practices (Marfo 2024). Addressing these financial barriers is crucial for fostering an environment where green innovation can thrive. Policymakers and financial institutions must collaborate to create tailored financial products and support mechanisms that empower SMEs to invest in green technologies and practices. Stakeholder engagement is a crucial element affecting the success of green innovations in Ghana's industry. Effective stakeholder involvement can augment a firm's absorptive capacity, allowing it to utilise external knowledge and resources for innovation (Appiah, 2023). The affiliation between stakeholder engagement and green process innovation is substantial, as companies that actively engage stakeholders in their innovation processes are more adept at creating sustainable goods and practices. This collaborative strategy not only improves innovation results but also fortifies the firm's rapport with its stakeholders, cultivating a feeling of collective accountability for environmental

sustainability. The significance of knowledge management in enhancing innovation performance is undeniable. Institutions that proficiently handle their knowledge assets are more inclined to attain substantial progress in green innovation (Bawa, 2023). This is especially pertinent to Ghana's industrial industry, where insufficient internal expertise and external issues demand a comprehensive knowledge management structure. Manufacturing organisations can improve their innovation capabilities and adapt more effectively to market needs by cultivating a culture of continuous learning and knowledge sharing. The influence of corporate contributions on CSR awareness and company performance is significant. Studies demonstrate that companies participating in philanthropic endeavours can bolster their reputation and legitimacy among local communities, therefore augmenting their overall CSR profile (Hasan et al., 2024). This link highlights the need for transparency and communication in CSR operations, as companies that proficiently articulate their charitable endeavours are more inclined to earn the trust and backing of stakeholders.

The impact of sustainable leadership on the success of manufacturing organisations is increasingly acknowledged. Leaders who emphasise environmental sustainability and cultivate a culture of creativity are more adept at advancing green ideas within their organisations (Marfo et al., 2024). This leadership approach not only improves the firm's environmental performance but also bolsters its overall market competitiveness. The convergence of digitalisation with sustainable innovation is a burgeoning field of interest. As industrial companies in Ghana progressively embrace digital technology, the opportunity to augment green innovation with digital empowerment becomes evident (Appiah, 2024). Digital solutions may enhance resource management, optimise operational efficiency, and empower companies to create innovative green goods that satisfy the changing demands of consumers. The resilience of the manufacturing sector in the face of climate change is also a critical consideration. Research suggests that green technology innovations can enhance the adaptability of manufacturing enterprises to extreme climate events, thereby ensuring their long-term sustainability (Wang et al., 2024). This adaptability is essential for maintaining competitiveness in a rapidly changing global landscape, where environmental considerations are becoming increasingly paramount. Fostering a culture of innovation, enhancing stakeholder engagement, and leveraging digital technologies, Ghanaian manufacturing firms can position themselves as leaders in sustainable practices. The ongoing research and empirical evidence accentuate the importance of these elements in driving

performance and ensuring the long-term viability of the manufacturing sector in Ghana.

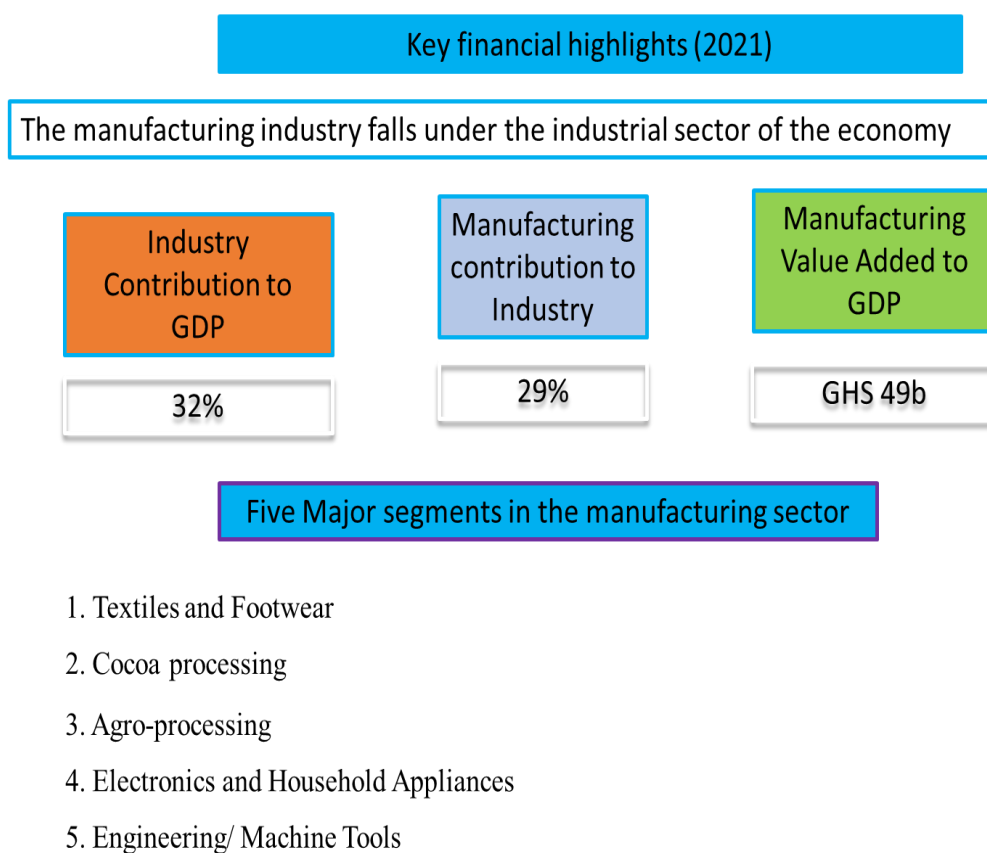


Figure 2. Ministry of Trade, Industry, and EMIS Report (Source, Ministry of Trade)

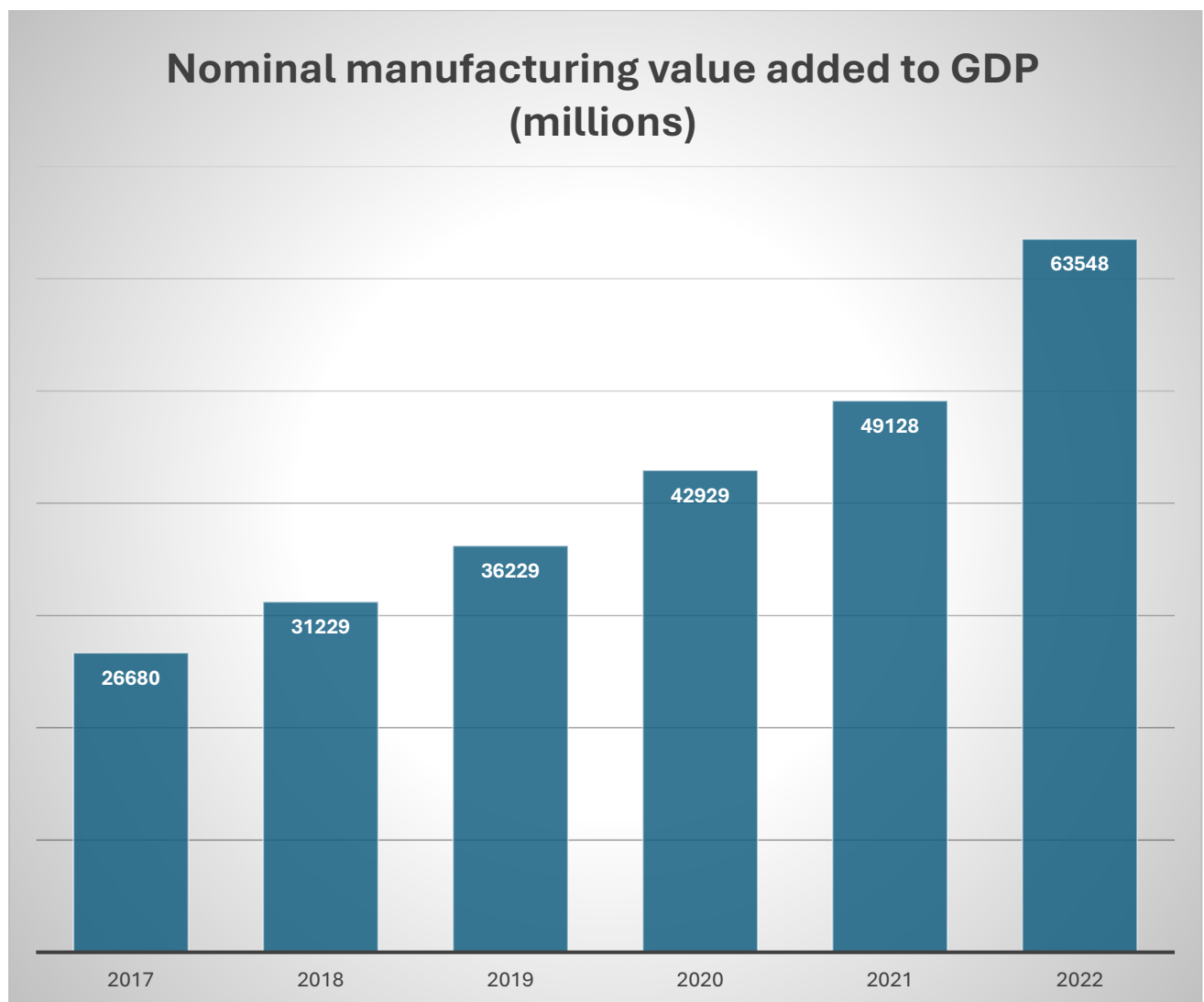


Figure 3. Contribution of the manufacturing Sector to Ghana GDP (Source-Ministry of Trade)

2.2 Theoretical lenses of the Research

2.2.1 Resource based view theory (RBV)

The RBV hypnotized the efficiency in the use of enterprise resources in a way to reduce waste and environmental externalities. Barney et al. (2021) asserts that organisations can attain and maintain a competitive advantage by strategically managing resources that are valuable, rare, inimitable, and non-substitutable. The resources, encompassing both real and intangible assets like unique technology, skilled labour, brand reputation, and organisational culture, are crucial for establishing a firm's competitive positioning (Huang et al., 2023). CSR is increasingly acknowledged as a strategic asset that generates intangible

benefits, like legitimacy, trust, and stakeholder loyalty (Shahzad Shabbir & Wisdom, 2020). These intangible assets, while challenging to measure, constitute important resources that can assist enterprises in emerging economies in enhancing their competitive edge (Sarwar et al., 2023). Emerging economies frequently exhibit fragile institutional frameworks, wherein legal systems, environmental restrictions, and labour laws may be inadequately enforced. In such situations, firms that participate in CSR can position themselves as ethically responsible organisations, distinguishing themselves from competitors. Through active engagement in socially responsible initiatives, encompassing environmental conservation, and equitable labour practices. Manufacturing firms that engage in CSR activities can create goodwill as stakeholders frequently pursue companies that adhere to elevated ethical standards (Hang et al., 2022).

Again, green innovation enables enterprises to diminish their environmental impact and enhance resource efficiency, potentially resulting in financial savings through decreased energy use, waste management costs, and material utilisation (Chen et al., 2023). These operational improvements not only augment the firm's profitability but also bolster its capacity to satisfy increasing consumer demand for sustainable products (Zameer et al., 2020). As customers grow more environmentally aware, companies providing sustainable alternatives can distinguish themselves in saturated markets. Thereby, it gains new client segments and cultivates enduring brand loyalty. Additionally, green innovation establishes entry hurdles for competitors by fostering knowledge-based resources that are challenging to duplicate. A company that invests in the development of patented green technology and sustainable manufacturing methods obtains exclusive capabilities that competitors cannot readily replicate (Thao & Xie, 2023). These knowledge assets are both scarce and non-replicable, granting the firm a persistent competitive advantage in an industry confronted with increasing environmental restrictions and evolving consumer preferences. Nsiah et al. (2022) evaluated green innovation and enterprise efficiency among manufacturing firms. The econometric evaluation indicated that green product and processes improves enterprise efficiency. Likewise, Ahmed et al. (2023) investigated green innovation and established those enterprises that engaged in green innovation, reducing their environmental externalities and improving the development of sustainable products and processes. Furthermore, the amalgamation of GIN with CSR allows manufacturing companies to utilise sustainability as a strategic instrument for enhancing performance.

Environmental management system ISO 14001 adoption by manufacturing enterprises in emerging communities catalysed the shift to resource efficiency with low environmental externalities. Ofori et al.'s (2023) investigation in EU regions indicated that voluntary ecological initiatives employed by enterprises reduced pollution levels significantly. Enterprises that adopted ISO 14001 reduced their environmental externalities, which leads to the development of technological products and processes. Organisations can demonstrate their commitment to CSR and stakeholder trust by implementing ISO 14001-compliant systematic environmental management practices. Green innovation, driven by CSR and ISO 14001 (Hu et al., 2023; Toha et al., 2020), promotes the creation of environmentally friendly products and processes. As such, these enterprises can ride on the sustainability target and develop an ecological product.

An environmental leader spearheads efforts to address ecological issues and establish a pathway for sustainable innovation aimed at developing eco-friendly products and services (Rizvi & Garg, 2021). Environmentally aware executives motivate their organisations to innovate in ways that benefit both the planet and their financial performance. Hu et al. (2023) examined manufacturing institutions in the tech sector in Taiwan. Employing the social identity model on sustainable leadership and environmental identity, their research outcome established that sustainable leaders developed low-pollution products through the ecological innovation technique. According to the RBV, the distinctive assets and competencies of a company are the source of its competitive advantage. In this context, green innovation and environmental leadership constitute essential elements for organisations to sustain a competitive advantage (Cui et al., 2023). Companies can differentiate themselves from competitors by integrating environmental leadership into their strategy and employing green innovation as a fundamental competency. Organisations can enhance their resource management, sustainability, and competitive edge by aligning resource-based views with environmental objectives.

2.2.2 Stakeholders' Theory Perspective

Formulated by Edward Freeman, Stakeholder Theory postulates that companies should prioritise not only the maximisation of shareholder value but also the interests of all stakeholders affected by or capable of influencing the firm's activities (Freeman, 2001; Freeman et al., 2020). The stakeholders comprise customers, employees, suppliers, governments, local communities, and the environment. This theory contrasts with standard profit-maximisation models

by highlighting the necessity of balancing the requirements and expectations of various stakeholders to attain sustainable economic growth and sustainability. Stakeholders' Theory emphasises that organisations can enhance their performance by aligning their operations with the interests and values of their most significant stakeholders. CSR initiatives are frequently perceived as a means for organisations to interact with stakeholders by addressing their social and environmental concerns (Bansal et al., 2023). Manufacturing enterprises that prioritise sustainable practices, such as enhancing labour conditions or reducing emissions, are likely to strengthen their relationship with local communities, governments, and consumers. These actions have the potential to establish trust and credibility, thereby fostering long-term loyalty and increased stakeholder support, both of which are critical for sustainable growth and profitability in competitive markets (Santos & Fernandes, 2024).

In emerging markets, where social and environmental challenges, including inequality, pollution, and resource depletion, are more evident, stakeholders are progressively demanding that corporations be accountable for their societal and environmental impact (Góes et al., 2023). Local communities require manufacturing firms to facilitate social development by generating employment, ensuring equitable salaries, and investing in the community, while regulators may advocate for adherence to environmental standards. Green innovation, as an element of corporate social responsibility, allows companies to address these constraints by minimising their environmental impact and enhancing societal welfare (Chen et al., 2023; Demartini et al., 2023). Through proactively addressing stakeholder concerns, manufacturing enterprises can mitigate conflict risk and enhance their social license to operate, which is essential for sustained success in emerging markets. Thao & Xie (2023) explored the Vietnamese manufacturing enterprise through a questionnaire approach. Their findings established that green subsidies help improve the development of green products and processes to depreciate environmental externalities.

Environmental leadership advocates for sustainable practices through proactive and forward-thinking initiatives (Gulliver et al., 2023). Environmental leaders in developing economies can enhance the impact of their sustainability projects by embracing Stakeholder Theory. To align their sustainability initiatives with ecological requirements and community welfare, these leaders engage with stakeholders to have a comprehensive awareness of local environmental issues and society expectations (Pham et al., 2023; Wang et al., 2023). This approach adopts economic development and social equity while aiding in the alleviation of

environmental externalities such as pollution and resource depletion. Ultimately, developing communities attain sustainable development beneficial to all by considering stakeholder perspectives and exhibiting robust environmental leadership (Bahmani et al., 2023; Hu et al., 2023). Again, to promote sustainability, stakeholder relationships with ISO 14001 are essential, particularly in developing countries. Manufacturing enterprises can reduce their negative effects on the environment while simultaneously increasing their efficiency by following the guidelines laid out by ISO 14001:2015 (Abid et al., 2022; Toha et al., 2020). The adoption and effective implementation of this standard rely heavily on stakeholders, who encompass governments, corporations, communities, and non-governmental organisations. To combat pollution, deforestation, and resource depletion, stakeholders in Ghana are working to increase public awareness, public funding, capacity building, and regulatory compliance. Organisations are motivated to enhance their processes consistently through ISO 14001, which helps them fit with global sustainability goals. This partnership improves developing economies' long-term economic growth, environmental conservation, and social well-being, which helps ensure a sustainable future (Neeveditah et al., 2017). Investigating the construct of CSR, GIN, ISO 14001, and ENL on enterprise performance employing the framework of the Stakeholder's theory, the assessment from this research will provide the necessary policy directions to governments, managers and other pressure groups within the emerging communities like Ghana.

2.3 Definition of terms

2.3.1 Corporate Social Responsibility

Companies have a moral responsibility to pursue their economic objectives in a way that also benefits their workers, customers, communities, and the environment. CSR encompasses a range of practices that aim to balance profit-making activities with social and environmental considerations. Organizations increasingly view CSR as integral to their identity and culture rather than merely compliance requirements, with many deliberately fostering cultures of social responsibility as strategic priorities (Putri & Naili, 2023). It emphasises that companies should not only focus on financial performance but also on their roles as corporate citizens, which include fulfilling societal obligations and contributing positively to the communities in which they operate (Wang & Sun, 2021). The motivations for CSR initiatives demonstrate a maturation from purely

altruistic community contributions to sophisticated dual frameworks that recognize both ethical imperatives and business benefits, though defensive risk mitigation perspectives remain less common.

2.3.2 Green innovation

It covers a spectrum of approaches meant to minimise waste, improve resource efficiency, and lower emissions all across the manufacturing process (Zhao et al., 2025). GIN represents a complex strategic imperative that organizations approach through regulatory compliance, market positioning, operational efficiency, and environmental leadership. While consistent patterns emerge around sustainability driving market expansion and operational benefits a notable gap exists between innovation rhetoric and substantive implementation (Purwanto, 2024), with many organizations conflating basic sustainability with genuine innovation. Enterprises face external pressures, such as regulations and public expectations, to enhance their credibility and environmental impact by adopting sustainable practices (Li et al., 2023). Internal variables, like resource scarcity, lack of competence, and technological deficiencies, may promote a culture of learning and flexibility, prompting firms to pursue green innovations (Zhu et al., 2022). The most sophisticated approaches integrate regulatory requirements with strategic market considerations, transforming environmental constraints into competitive advantages through product development and operational transformation. Cavachhe et al. (2023) assert that GIN constitutes a long-term approach that benefits both the business and the environment by addressing environmental challenges and aligning with sustainable development objectives. However, challenges persist in articulating specific innovation methodologies and comprehensively measuring financial impacts, suggesting organizations need more robust frameworks for demonstrating tangible environmental and business value. This approach established that successful GIN requires moving beyond compliance toward strategic integration of environmental considerations that deliver both ecological benefits and sustainable competitive positioning.

2.3.3 EMS ISO 14001

ISO 14001 is an international standard that outlines the requirements for an Environmental Management System (EMS). It provides a framework for

organisations to manage their environmental responsibilities systematically and sustainably. This standard aims to help organisations improve their environmental performance by enhancing their management commitment, ensuring compliance with legal requirements, and fostering continual improvement in environmental practices Labella et al., 2025. Organisations adopting this standard are encouraged to assess their environmental impacts, set objectives and targets, and engage employees in environmental initiatives, thereby promoting a culture of sustainability within the organisation (Ali et al., 2022). ISO 14001 serves as a critical tool for organisations striving to balance economic growth with environmental stewardship. Stakeholder engagement consistently appears as both a motivation for certification and a resulting benefit, with organizations reporting strengthened relationships across multiple stakeholder groups though regulatory relationships maintain a more transactional character compared to collaborative partnerships with other stakeholders (Hidayati, 2023; Baxter, 2021). The literary works has established that implementation approaches range from systematic integration within operational workflows to more distinctive approaches leveraging technology or direct managerial oversight, suggesting that organizational context significantly influences implementation methodology.

2.3.4 Environmental leadership

Environmental leadership consistently emerges as a strategic paradigm that prioritizes long-term ecological health over short-term financial gains while actively fostering innovation through creative risk-taking. This concept encompasses a range of practices and behaviours that prioritise ecological considerations in decision-making processes and organisational strategies (Kardoyo et al., 2020). Environmental leaders are characterised by their commitment to fostering pro-environmental activities, promoting sustainable practices, and integrating environmental values into the organisational culture. The role of ENL is critical in shaping organisational policies and practices that align with sustainability objectives. Leaders who embody environmental leadership not only advocate for ecological responsibility but also inspire their teams to engage in innovative solutions that address ecosystem externalities (Hou et al., 2023). This leadership style is often linked to broader concepts such as sustainable leadership, which emphasises the importance of balancing social, environmental, and financial outcomes in organisational performance.

Ultimately, the most promising environmental leadership approaches combine strategic vision with practical execution while navigating the complex relationship between environmental stewardship and business performance.

2.3.5 Conceptual framework

The research model was developed from literature works and illustrated in **Chyba! Nenalezen zdroj odkazů..** This provides the background and the significant link between the constructs and the direction of the relationship. The direct, mediating, and moderating effects are elicited with arrow direction.

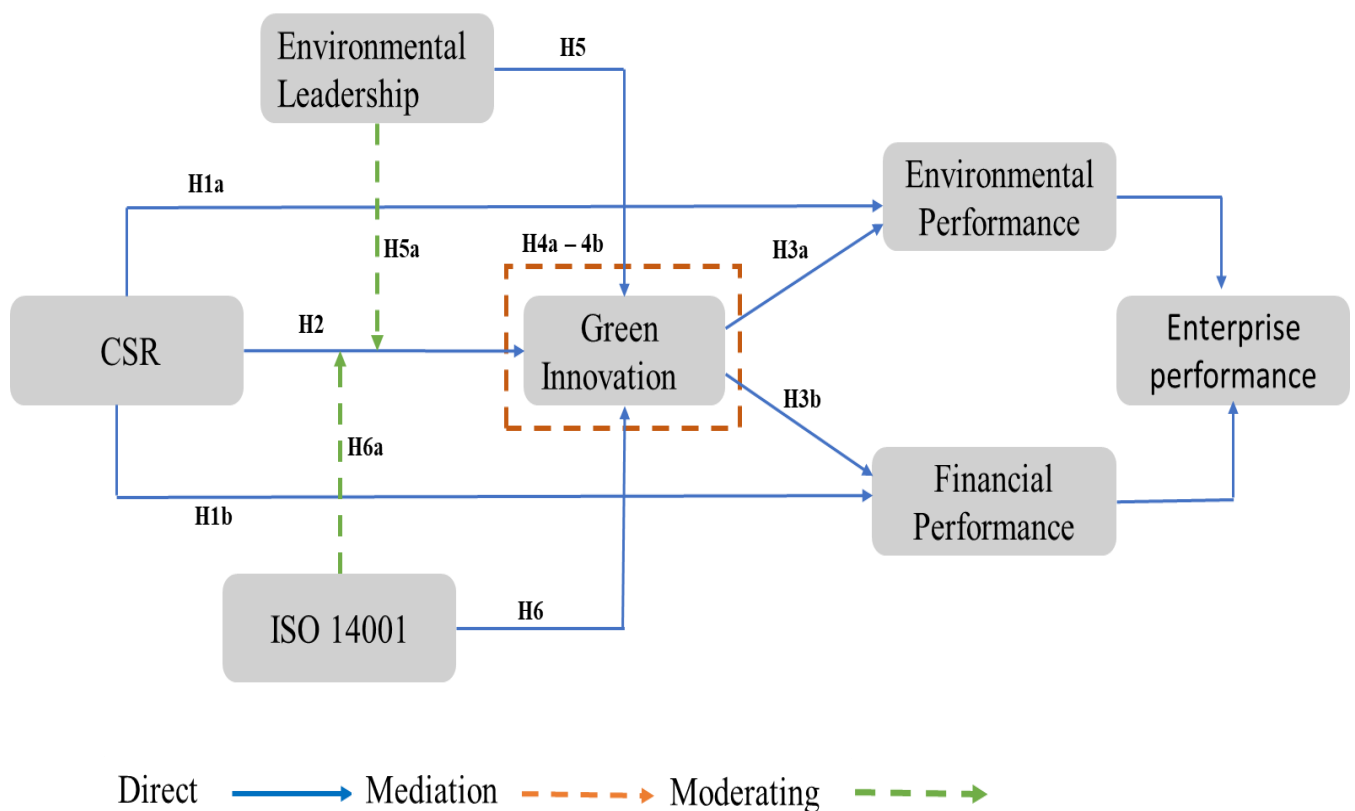


Figure 4. Model development. (Source: author)

2.4 Hypothesis development

2.4.1 Corporate Social Responsibility, green innovation, and enterprise performance

CSR promotes GIN and business growth by promoting long-term strategies that enhance productivity. Research by Liu et al. (2024) and Mbanyele et al.

(2022) shows that CSR has a substantial impact on business efficiency employing GIN, which include innovations in both products and processes that are designed to be environmentally sustainable. Companies can greatly benefit the environment and their bottom line by implementing green technologies, which are promoted by CSR activities (Yuan & Cao, 2022). Improving stakeholder trust and improved long-term profitability are common outcomes for companies that incorporate CSR into their plans. Achieving a competitive advantage mediates the positive effects of CSR and green product innovation on organisational performance (Achi et al., 2022). The context in which firms operate is vital for achieving the benefits of CSR initiatives, even though environmental sustainability is commonly believed to be essential for building long-term stakeholder loyalty. This is because external factors, like the perception of environmental volatility, can mitigate these relationships. According to Sarwar et al. (2023), a company's bottom line can take a hit if it doesn't implement GIN, which can appreciate productivity, reduce operational expenses, and optimise resource efficiency.

Furthermore, CSR has been shown to positively correlate with enterprise performance in prior literary investigations. Hang et al. (2022) depicted that competitive advantage mediates the association between CSR, green product innovation, and organisational performance, while green trust moderates the effect on performance. Nsiah et al. (2023) explored CRS and GIN within rising communities' ENL. The results showed that CSR improved environmental performance at the expense of financial and GIN performance. In small and medium-sized enterprises, green process innovation significantly boosts financial and environmental performance. Businesses in developing nations that produce goods have a responsibility to reduce their influence on environmental degradation and resource loss by adopting more sustainable methods. According to Rehman et al. (2022) GIN can help institutions become more efficient while decreasing their negative effects on the environment. Marietza and Ilhami (2023) investigated energy and mining businesses registered in Indonesia between 2018 and 2021. The assessment elicited an inverse relationship between CSR disclosure, enterprise performance, and return on equity, although green innovation has a positive effect on ROE. Results on the connection between CSR, green innovation, and business have been contradictory in the empirical study. Consequently, by utilising a variety of data sources and variables, this study will fill in the gaps.

The empirical evaluation has produced mixed findings on the relationship between CSR, GIN, and enterprise efficiency. As a result, this study will close the gaps by incorporating various data sources and variables.

H1a¹: CSR has a positive influence on enterprise environmental performance.

H1a²: CSR has a negative influence on enterprise environmental performance.

H1a³: CSR has no influence on enterprise environmental performance.

H1b¹: CSR has a positive influence on enterprise financial performance.

H1b²: CSR has a negative influence on enterprise financial performance.

H1b³: CSR has no influence on enterprise financial performance.

H2¹: CSR has a positive influence on green innovation.

H2²: CSR has a negative influence on green innovation.

H2³: CSR has no influence on green innovation.

2.4.2 Green innovation and enterprise performance mediating effect

The context of GIN is improving enterprise performance while tackling urgent environmental issues (Zameer et al., 2020). With heightened scrutiny on environmental effects, the incorporation of green product and process innovations into corporate plans and techniques has become a practical method for enhancing enterprise efficiency and sustainability (Xu et al., 2022). The relationship between green innovation, environmental and financial efficiency has attracted considerable interest in recent empirical evaluations (Fosu et al., 2024; Sheikh, 2022; Yu et al., 2020), demonstrating the need to employ environmentally friendly practices to enhance organisational performance. Green innovation includes several activities designed to mitigate the adverse environmental effects of a company's operations while enhancing resource efficiency and sustainability (Pan et al., 2022). This may encompass the creation of innovative products and services that reduce waste, the integration of energy-efficient technologies, and the execution of operations that diminish carbon emissions (Xue et al., 2022). The justification for green innovation is that by adopting ecologically sustainable practices, companies enhance societal welfare while simultaneously gaining a competitive advantage in the market.

Recent studies demonstrate that companies investing in green innovation can achieve significant operational advantages, such as cost reductions, increased productivity, and enhanced brand recognition (Ahmed et al., 2023; Marietza & Ilhami, 2023). In Indonesia, Novitasari and Tarigan (2022) demonstrate that

enterprises adopting green innovations can decrease energy usage and trash disposal expenses and reduce emissions. Moreover, green innovations can optimise processes, leading to enhanced resource efficiency and diminished input expenses. As companies increasingly emphasise sustainability, the initial expenditure on green technologies such as products and processes have a negative impact in the short term but improved profitability in the long term (Azam et al., 2023; Li et al., 2023). Moreover, the influence of green innovation on organisational performance extends beyond financial indicators (net profit, sales revenue, and return on shares). Commitment to sustainability positively influences non-financial performance factors, including employee engagement and organisational culture (Aftab et al., 2022). The research hypothesised that,

H3a¹: There is a positive relationship between green innovation and environmental performance.

H3a²: There is a negative relationship between green innovation and environmental performance.

H3a³: There is no relationship between green innovation and environmental performance.

H3b¹: There is a positive link between green innovation and financial performance.

H3b²: There is a negative link between green innovation and financial performance.

H3b³: There is no link between green innovation and financial performance.

H4a¹: Green innovation mediates the link between CSR and environmental performance.

H4a²: Green innovation doesn't mediate the link between CSR and environmental performance.

H4b¹: Green innovation mediates the association between CSR and financial performance.

H4b²: Green innovation doesn't mediate the association between CSR and financial performance.

2.4.3 Environmental leadership moderating effect

Companies are increasingly recognizing the value of sustainability in their operations, and one way to improve the efficacy of CSR and GIN is through environmental leadership (Nsiah et al., 2023). Scholarly study has recently focused on the complex role of leadership in shaping the relationship between

CSR initiatives and GIN. This is in response to the growing relevance of organizations aligning their operations with ecological sustainability (Rizvi & Garg, 2021). There has been prior literary works on the link between CSR and GIN, and it has shown both direct and indirect effects, as well as no influence at all. Soni (2022) assessed CSR-GIN relationship in India's manufacturing sector, the inspection looked at how ENL affected connection. The study indicated ENL has a beneficial effect on the connection between CSR programs and GIN. Zhu et al. (2022) expanded their investigation into China's tech sector, examining how ENL affects the connection between CSR and GIN. Based on their findings, which were derived from data collected from tech companies, ENL amplifies the significant correlation between CSR involvement and GIN. Companies whose top executives care about the environment are better able to use CSR engagement to promote environmentally friendly innovations.

To investigate the impact of sustainable leadership, Hu et al. (2023) zeroed in on Taiwan's tech and electronics sector. According to the study's assessment of IT companies, sustainable leadership greatly appreciate the significant impact of CSR initiatives and environmentally conscious innovation. Wang et al. (2023) investigated the impact of ENL on the relationship between GIN and GIN in the context of Chinese manufacturing firms. The data indicate that the positive influence of CSR on GIN was most pronounced in organisations where CEOs prioritised environmental protection. Pham et al. (2023) examined the influence of transformational leadership on small and medium-sized enterprises in Vietnam's construction industry. In SMEs, the findings indicated that transformational leadership enhanced the positive relationship between green learning and GIN. From the prior assessment (Arici and Uysal (2022; Begum et al., 2022; Niazi et al., 2023) the following hypothesis was developed to address the scant gaps on the relationship between ENL and GIN, and its moderating influence.

H5¹: Environmental leadership had a positive influence on green innovation.

H5²: Environmental leadership had a negative influence on green innovation.

H5a¹: Environmental leadership moderate the relationship between CSR and green innovation.

H5a²: Environmental leadership doesn't moderate the relationship between CSR and green innovation.

2.4.4 Environmental management system ISO 14001 moderating effect

The adoption of Environmental Management Systems, such as ISO 14001, has gained significance for organisations aiming to improve their environmental performance and foster sustainability (Arana-Landín et al., 2025). ISO 14001:2015, formulated by the International Organisation for Standardisation, offers a framework for organisations to proficiently manage their environmental obligations, reduce their ecological impact, and enhance operational efficiency (Labbella et al., 2024). The integration of ISO 14001 within corporate strategies not only influences environmental practices but also guides enterprises into green innovation and CSR initiatives. A large body of research has shown that environmental management practices have an improving impact on substantial corporate efficiency in regard to ISO 14001 and company growth. Organisations that achieve ISO 14001 certification often report improved operational efficiencies, reduced costs, and enhanced employee morale, which are critical components of long-term enterprise performance (Bashir et al., 2024). Likewise, ISO 14001 catalyses the development green products, processes, and services in manufacturing enterprises in emerging communities. Investment in new technology and processes that support environmental goals is encouraged by firms that follow the concepts of ISO 14001 standards. This boosts the company's image as a responsible citizen and improves its environmental performance (Ofori et al., 2023).

In the case of Italy, Bravi et al. (2020) researched enterprises that have certified ISO 14001. A questionnaire consisting of 1508 questions was answered by quality managers. The empirical analysis demonstrated that ISO 14001 helps to reduce waste management and energy utilisation. Again, in a hierarchical linear regression, Duque-Grisales et al. (2020) investigated 86 registered enterprises for the years 2016-2017 in Latin America. The study utilised ISO 14001 as a moderator to examine the relationship between green innovation and financial efficiency. The findings illustrated that ISO 14001 did not affect the financial efficiency of the enterprises studied. From the lens of the fishbone and resource-based view model, the moderating role of EMS ISO 14001 was assessed to achieve the SDGs by Toha et al. (2020). The research findings revealed that EMS ISO 14001 enhances the products and processes of enterprises. From the context of European communities, Ofori et al. (2023) explored ISO 14001 and its effects on the environment in the adoption of innovation. The findings show that countries that obtained ISO 14001 certification reduce carbon emissions. Furthermore, Hu et al. (2023) evaluated voluntary adoption of ISO 14001

between 2008 and 2020 among registered firms in China. The empirical findings showed that the implementation of ISO 14001 certification increased the amount and quality of GIN. The integration of ISO 14001 as an EMS to an enterprise's strategic policy will serve as the relationship between GIN and CSR. ISO 14001 promotes a systematic method for environmental management, urging organizations to implement sustainable practices, invest in GIN, and include stakeholders in their sustainability efforts. The next hypothesis is as follows:

H6: EMS ISO 14001 had a positive influence on green innovation.

H6: EMS ISO 14001 had negative influence on green innovation.

H6a¹: EMS ISO 14001 moderates the link between CSR and green innovation.

H6a²: EMS ISO 14001 doesn't moderate the link between CSR and green innovation.

3. METHODOLOGY

3.1 Research Approach and Design

Conducting successful research is based on designing the evaluation methodology. As encapsulated in Figure 5, the thesis model presents the steps followed to research the impact of CSR and GIN on enterprise efficiency, when assessing the moderating effect of ENL and ISO 14001. The literature examined both the theories of the resource-based view and the stakeholder theory. Next, the empirical work and the gaps for the development of the research are illustrated. This assisted in the evaluation objectives and the analysis questions to be solved to achieve the investigation purpose. This study employed explanatory sequential mixed methodology to examine the influence of CSR, GIN, ISO 14001, and ENL on the performances (ENP and FINP) of manufacturing firms in an emerging community of Ghana. The justification for choosing explanatory sequential mixed method is its capacity to systematically and objectively measure the link between CSR, GIN, and enterprise performance through the gathering and analysis of numerical data and qualitative data. This methodology allows the researcher to utilise statistical techniques for hypothesis testing and deriving conclusions applicable to the wider population of manufacturing enterprises in emerging markets. The explanatory sequential mixed method approach offers the theoretical frameworks and hypotheses generated from the current literature on constructs evaluated. On a qualitative basis, the thesis points to the readers that interview was employed to collect information on CSR, green innovation, ENL, and ISO 14001 from managers and experts within the manufacturing sector of Ghana. The interviews for both quantitative and qualitative data were curated through online and offline interviews with the Google survey guide form.

Furthermore, the research was emphasised on the post-positivist approach of research evaluation. Park et al. (2020) expound that the assessment of the independent and dependent construct relationship to find the cause and effect falls under the deductive approach. The establishment of causal linkages or explanatory associations that permit the prediction and manipulation of the phenomena under investigation is a fundamental objective of post-positivist research (Chua et al., 2019). It is significant to highlight that the thesis employed the Smart PLS4 SEM technique in the evaluation of the data survey collected. The purpose of utilising the PLS SEM is its superior estimator of both the measurement and structural models. Hair et al. (2022) assert that when dealing with a complex model, it is suitable to employ PLS SEM for such an investigation

to achieve the best results in terms of validity and reliability. On the qualitative angle the assessment was done employing the NVIVO.

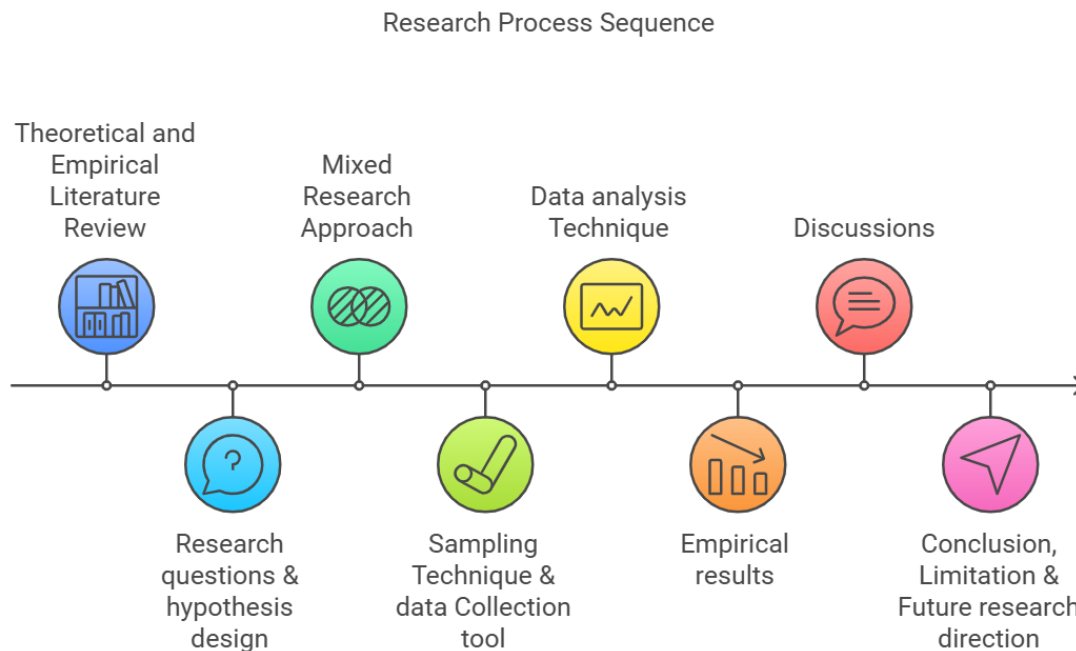


Figure 5. Thesis design sequence

3.2 Population and Sampling Size Techniques

The research evaluation focuses on SMEs across various regions in Ghana, aiming to gather a diverse group of managers to assess their responses to sustainability challenges. According to the Ghana Statistical Service (GSS), SMEs constitute the highest portion of the community enterprises in Ghana. Nyimbili and Nyimbili (2024) emphasise the importance of ensuring comprehensive population coverage in quantitative surveys to prevent sampling bias. The target population includes managers and key personnel responsible for critical decisions regarding sustainable and strategic enterprise policies. A variety of factors are taken into account when deciding on the sample size for SEM, such as the number of latent variables and observed indicators, the complexity of the model, the expected effect size, and the desired statistical accuracy. In order to get accurate parameter estimates and sufficient statistical power, higher sample numbers are typically required for more complicated models. According to Alvi

(2016), one way to determine the sample size is to multiply the total number of latent structures by 10. Soper (2020) notes that an online sampling calculator can help estimate the minimum sample size, which, with a confidence level of 80%, a margin of error of 5%, and a population proportion of 50%, is determined to be 164. However, to adequately examine the relationships between variables and the model, a minimum of 384 respondents is required, as per Cohen's sampling guidelines (Cohen, 2013). Nonetheless, the simsem technique, which is more robust and accounts for power assessment, effect size, and complexities of the model, was employed in the R package to assess the sample size. The results from the simsem analysis revealed a minimum sample size of 83.

pwr.t.test (n = NULL, sig.level = 0.05, type = paired, althernative
= two.sided, power = 0.95, d = 0.4

n = 83.164

d = 0.4

sig.level = 0.05

power = 0.95

althernative = two.sided

Finally, Muthén (2025) indicated in their article that when testing for CFA with normal distribution and no data curation missing, the sample size should be 150. With reference to the above literature, the minimum sampling suitable for research was 195 managers and technical individuals with a link to sustainability strategies. The process of participant selection for the qualitative assessment was subject to critical criticism; a) no more than two participants were selected from each zonal group. b) The participants should have experience, knowledge, and willingness to respond to questions. c) Special consideration was given to middle to top managers as they have decision-making roles.

3.3 Data collection

In line with literary assessment, no data gathering strategy should jeopardize relevance, correctness, dependability, or validity (Rabianski, 2003). The literature normally acknowledges two major groups of data sources: primary and secondary. The collecting and analysis of primary data is consistent with Rabianski (2003) technique. Secondary data, as opposed to primary data, is defined as previously validated information (Kotler & Keller, 2006). Data was

curated through a structured questionnaire technique to capture information on CSR practices, GIN, ENL, ISO 14001, and enterprise performance. The questionnaire was developed based on existing literature to ensure effective operationalisation of the constructs (see Table 1). The data collection process involved administering the questionnaire to the selected firms, which was conducted through online surveys, in-person visits, and telephone interviews. The sample manufacturing enterprise was sourced from the World Enterprise Survey (www.enterprisesurveys.org/en), Ghana Investment Promotion website, and Ghana Statistical Service (see Appendix 2, some selected manufacturing firms). The data collection was in two sections: a) *August - November 2024* and b) *December 2024 – January 2025*. The researcher would like to point out that another expert from the Ghana Statistical Service helped in the data collection across the 16 regions of Ghana. These are individuals who do data collection for the government and other non-governmental institutions. In total, seven hundred and thirty-five (735) questionnaires were distributed across the 16 regions. With a return of five hundred and seventy-six (576) accounting for 78.4%. Table 3 illustrates the demographic dimensions and sectoral divisions. The data on the qualitative section was collected in December 2024. The researcher first made contact with participants during the quantitative data collection, and a date was set for interviews. To ensure privacy, the interviews were conducted outside the participants' offices. The participants were first informed of the time duration (15 minutes) and all the sections of the questions. They were informed to opt out of the interview at any point they feel uncomfortable.

It is imperative to stress that ethical standards of data collection are paramount in ensuring the integrity of research and the protection of participants. Consent letter was sourced from the Head of Faculty of Economics and Management (FaME) (see Figure 26). These standards encompass a variety of considerations, including privacy, informed consent, and the potential for harm, which are critical in mixed research methodologies. Laryeafio (2023) article on ethical evaluation documents the ethical measures taken in their study, including obtaining ethics committee approval, explaining the research purpose, and ensuring informed consent. Therefore, participants were assured of privacy and anonymity. The participants were assured that at any point they were not comfortable with the interview or questionnaire; they could opt out.

3.4 Research Instrument and Measurement Scale

To effectively assess the constructs related to CSR, the research would like to point the reader's attention to the point that all these constructs were adopted from empirical literature (Achi et al., 2022; Elia et al., 2024; Fosu et al., 2024). For estimation purposes, eight (8) constructs were employed to inspect CSR (see Table 1). This covered four (4) sections of CSR of social, economic, environmental, and philanthropic initiatives. Again, green innovation was examined with reference to empirical literature that has been validated in top-ranked journals (Bedi et al., 2025; Takyi et al., 2024; Marfo, 2024). The measurement construct for green innovation was on product and process innovation practices deployed to diminish waste and resource efficiency. Hence, five (5) constructs measurement was employed to assess GIN in the section of green product and process innovation (see Table 1). On the constructs of environmental leadership, five (5) constructs were employed from empirical investigations on the link between ENL, GIN, and enterprise performance (Begum et al., 2022; Aftab et al., 2022; Nsiah et al., 2023). Leaders are considered the brain of innovation advocates for sustainability practices within an enterprise. Furthermore, ISO 14001 inspected with five (5) constructs. These constructs were adopted from articles exploring the effect in the SMEs in emerging communities. Finally, enterprise performance was measured from two points (financial and environmental). The purpose of adopting these two forms of performance was to close the gaps in prior literature (Lawton et al., 2025; Labella et al., 2024; Bravi et al., 2020). Financial was explored with four (4) constructs, which were adopted from the literature evaluation of Nsiah et al. (2023) and Hang et al. (2022). Also, the environmental section was measured with five (5) constructs adopted from previous articles. It is of significant importance to draw the reader's mind to the points that financial measurement was assessed from the subjective angle (Vij et al., 2016) rather than from the objective angle of financial measurement, as financial statements of manufacturing enterprises were not accurately available. The constructs were evaluated on a Likert scale with a 5-point scale of strongly agree 1 – strongly disagree -5. The researcher points the reader's attention to understand that all the questionnaires were in a positive form and closed-ended questions (Memmedova & Ertuna, 2024). From a qualitative point of view, ten open questions were sourced from the participants' understanding of variables. This was part of the evaluation carried out in the first stage of the research. For each variable, three (3) questions were administered to gather their response after arrangements were agreed.

Table 1. Definition of variables and constructs

Variables	Constructs
<i>How much do you agree or disagree with the following assertions on a 5-point Likert-scale? (Strongly Agree=1, Strongly Disagree=5).</i>	
Green innovation	
GIN1 - When developing or designing a product, our organisation prioritises using materials that have a low environmental impact.	
GIN2 - When developing or designing a product, our organisation prioritises using materials that are environmentally friendly, recyclable, reusable, and biodegradable.	
GIN3 – Our production has reduced emissions of hazardous chemicals or wastes as a result of our company's production method.	
GRN4 - Our company's production technique efficiently recovers treatable and reusable materials from trash and pollution.	
GIN5 - Our company's production method efficiently decreases the usage of water, power, coal, gas, and oil.	
CSR	
CSR1- Customer happiness is a key performance factor for the enterprise's product and service marketing efficiency.	
CSR2- It is the enterprise's goal to understand its customers' demands.	
CSR3- Profit maximization is the company's primary objective.	
CSR4- Workplace safety is a priority for this organisation.	
CSR5- Opportunities for advancement and training are available to workers at this organisation.	
CSR6- To help the most disadvantaged members of society, the corporation donates to charitable causes and funds social programs.	
CSR7- There is more to the company's social responsibility than just making money.	

CSR8- As far as the environment is concerned, the corporation acts responsibly.
<i>Environmental Leadership (ENL)</i>
ENL1 - Executives have said that the low-carbon idea is the organisation's long-term goal.
ENL2 - Education on low-carbon practices is the responsibility of executives.
ENL3 - Leadership offers financial incentives to promote carbon-light operations.
ENL4 - Company culture is infused with environmental initiatives, strategies, and objectives.
ENL5 -At the highest level of firm, there is a designated fund for protecting the environment.
ISO 14001
ISO 1 – ISO 14001 helps the firm in monitoring of environmental performance.
ISO 2 – ISO 14001 encourages businesses to track the environmental consequences of their goods and services over their entire life cycle and take action to mitigate them.
ISO 3 - Integration of the EMS ISO 14001 with enterprise activities.
ISO 4 - Environmental, social, financial, regulatory, and technical factors are all parts of the enterprise's operational context.
ISO 5 - A more accurate assessment of potential dangers and opportunities
Enterprise performance (Financial)
FP1- Does your organisation implement green innovation practices to enhance its overall organisational performance.
FP2- Has your organisation observed an improvement in financial performance because of integrating green innovation and CSR into its business strategy.

FP3- Do you believe that CSR initiatives favourably influence your organisation's green innovation efforts.
FP4- Does the adoption of green innovation practices contribute to employee satisfaction and organisational growth in your enterprise.
Enterprise performance (Environmental)
ENP1- The enterprise has ecological certification to mitigate environmental externalities.
ENP2 - On average, our company's environmental performance during the last five years has improved.
ENP3 - Over the last three years, our company has reduced its consumption of water, power, and gas.
ENP4 - There has been an improvement in our organisation's environmental compliance.
ENP5 - When it comes to things like garbage disposal and carbon dioxide emissions, our business follows all the requirements.
Source: Author's compilation (2024)

3.5 Data Analysis Techniques

The prevailing corporate governance environment has significantly emphasised the relationship of CSR, GIN, ISO 14001, ENL, and enterprise performance (ENP and FINP). To assess the link between the constructs, PLS-SEM provides a robust framework for analysing interactions, particularly for mediating and moderating effects (Ringle et al., 2015). The application of Smart PLS4-SEM allows for the exploration of these relationships in a manner that traditional regression techniques may not adequately address. One of the primary strengths of PLS-SEM is its capability to analyse models with multiple constructs, including mediators and moderators, within a single framework. For instance, Hair et al. (2022) study on entrepreneurial intentions highlights how PLS-SEM facilitates the testing of moderated mediation models, which can be challenging to evaluate using conventional statistical tools. This is particularly relevant when researchers aim to understand how certain variables influence each other through mediating effects while also considering the impact of moderating

variables. The flexibility of PLS-SEM in accommodating such complex relationships makes it a preferred choice for this research evaluation. Moreover, the use of Smart PLS-SEM is not limited to specific types of data distributions. As noted by Xiong et al. (2015) and Baah et al. (2021), the variance-based estimation approach of PLS-SEM is materially beneficial when dealing with non-normal data, which is often encountered in exploratory research. Consequently, PLS-SEM serves as a robust alternative for analysing causal association, especially in inspection where the data may exhibit non-normality. Not only is PLS-SEM very adaptable to different kinds of data, but it also does an exceptional assessment of maximizing the explained variance of endogenous latent variables. This is critical for the study as it aims to maximise the predictive power of the models. The methodological rigour of PLS-SEM is further enhanced by its capacity to incorporate various types of relationships among constructs. For example, Johari et al. (2022) demonstrate how PLS-SEM can effectively analyse a model comprising multiple independent, moderator, and dependent constructs. This ability to simultaneously assess direct, indirect, and interaction effects allows researchers to construct more nuanced models that reflect the complexities of real-world phenomena. The Smart PLS has two sections, measurement and structural technique.

Verifying the validity and reliability of the constructs employed in the dissertation is an important part of evaluating the measurement technique. To make sure each construct represents the desired inspection effectively, this stage checks important sections including composite reliability (CR) and average variance extracted (AVE). Strong reliability is indicated by CR rates above 0.70, while construct that explain more than half of their variance have AVE values above 0.50. The Fornell-Larcker criterion was used to evaluate discriminant validity, which checks to see if each concept is unique and does not overlap with others. To make sure the constructs were significantly valid, we also included HTMT and cross-loading. Furthermore, confirmatory factor analysis (CFA) was employed to confirm the dimensionality of the constructs, confirming that item groups, as expected, contribute to the model developed. These econometric evaluations ensure that the necessary conditional assessment (NCA) of CSR, GIN, ENL, ISO 14001, ENP, and FINP is made.

The structural model evaluation aims to establish the hypothesised link between the constructs. This study examines paths, R-squared, and effect sizes (f^2) to identify the strength and importance of the relationship in the model. Path coefficients indicate the strength of the link between variables, and R-squared

values represent the amount of variance explained in the endogenous variable by the exogenous variables. In order to identify both direct and indirect impacts, bootstrapping methods were used to find out whether the path coefficients were statistically significant. In addition, the dissertation evaluated how ISO 14001 and ENL moderate the link between CSR, GIN, and enterprise performance, shedding light on the ways in which these two constructs affect these dynamics. As illustrated in Figure 6, the inspection steps are presented.

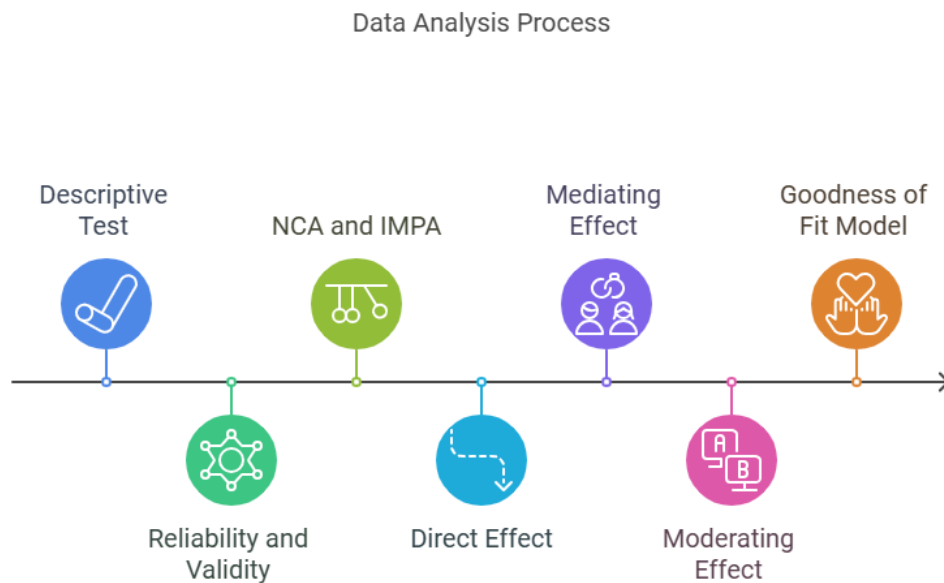


Figure 6. Data analysis steps

3.6 Common method bias

Common method variance (CMV) is a significant apprehension in empirical research, particularly in enterprise assessments where data is often collected from the same respondents. CMV is the amount of variation that comes from the measurement itself, not the elements that the measurements stand for. This phenomenon can lead to biased estimates of the relationship between CSR, GIN, ENL, ISO 14001, and enterprise performance (FINP and ENP). Understanding and addressing CMV is necessary for ensuring the validity of assessment findings. One of the primary issues with CMV is its potential to distort parameter estimates in regression models. Siemsen et al. (2009) illustrate that CMV can lead to misleading conclusions by either inflating or deflating the relationships between variables, depending on how symmetrically the bias affects the observed measures. Their research highlights that while bivariate relationships may be

particularly susceptible to CMV, multivariate relationships can also be adversely affected. Chang et al. (2010) emphasise the common occurrence of CMV in studies utilising the same respondent data in the field of international business research. They observe that numerous publications submitted to journals in this domain frequently have indications of CMV, leading editors to solicit validity verifications from authors. This practice demonstrates an increasing recognition of the necessity to consider CMV in research design and analysis, since neglecting this aspect might undermine the validity of findings and the conclusions derived from them. Kock (2015) further elaborates on the implications of CMV in the evaluation of PLS-SEM, noting that classic PLS-SEM algorithms can excel effectively in depreciating model-wide collinearity, which is often exacerbated by CMV. The variance inflation factor was employed to validate the CMV in the assessment process. Kock et al. (2021) indicated that a VIF less than 5 is considered to have less multicollinearity among the variables. The result established a VIF less than 5, affirming no CMV.

3.7 Necessary condition analysis (NCA) and important performance evaluation (IPMA)

3.7.1 IPMA

IPMA is a methodological technique that enhances the insights obtained from Structural Equation Modelling (SEM) by integrating two key dimensions: the importance of constructs and their performance scores. This technique enables researchers to categorise various attributes into categories of low, moderate, and high importance and performance, thereby providing a clearer understanding of which components require management attention and improvement (Fakfare & Manosuthi, 2022; Sarstedt, 2024). IPMA extends traditional SEM analysis by offering a two-dimensional map that juxtaposes the performance scores of constructs against their total effects, or importance, on a target construct (Sarstedt, 2024). This dual perspective enables scholars to derive actionable insights that can inform real-world applications, particularly in fields such as Business and economics (Li et al., 2024). Identifying areas that necessitate immediate managerial intervention, IPMA serves as a valuable tool for enhancing strategic decision-making and optimising resource allocation (Tailab, 2020). As a result, the relationship between CSR, GIN, ENL, ISO 14001, ENP, and FINP was evaluated to provide management with constructs needed for the

implementation to achieve sustainability by manufacturing enterprises in emerging communities.

3.7.2 Necessary condition analysis

1. Theoretical bases

NCA is grounded in the theoretical framework that distinguishes between necessary and sufficient conditions in causal relationships. The NCA must be present for a particular outcome to occur (ie. Y depends on X), although its presence alone does not guarantee that the outcome will happen (Linder et al., 2022; Neubauer, 2022). Thus, as per the NCA, condition X influences the outcome of Y by establishing a ceiling line on the scatter plot of the study data (XY), which signifies a threshold. This concept is particularly relevant in fields such as sustainability, entrepreneurship, and organisational behaviour, where researchers seek to identify the essential factors that contribute to desired outcomes (Tynan et al., 2020; Richter et al., 2020). NCA emphasises the identification of constraints or bottlenecks that limit the achievement of specific results, thus providing a nuanced understanding of causal pathways. In reference to the dissertation, for environmental and financial performance to be achieved, it depends on the level of CSR, GIN, ISO 14001, and ENL within the manufacturing sector. Following the work of Dul et al. (2023) and Li et al. (2024), the NCA and the PLS was employed.

2. Meaningful data

The efficacy of NCA relies positively on the quality and meaningfulness of the data employed in the analysis. Displays the descriptive evaluation to ensure the datasets are reliable and valid, as NCA is sensitive to sampling errors and measurement inaccuracies (Linder et al., 2022). The analysis empirically involves assessing the link between exogenous and endogenous constructs to determine whether the independent variables are necessary for the dependent outcomes. The outcomes presented the distribution and spread of data sufficient to allow for the identification of NCA.

3. Scatter plot and ceiling lines

In NCA, scatter plots are a crucial visual tool used to illustrate the link between variables. The scatter plot displays the independent variable on the X axis and the dependent variable on the Y axis, allowing for the observation of the distribution

of data points (Edelmann, 2023; Sanyal, 2023). A key feature of this analysis is the inclusion of ceiling lines, which represent the upper limits of performance for the environmental and financial performance. These lines help to delineate the areas of necessary conditions by highlighting regions where the CSR, GIN, ENL, and ISO 14001 must reach a certain threshold for the desired outcome to be achieved. An empty zone above the ceiling line signifies that certain amounts of the independent variables are required but insufficient for attaining the outcome. Thereby emphasising the importance of targeting specific conditions for success. This visual representation aids in identifying gaps and potential areas for improvement.

4. Effect size evaluation

Furthermore, the estimation of F^2 through NCA aids in understanding the significance of the proposed necessary condition. To quantify this effect, the parameter (d) is calculated as the ratio of the areas representing observed sectors (S) to those with absent observations (C). The function is as follows,

$$effect\ size_{(d)} = \frac{C}{S}$$

Additionally, Dul et al. (2023) established specific thresholds for interpreting effect sizes: a) (d) value between 0 and 0.1 signifies a "small effect size," b) (d) value ranging from 0.1 to 0.3 indicates a "moderate effect size," c) (d) value between 0.3 and 0.5 reflects a "large effect size," and d) (d) value exceeding 0.5 suggests a "very large effect size." In addition to these F^2 metrics, NCA offers methodologies such as "bottleneck analysis" and assessments of statistical significance. As noted by Sukhov et al. (2022), these methods assist researchers in avoiding inaccuracies and erroneous conclusions. It is important to highlight that the results of NCA are considered valid only when they satisfy three criteria outlined by Sukhov et al. (2022): (1) there must be a robust theoretical framework underpinning the assessment, (2) the F^2 (d) can't be zero ($d > 0$), and (3) the p value must have a positive significance influence.

5. Bottleneck evaluation

Bottleneck evaluation is a distinctive feature of NCA that focuses on identifying constraints that hinder the achievement of desired outcomes. Analysing the necessary conditions, researchers can pinpoint specific variables that act as bottlenecks within a system (Zhang, 2024). This evaluation is useful in complex environments where multiple factors interact, as it allows a targeted approach to improving performance (Sanyal, 2023). Understanding these bottlenecks enables

organisations to allocate resources more effectively and implement strategies that address the most critical constraints. Furthermore, recognizing the necessary conditions that must be met for success, organisations can develop more informed and strategic plans to enhance overall performance and achieve their objectives.

4. EMPIRICAL EVALUATION

4.1 Descriptive outcome

To investigate the relationship between CSR, GIN, ENL, ISO 14001, ENP, and FINP within the manufacturing enterprises in Ghana. The descriptive inspection was illustrated in Table 2 (see Table 27 for indicators descriptive). The descriptive outcome analysis provides significance to readers the demographics of the respondents, which can inform the interpretation of the research findings. Understanding the composition of the sample is significant for contextualising the estimations and drawing meaningful conclusions about the responses to sustainability issues among SMEs in Ghana. The outcome estimation illustrates that the majority of respondents are male, 368 (63.9%), while the remaining females constitute 36.1%. This indicates a significant gender disparity within the surveyed population. Also, it provides information on employment proposition in the SMEs. The age group of 36 - 40 years is the most represented, accounting for 28.9% of respondents. The younger age group (25 - 30 years) has the least representation at 16.6%, exhibiting a predominantly middle-aged workforce. Respondents' educational attainment shows a significant portion of respondents hold a master's degree (46.0%), followed closely by those with a Bachelor's/HND/Diploma (40.5%). This indicates a highly educated sample, which may influence their perspectives on the issues future sustainability policy development for SMEs in Ghana. On the part of individual employment position in the enterprise, business owners represent the largest segment (36.8%), followed by quality assurance managers (34.0%). This is the affirmation of the report by the GSS (2023), which indicates that SMEs are predominantly won and controlled by owners with small employee. Moreover, the major sub-sectors of manufacturing sector were explored. The food and beverage sector has the highest depiction (47.1%), indicating a strong focus on this industry within the dissertation. The metal fabrication and machinery sector has the least representation at 10.0%. The food and beverage industry results can be attributed to the low capital and requirements needed to open an enterprise. Finally, the economy of Ghana is divided into six zones for operating an enterprise for tax purposes. The Greater Accra region has the highest number of respondents (31.8%), while Zone 5 (Oti, Volta) has the lowest representation (7.9%). This regional distribution reflects the concentration of SMEs in urban areas compared to rural regions. The community of Tema hosted the high SMEs as it is close to the port for shipping and has a good road network.

Table 2. Descriptive outcome

		Frequency	Per centage (%)
Respondent information			
Gender	Male	368	63.9
	Female	208	36.1
Age	25-30	96	16.6
	31-35	113	19.6
	36-40	167	28.9
	41-45	105	18.2
	46-50	63	10.9
	50 and above	32	5.6
Education	Bachelor / HND/Diploma	233	40.5
	Master's	265	46.0
	PhD and above	78	13.6
Position	Line / Plant Manager	101	17.5
	Business Owner	212	36.8
	Quality Assurance Manager	196	34.0
	Executive Manager	67	11.6
Sub-Sector	Food and Beverage	271	47.1

Regional and Zonal Enterprises	Textile and Garment	114	19.8
	Metal Fabrication and Machinery	58	10.0
	Woodworking and Furniture	133	23.1
	Zone 1(Norther, Northeast, Upper East and West)	60	10.4
	Zone 2 (Ahafo, Bone, Bone East, Savannah)	105	18.2
	Zone 3 (Ashanti)	101	17.5
	Zone 4 (Central, Western, Western North)	81	14.1
	Zone 5 (Oti, Volta)	46	7.9
	Zone 6 (Greater Accra)	183	31.8

Note: Total sampling is 576. Author compilation, 2025

4.2 Measurement model

This section of the dissertation depicts the primary evaluation to ensure the constructs are reliable and valid to estimate the dissertation hypothesis development under the quantitative part.

4.2.1 Construct loading and VIF

As indicated in the previous part of the dissertation, CSR - 7 constructs, GIN - 5, ENL – 5 constructs, ISO 14001 – 5 constructs, ENP–5 constructs, and FINP – 4 constructs.

Table 3 and Figure 22 encapsulate the loading of all the constructs from the Smart PLS4 algorithm with a resampling of 10000. In reference to the empirical works of Hair et al. (2022), a loading of a construct should be at least 0.7 to meet the threshold. The findings from the PLS indicated that all the constructs are above 0.7. To check for the collinearity of the constructs, the VIF was employed. Multicollinearity, as described by Judijanto et al. (2023), happens when there is a high degree of collinearity between two or more exogenous constructs. This correlation can skew PLS findings and cause inaccurate construct estimates in the model. Guchait (2023) indicates that researchers can typically presume that data is free from significant collinearity issues if the VIF values remain below the threshold of 5 to depreciate the CMV. Therefore, the researcher affirms that no collinearity exists within the CSR, GIN, ENL, ISO 14001, ENP, and FINP.

Table 3. Construct loading and VIF

	Constructs	Loadings	VIF
Corporate Social Responsibility (CSR)	CSR1	0.823	2.540
	CSR2	0.875	3.574
	CSR3	0.780	2.181
	CSR4	0.808	2.943
	CSR5	0.826	3.131
	CSR7	0.740	2.344
	CSR8	0.820	2.836

Green Innovation (GIN)	GIN1	0.902	4.160
	GIN2	0.912	4.866
	GIN3	0.916	4.172
	GIN4	0.877	3.504
	GIN5	0.834	2.796
Environmental Leadership (ENL)	ENL1	0.780	1.643
	ENL2	0.851	2.556
	ENL3	0.892	4.275
	ENL4	0.918	3.303
	ENL5	0.906	4.311
Environmental management system ISO 14001 (ISO)	ISO1	0.919	1.494
	ISO2	0.902	1.037
	ISO3	0.910	3.777
	ISO4	0.916	4.596
	ISO5	0.886	3.755
Financial Performance (FINP)	FINP1	0.839	1.683
	FINP2	0.891	2.429
	FINP4	0.889	2.402
Environmental performance (ENP)	ENP1	0.851	3.008
	ENP2	0.909	4.341
	ENP3	0.887	3.404
	ENP4	0.900	3.508
	ENP5	0.872	2.934

Noted: VIF – variance inflation factor. Removed constructs - CSR6 (high VIF>5) and FINP3 (question deficiency)

Source: Author compilation from Smart PLS4

4.2.2 Validity and reliability of outcome

The validity and reliability outcomes presented in Table 4 demonstrate that the constructs used in this inspection, CSR, ENL, ENP, FINP, GIN, and ISO 14001, exhibit strong internal consistency and reliability. The high AVE values further approve that the constructs are well-defined and effectively measure the link between the variables. The outcome corroborates with Manley et al. (2021) assessment which established that CA and rho_c estimation should be above 0.7 to ensure reliability. Again, the AVE value of 0.5 or higher is deemed acceptable. In Table 4, all constructs exceed this threshold, with values ranging from 0.658 (CSR) to 0.822 (ISO), depicting that the constructs effectively capture the intended variance.

Table 4. Validity and reliability outcome

	CA	rho_c	AVE)
CSR	0.913	0.918	0.658
ENL	0.920	0.925	0.758
ENP	0.930	0.933	0.782
FINP	0.844	0.844	0.763
GIN	0.933	0.936	0.790
ISO	0.946	0.949	0.822

Source: Author compilation from Smart PLS4

4.2.3 Discriminate validity evaluation

Prior literature has indicated that when estimating the measurement technique in PLS-SEM, one of the analyses to carry out is the discriminant validity. Discriminant validity is essential in validating measurement models,

ensuring that constructs are distinct from one another. The researcher points out to readers that the HTMT, Fornell-Larcker, and cross-loading methods were employed. The findings are exhibited in Table 5, Table 6, and Table 7 illustrating the relationship between CSR, GIN, ENL, ISO 14001, ENP, and FINP of the investigated manufacturing enterprises. The HTMT values suggest that all pairs of constructs maintain adequate discriminant validity. Henseler et al. (2015) indicated that a construct's relationship should be below the threshold value of 0.90 (see Table 5). This indicates that the constructs of CSR, ENL, ENP, FINP, GIN, and ISO are empirically distinct, supporting the theoretical framework that underpins their measurement.

The Fornell-Larcker criterion analysis indicates that most constructs exhibit adequate discriminant validity, as the square roots of their AVE values exceed the relationship with other constructs (see Table 6). However, there are notable exceptions concerning the relationship between ENP and GIN, where the correlations approach the square root of the AVE values. This depicts that these constructs may not be entirely distinct, warranting further investigation. Li et al. (2024) indicate that other discriminant techniques can be employed to check the issue of closed relationships in construct correlations. Likewise, cross-loadings assess whether items load more significantly on their intended constructs than on other constructs (see Table 7). This method requires that each item's loading on its designated factor be greater than its loadings on other factors (Ximénez et al., 2022). While cross-loadings can provide valuable insights into the construct validity, they can also be sensitive to model specifications. Ignoring cross-loadings may lead to erroneous conclusions about the distinctiveness of constructs, particularly in complex models. As there are no issues of discriminant validity, the researcher proceeded with the quality checks.

Table 5. Heterotrait-Monotrait ratio (HTMT)

	CSR	ENL	ENP	FINP	GIN	ISO
CSR	1					
ENL	0.887	1				
ENP	0.673	0.619	1			
FINP	0.784	0.861	0.762	1		
GIN	0.674	0.694	0.725	0.792	1	
ISO	0.846	0.892	0.521	0.736	0.565	1

Source: Author compilation from Smart PLS4

Table 6. Fornell-Larcker Criterion

	CSR	ENL	ENP	FINP	GIN	ISO
CSR	0.811					
ENL	0.820	0.871				
ENP	0.626	0.579	0.884			
FINP	0.690	0.752	0.676	0.873		
GIN	0.629	0.655	0.869	0.703	0.889	
ISO	0.786	0.831	0.491	0.660	0.534	0.907

Source: Author compilation from Smart PLS4

Table 7. Cross Loadings

	CSR	ENL	ENP	FINP	GIN	ISO
CSR1	0.823	0.681	0.516	0.531	0.517	0.576
CSR2	0.875	0.756	0.618	0.606	0.606	0.701
CSR3	0.780	0.660	0.548	0.540	0.577	0.576
CSR4	0.808	0.619	0.498	0.516	0.473	0.662
CSR5	0.826	0.695	0.511	0.563	0.538	0.639
CSR7	0.740	0.580	0.371	0.519	0.393	0.627
CSR8	0.820	0.645	0.455	0.637	0.432	0.689
ENL1	0.687	0.780	0.524	0.496	0.689	0.594
ENL2	0.683	0.851	0.493	0.734	0.528	0.729
ENL3	0.699	0.892	0.491	0.659	0.509	0.730
ENL4	0.758	0.918	0.491	0.732	0.533	0.768
ENL5	0.722	0.906	0.497	0.675	0.533	0.809
ENP1	0.519	0.482	0.851	0.597	0.683	0.412
ENP2	0.568	0.510	0.909	0.575	0.757	0.437
ENP3	0.582	0.478	0.887	0.589	0.729	0.416
ENP4	0.561	0.526	0.900	0.636	0.837	0.445
ENP5	0.538	0.558	0.872	0.591	0.817	0.458
FINP1	0.666	0.538	0.596	0.839	0.579	0.543
FINP2	0.549	0.699	0.612	0.891	0.648	0.585
FINP4	0.589	0.735	0.563	0.889	0.614	0.600
GIN1	0.583	0.577	0.839	0.646	0.902	0.503
GIN2	0.583	0.555	0.829	0.627	0.912	0.471
GIN3	0.570	0.577	0.827	0.643	0.916	0.478

GIN4	0.508	0.553	0.713	0.575	0.877	0.431
GIN5	0.545	0.653	0.637	0.629	0.834	0.486
ISO1	0.708	0.765	0.412	0.603	0.452	0.919
ISO2	0.667	0.690	0.408	0.544	0.435	0.902
ISO3	0.703	0.740	0.467	0.593	0.515	0.910
ISO4	0.738	0.786	0.466	0.619	0.495	0.916
ISO5	0.739	0.780	0.466	0.623	0.511	0.886

Source: Author compilation from Smart PLS4

4.2.4 Model Fitness indices – PLS SEM

The model fitness of the endogenous variables was extracted from the PLS algorithm of the measurement model as exhibited in The NFI, meanwhile, is lower than the critical value of 0.90.

Table 8. The R-squared values for GIN, ENP, and FINP indicate how well the exogenous variables (CSR, GIN, ENL, ISO 14001) are explained. The findings show R-squared figures of GIN 0.468 (46.8%), ENP 0.764 (76.4%), and FINP 0.594 (59.4%). With a corresponding adjusted R-squared value of GIN 0.458 (45.8%), ENP 0.761 (76.1%), and FINP 0.580 (58.6%). From these values, it is evident that the ENP estimate has a high explanatory power, with approximately 76.4% of the variance in the exogenous construct explained by the endogenous construct. In contrast, FINP and GIN have lower R² values, indicating that they explain 59.4% and 46.8% of the variance, respectively. Next, The NFI, meanwhile, is lower than the critical value of 0.90.

Table 8 produced a Q² value of 0.393 for ENP, depicting that approximately 39.3% of the variance in the endogenous construct can be explained by the model. In contrast, FINP, with a Q² value of 0.525, demonstrates a stronger predictive capability, explaining 52.5% of the variance. GIN, with a Q² value of 0.456, falls in between the two, suggesting a moderate level of predictive accuracy. The researcher draws readers' attention to the interpretation of Q²

values, as it is significant for understanding model performance. A Q^2 value closer to 1 indicates a model that elucidates a significant portion of the variance, while a value closer to 0 illustrates a model with limited predictive power. In this context, the models can be ranked in terms of predictive power as follows: $FINP > GIN > ENP$. This ranking provides a foundational understanding of how well each model performs in terms of explaining variance.

$$Q^2 = \frac{(Q^2_{\text{included}} - Q^2_{\text{excluded}})}{(1 - Q^2_{\text{included}})}$$

Furthermore, SRMR and NFI indices were assessed on the fitness of the dissertation model development. The estimate of SRMR value is below the threshold of 0.08 (0.068), demonstrating an acceptable fit. The NFI, meanwhile, is lower than the critical value of 0.90.

Table 8. R Square, Adjusted R Square, and Q^2 predict

	R-square	R-square adjusted	Q^2predict
ENP	0.764	0.761	0.393
FINP	0.594	0.586	0.525
GIN	0.468	0.458	0.456
Saturated model		Estimated model	
SRMR		0.063	0.068
NFI		0.752	0.746
$Q^2 = < 0.15 \text{ weak}, < = 0.35 \text{ moderate}, > 0.35 \text{ strong}.$			

Source: Author compilation from Smart PLS4

4.3 Structural model

4.3.1 Direct path hypothesis evaluation

Table 9 exhibited the estimated outcome for the direct path hypotheses on the relationship between CSR, GIN, ENL, ISO 14001, ENP, and FINP. The findings

indicate a statistically significant relationship between CSR and ENP (**H1a**). With a Coeff value of 0.132, T value 4.390, and P value 0.000. The Coeff figure of 0.132 implies that a 1% upsurge in CSR initiative will increase ENP by 13.2%. This outcome established that CSR initiative is not just a social contribution but place the manufacturing firm in the community where they operate as a responsible company, leading to their environmental efficiency. On the relationship between CSR and FINP, the empirical outcome indicates that CSR had a positive link with FINP (**H1b**). A Coeff value of 0.410 indicates a strong relationship, suggesting that CSR initiatives significantly enhance financial performance. The T statistic of 9.087 and the P value of 0.000 further validate the robustness of this link. The effect implies that a 1% change in CSR activities helps to improve the financial efficiency of enterprises by 41%. Therefore, manufacturing enterprises that want to increase their financial efficiency can be involved in CSR activities, which will have a positive impact on their finances. Again, the nexus between CSR and GIN was tested (**H2**). The findings revealed that CSR positively impact GIN with a Coeff estimate of 0.252, a T statistic of 3.518 indicates statistical significance, and the P value of 0.000 confirms that an efficient CSR initiative will cause a drive for green innovation and sustainability efforts within organisations. Additionally, **H3a - H3b**, illustrated the empirical connection between $GIN \rightarrow ENP$ and $GIN \rightarrow FINP$. The findings revealed that $GIN \rightarrow ENP = 0.786$, $GIN \rightarrow FINP = 0.445$ and T values of 27.314 and 9.537, respectively. The implication is that, when enterprises improve sustainability investment in GIN will upsurge an appreciation in FINP and ENP. On the effect of ENL $\rightarrow$ GIN (**H5**) the ENL has a significant positive effect on GIN, with a Coeff estimate of 0.477. The T-statistic of 8.483 and the P-value of 0.000 indicate that strong leadership in environmental initiatives fosters innovation within organisations. As encapsulated in Table 9 and Figure 23, the relationship between ISO 14001 and GIN (**H6**) established a negative relationship. With a Coeff estimate of -0.095. A t-statistic of 1.407 and a p-value of 0.160 indicate that this association had a negative, statistically significant. This implies that it may not have an impact on fostering green innovation and enterprise sustainability practices.

Table 9. Direct path hypothesis

Hypothesis	Original sample	Std. dev	T statis	P values	F ²

CSR -> ENP (<i>H1a</i>)	0.132	0.030	4.390	0.000	0.044
CSR ->FINP (<i>H1b</i>)	0.410	0.045	9.087	0.000	0.205
CSR -> GIN (<i>H2</i>)	0.252	0.072	3.518	0.000	0.034
GIN -> ENP (<i>H3a</i>)	0.786	0.029	27.314	0.000	0.546
GIN ->FINP (<i>H3b</i>)	0.445	0.047	9.537	0.000	0.315
ENL -> GIN (<i>H5</i>)	0.477	0.056	8.483	0.000	0.096
ISO -> GIN (<i>H6</i>)	-0.095	0.068	1.407	0.160	0.006
F square >=0.02 is small, >=0.15 is medium, >=0.35 large (Cohen, 1988), T value >1.96.					

Note: Source: Author compilation from Smart PLS4

Furthermore, the researcher stresses to readers the significance of the (F^2). According to Cohen (1998), F^2 helps to explain the influence of the exogenous construct on the endogenous construct in the form of small (0.02), medium (0.15), and large (0.35).

$$F^2 = \frac{(R2_{included} - R2_{excluded})}{(1 - R2_{included})}$$

On the effect side evaluation, $CSR \rightarrow ENP$ was 0.044 (small effect side). This established that CSR has a small effect on ENP, suggesting that while CSR initiatives may contribute to environmental outcomes, their impact is relatively limited.

$CSR \rightarrow FINP$ $f^2 = 0.205$ (Medium Effect Size). The medium effect size indicates that CSR has a more substantial impact on FINP, suggesting that effective CSR practices can lead to significant improvements in financial outcomes.

$CSR \rightarrow GIN$ $f^2 = 0.034$ (Small Effect Size) - This value indicates a small effect of CSR on GIN; the implication is that while CSR may encourage some level of innovation, its influence is not strong.

ENL → *GIN* $f^2 = 0.096$ (Small Effect Size) - The small effect size indicates that ENL has a limited impact on promoting GIN, establishing that other factors may also play a significant role in fostering innovation.

GIN → *ENP* $f^2 = 0.546$ (Large Effect Size) - This large effect size indicates that GIN has a very strong impact on ENP, suggesting that investments in GIN are crucial for achieving significant improvements in environmental outcomes.

GIN → *FINP* $f^2 = 0.315$ (Large Effect Size) - The large effect size indicates that GIN also has a strong positive impact on financial performance, reinforcing the idea that innovation in sustainable practices can lead to substantial financial benefits.

ISO → *GIN* $f^2 = 0.006$ (Small Effect Size) - This small effect size suggests that ISO certification has a minimal impact on green innovation, indicating that while certification may provide a framework for environmental management, it does not significantly drive innovation.

The f-square values provide valuable interpretation into the strength of the relationship between the constructs in the dissertation. Green innovation emerges as a critical factor with large effect sizes on both ENP and FINP, while CSR exhibited a medium effect on FINP but limited effects on ENP and GIN. ENL and ISO certification also demonstrate small effect sizes, indicating that while they play a role, their impact is not as pronounced as that of green innovation. The researcher would like to point out to readers that the effect size (F^2), as one of the quality checks was further evaluated with the NCA (Dul et al., 2023).

4.4 Mediating path hypothesis – PLS SEM

Table 10 presents the mediating effects of GIN in the relationships between CSR and both ENP and FINP (*H4a* – ***CSR* → *GIN* → *ENP***, *H4b* – ***CSR* → *GIN* → *FINP***). The PLS-SEM was employed to estimate the mediation outcome. In reference to Zhao et al. (2010) mediation explanation, when the indirect and total effects are significant and point in the same direction, the mediator is considered a complementary partial mediation (Figure 25). The results indicate a significant complementary partial mediating effect of GIN on the relationship between CSR and ENP. The estimation coefficient value of 0.198 suggests a positive relationship, indicating that CSR positively influences GIN, which in turn enhances environmental performance. Similarly, the analysis shows a complementary partial mediating effect of GIN on the association between CSR and FINP. With the structural model estimated Coefficient 0.112, the findings

indicate that enterprises that invest in green innovation can improve their financial and environmental efficiency.

Table 10. Mediating outcome

Hypothesis	Original sample	STDEV	T statistics	P values
<i>CSR</i> → <i>GIN</i> → <i>ENP</i>	0.198	0.057	3.470	0.001
<i>CSR</i> → <i>GIN</i> → <i>FINP</i>	0.112	0.030	3.776	0.000
Note: Source: Author compilation from Smart PLS4				

4.5 Moderating path hypothesis

As indicated early in the dissertation, ENL and ISO 14001 were moderated on the link between CSR and GIN. *H5a* estimated the moderating effect of *ENL x CSR* → *GIN*. The findings exhibited in Table 11 and Figure 7 revealed a significant moderating association of ENL on CSR and GIN (*Coeff* 0.198 and *T value* 3.292). The positive moderating of ENL on CSR and GIN implies that enterprises that prioritised sustainable leadership qualities developed innovative products and processes that are ecologically appreciative to the environment where enterprise operate. Also, the analysis shows an insignificant negative moderating effect of ISO certification on the relationship between CSR and GIN (*ISO x CSR* → *GIN*). The coefficient estimates of -0.102 indicate that the presence of ISO certification weakens the impact of CSR on GIN. The outcome in Table 11 and Figure 8 suggest that while ISO certification is intended to promote environmental management practices, it may inadvertently limit the flexibility or creativity associated with CSR initiatives aimed at fostering green innovation. The final structural model estimation is presented in Figure 9.

Table 11. Moderating outcome

Hypothesis	Original sample	STDEV	T statistics	P values
<i>ENL x CSR</i> → <i>GIN</i>	0.198	0.060	3.292	0.001
<i>ISO x CSR</i> → <i>GIN</i>	-0.102	0.056	1.841	0.066

Note: Source: Author compilation from Smart PLS4

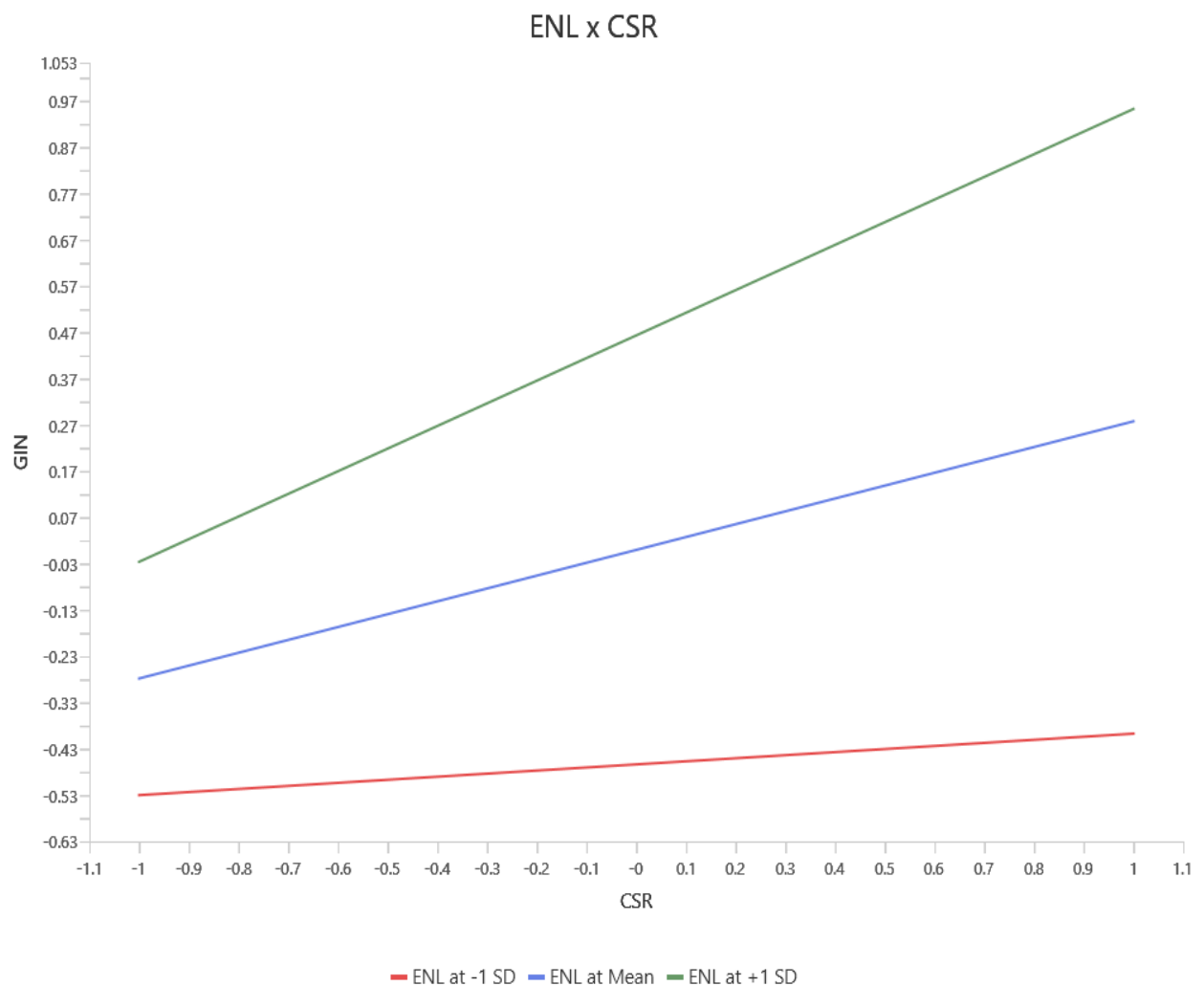


Figure 7. Moderating Charts - Simple slope analysis – *ENL*CSR*→*GIN*

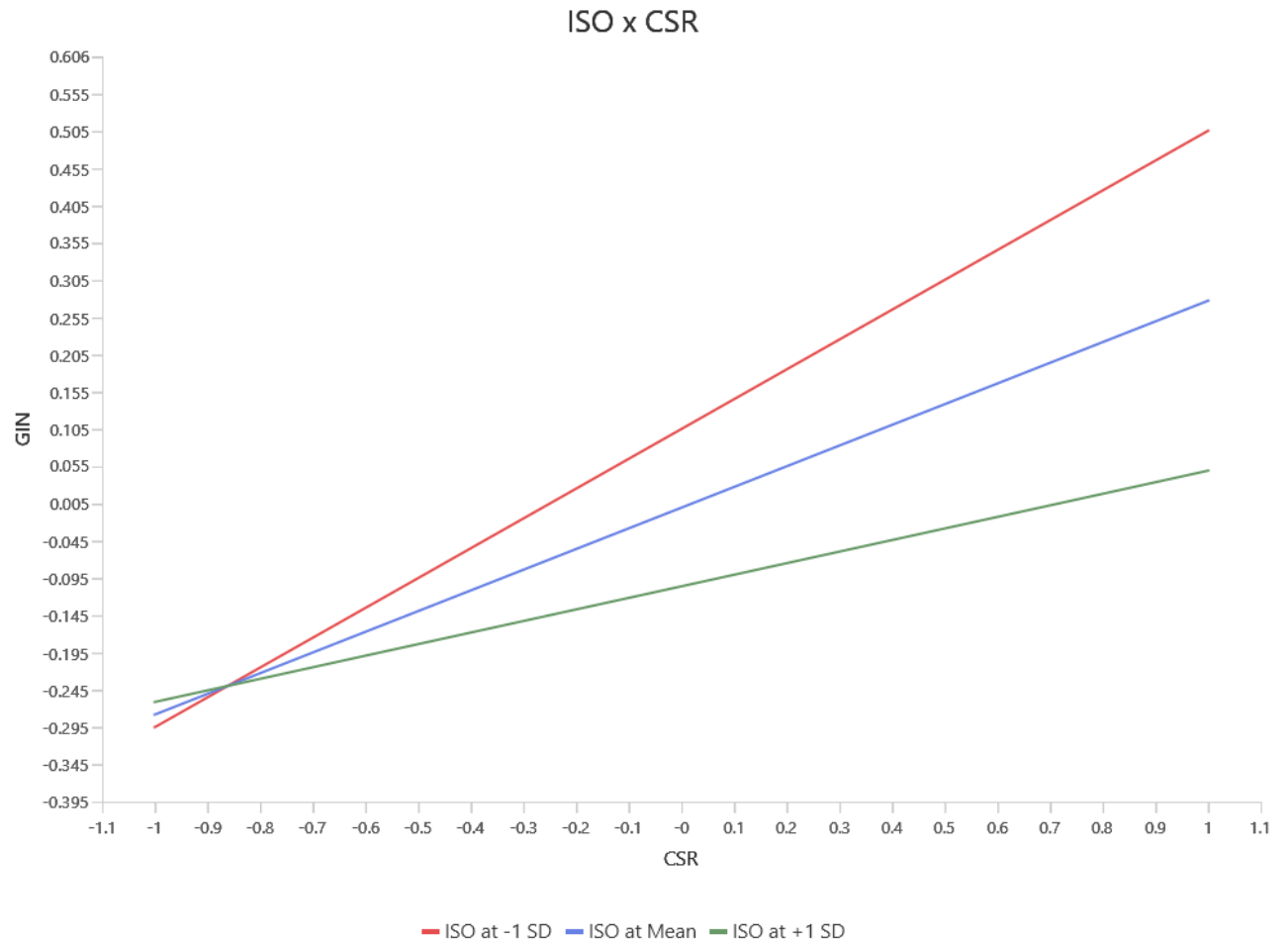


Figure 8. Moderating Charts - Simple slope analysis – ISO x CSR -> GIN

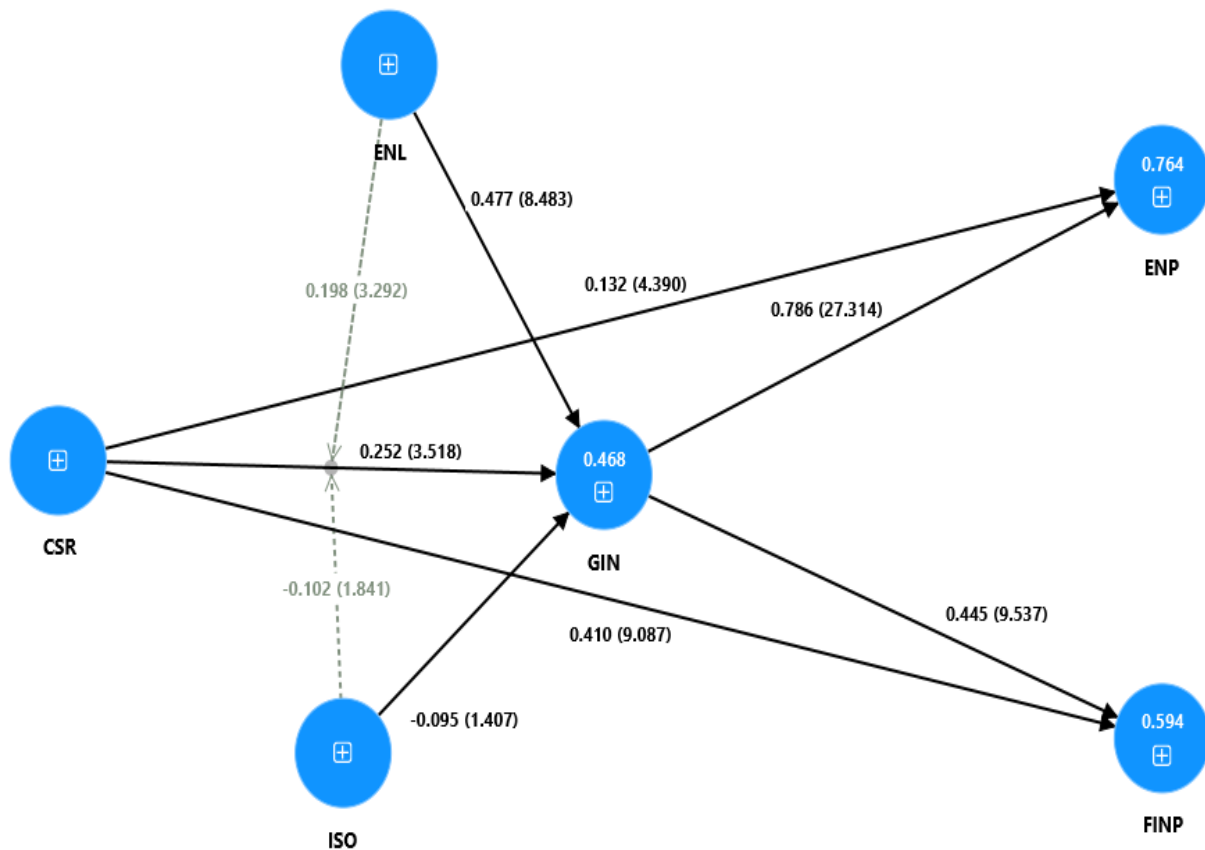


Figure 9. Structural model evaluation (Source: Author analysis from Smart PLS 4)

4.6 Structural model assessment with control variables.

Empirical prior literature has shown that ignoring control variables in the test of the structural model can raise more issues of statistical significance of the outcome. As such, the researcher referenced the work of Ntsiful (2025) and controlled for the variables of age, education, employment, and gender. The findings presented in Table 25 and Figure 24 shows that none of the control variables had a significant effect on the variables.

4.7 Necessary condition analysis

4.7.1 Result of Necessary Condition Analysis effect sizes (d) - Environmental performance

Table 12 illustrates the NCA outcome to attain ENP by manufacturing enterprises in Ghana. The Cohen d effect size was employed on the variables of CSR, GIN, ENL, and ISO 14001. As pointed out in the method section of the dissertation and Figure 6 the analytical steps. The outcome indicates that CSR and GIN had a medium effect size ($CSR\ 0.24 < 0.3$) and ($GIN\ 0.29 < 0.3$).

However, ENL and ISO 14001 had a large effect size ($ENL\ 0.31 < 0.5$) and ($ISO\ 0.31 < 0.5$).

The bottleneck evaluation aims to identify specific variables or constructs within the technique that serve as constraints, indicating the minimum essential factors necessary for achieving the desired outcome (Dul, 2023). The findings from the NCA, as illustrated in Table 13, indicate that for SMEs to attain 100% ENP, they must implement CSR at a minimum level of 98.75% (Figure 10), GIN at 98.61% (Figure 11), ENL at 97.56% (Figure 12), and ISO 14001 certification at 98.61% (Figure 13). These results highlight the importance for executives, stakeholders, and decision-makers to devise strategies that integrate these critical factors into the operational processes of SMEs. Such integration is essential for enhancing efficiency and supporting these businesses in their efforts to foster a sustainable environment within Ghana's manufacturing sector.

Table 12. Ceiling lines- details-CEFDH (Environmental performance)

	Effect size	Obs. above ceiling	Accuracy	Condition inefficiency	Outcome inefficiency
CSR	0.24	0.000	100.000	0.000	49.861
ENL	0.31	0.000	100.000	0.000	10.434
GIN	0.29	0.000	100.000	0.000	10.434
ISO	0.31	0.000	100.000	0.000	10.040

Source: Author compilation from Smart PLS4

Table 13. Bottleneck Tables-CEFDH- values -Percentiles (Environmental performance)

	ENP	CSR	ENL	GIN	ISO
0.%	1.000	NN	NN	NN	NN
10.%	1.400	NN	NN	NN	NN
20.%	1.800	NN	26.910	10.243	13.889

30.%	2.200	NN	26.910	10.590	21.528
40.%	2.600	NN	26.910	10.590	22.917
50.%	3.000	30.729	38.194	30.208	34.722
60.%	3.400	30.729	38.194	30.208	34.722
70.%	3.800	30.729	59.896	30.208	34.722
80.%	4.200	87.674	92.535	91.840	90.104
90.%	4.600	87.674	94.618	91.840	90.799
100.%	5.000	98.785	97.569	98.611	98.611

Note: NN indicates not necessary condition to attain ENP

Source: Author compilation from Smart PLS4

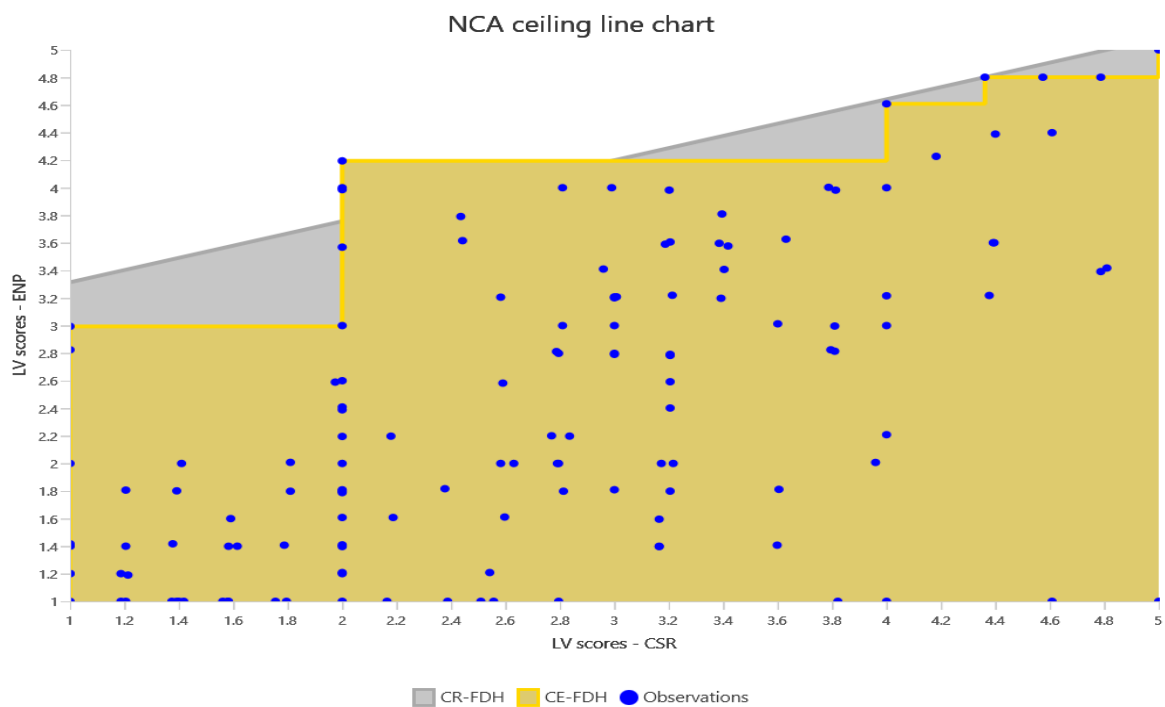


Figure 10. NCA Ceiling line for CSR for ENP

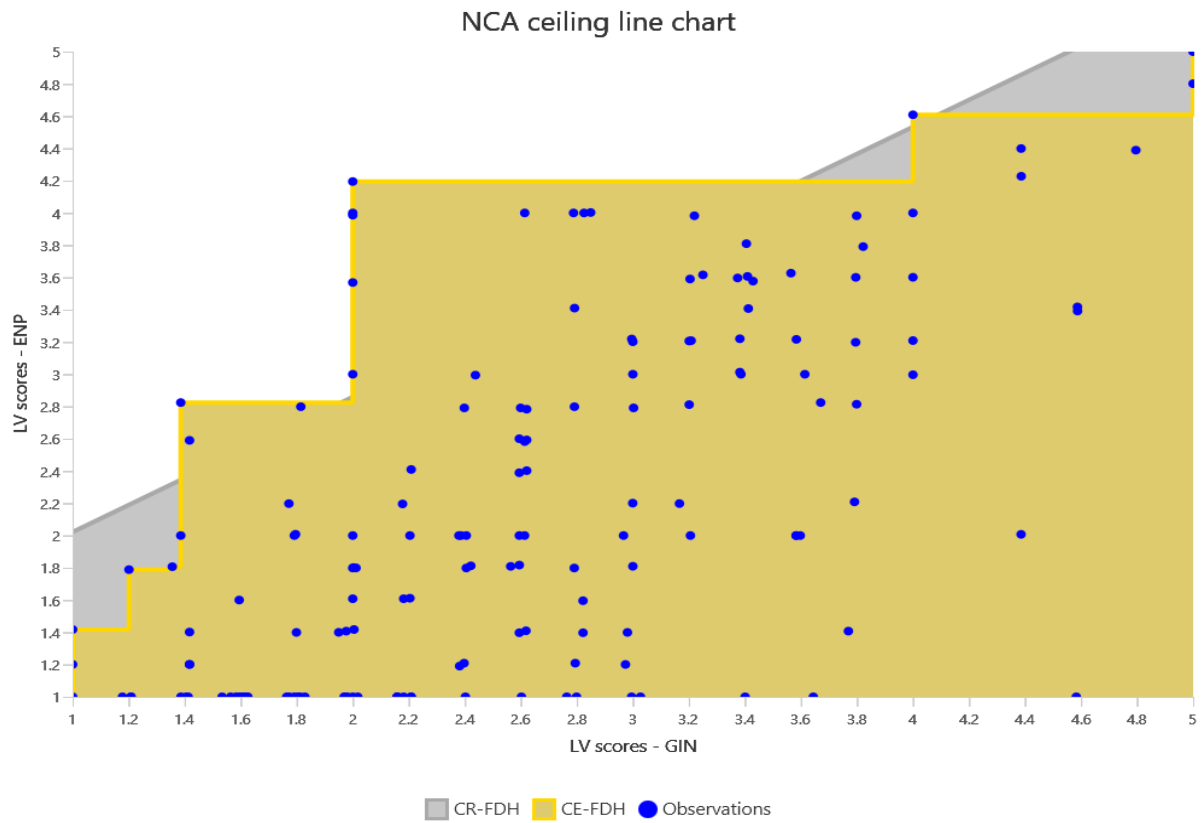


Figure 11. NCA Ceiling line for GIN for ENP

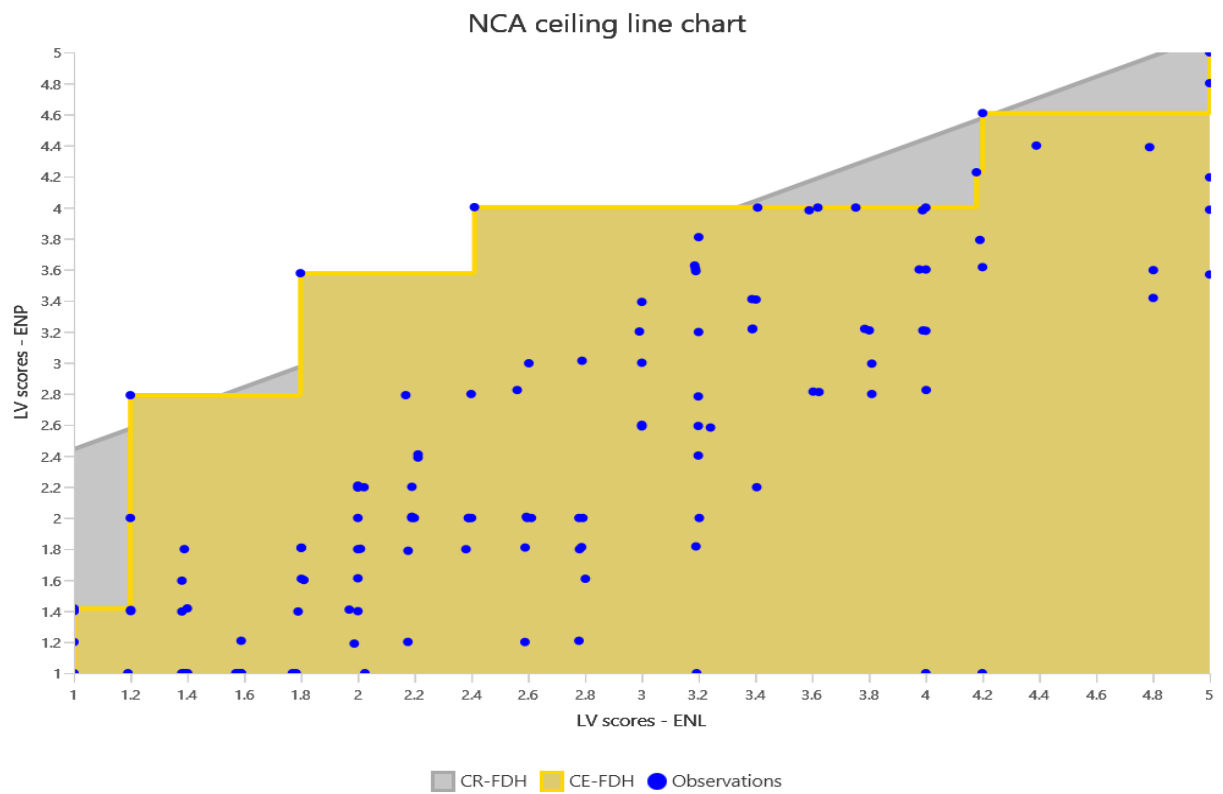


Figure 12. NCA Ceiling line for ENL for ENP

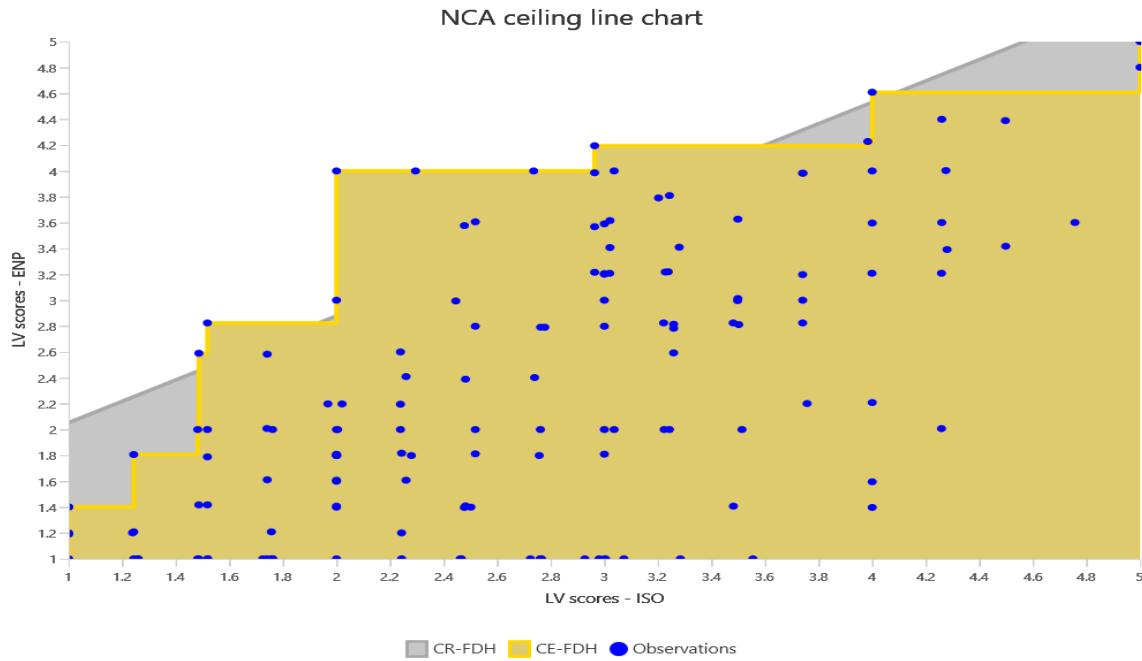


Figure 13. NCA Ceiling line for ISO 14001 for ENP

4.7.2 Result of Necessary Condition Analysis effect sizes (d) -Financial performance

To establish the various conditions and importance of each variable in achieving financial performance, the NCA effects of Cohen's was employed. Table 14 presents the effect size (F^2) and the ceiling of each variable to achieve a high performance. The F^2 of ($d = 0 < d < 0.1$) “weak F^2 ”, ($d = 0.1 < d < 0.3$) “moderate F^2 ”, ($d = 0.3 < d < 0.5$) “large F^2 ” and ($d = 0.5 < d < 0.7$) implies “very large F^2 ”. The empirical evaluation indicates that all the variables fall within the moderate effect size group. Table 14 illustrates each variable and its effect size ceiling. The NCA effect sizes indicate that CSR, ENL, GIN, and ISO certification all have moderate effects on the outcomes measured. These outcomes highlight the magnitude of integrating these constructs into enterprise strategies to drive sustainability and performance improvements.

A distinctive feature of NCA is bottleneck evaluation, which aims to identify barriers that hinder the achievement of desired outcomes. This evaluation

is particularly beneficial in complicated circumstances with several interacting components due to its capacity for a concentrated approach to performance enhancement (Sanyal, 2023). In reference to Table 15, for manufacturing enterprises to attain 100% of financial performance management, they are required to implement not less than CSR (93.2% Figure 14), GIN (98.6% Figure 15), ENL (97.6% Figure 16), and ISO (98.6% Figure 17). By comprehending these bottlenecks more thoroughly, businesses can more effectively allocate resources and tackle the most critical constraints with strategic approaches. Furthermore, when businesses comprehend the prerequisites for success, they can formulate more effective and strategic plans to enhance performance and achieve their sustainability objectives.

Table 14. Ceiling lines- details-CEFDH - (Financial performance)

	Effect size	Obs. above ceiling	Accuracy	Condition inefficiency	Outcome inefficiency
CSR	0.16	0.000	100.000	15.963	63.397
ENL	0.25	0.000	100.000	0.000	44.349
GIN	0.25	0.000	100.000	0.000	24.907
ISO	0.27	0.000	100.000	0.000	31.036

Note: $F^2 = (d = 0 < d < 0.1)$ depicting “weak F^2 ”, $(d = 0.1 < d < 0.3)$ “moderate F^2 ”, $(d = 0.3 < d < 0.5)$ “large F^2 ” and $(d = 0.5 < d < 0.1)$ “large F^2 ”.

Source: Author compilation from Smart PLS4

Table 15. Bottleneck Tables-CEFDH- values -Percentiles

	FINP	CSR	ENL	GIN	ISO
0.%	1.000	0.000	0.000	0.000	0.000
10.%	1.400	0.000	0.000	0.000	0.000

20.%	1.800	0.000	0.000	0.000	0.000
30.%	2.200	0.000	0.000	13.194	0.000
40.%	2.600	0.000	0.000	13.194	22.917
50.%	3.000	0.000	38.194	13.194	28.125
60.%	3.400	0.000	51.389	13.194	56.944
70.%	3.800	54.340	69.097	60.069	60.417
80.%	4.200	55.035	69.097	75.347	72.743
90.%	4.600	55.035	69.097	75.868	72.743
100.%	5.000	93.229	97.569	98.611	98.611

Source: Author compilation from Smart PLS4

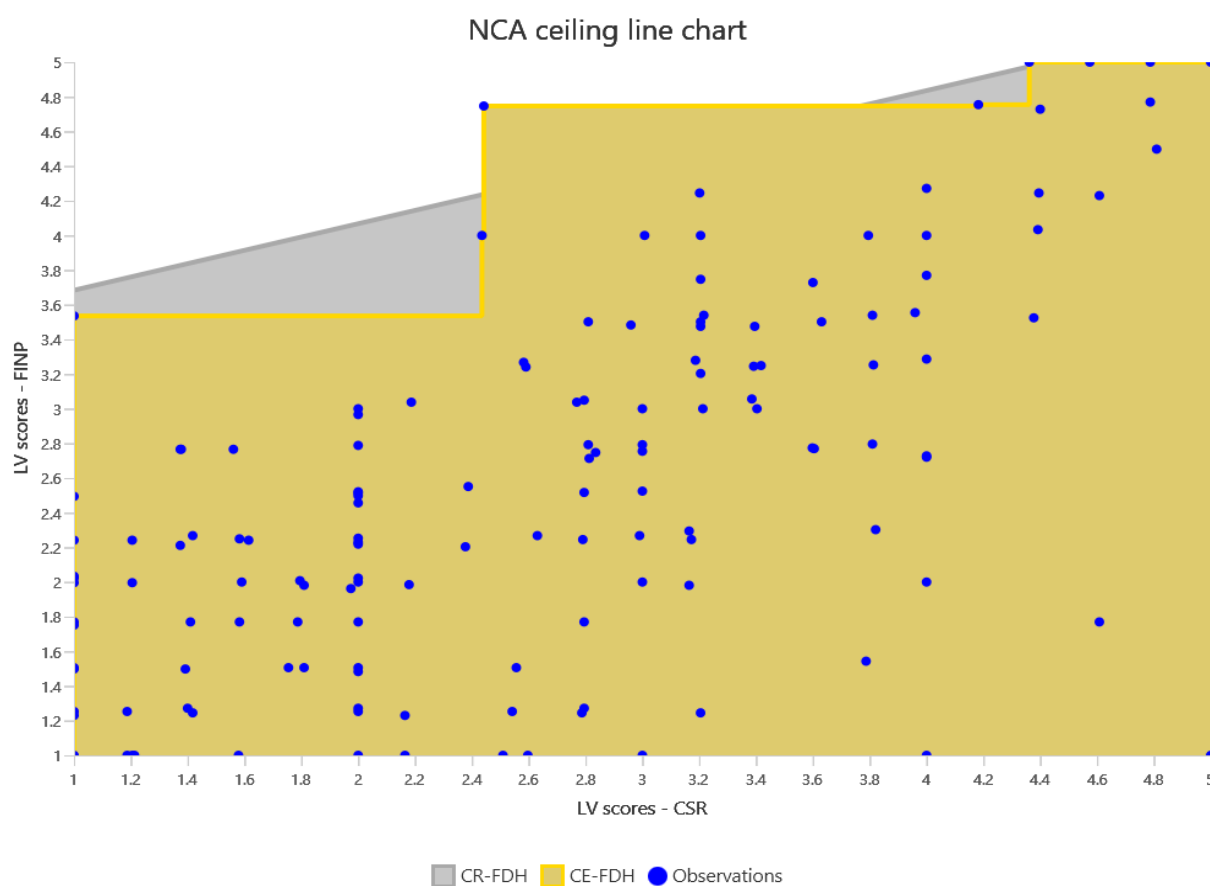


Figure 14. NCA Ceiling line for CSR for FINP

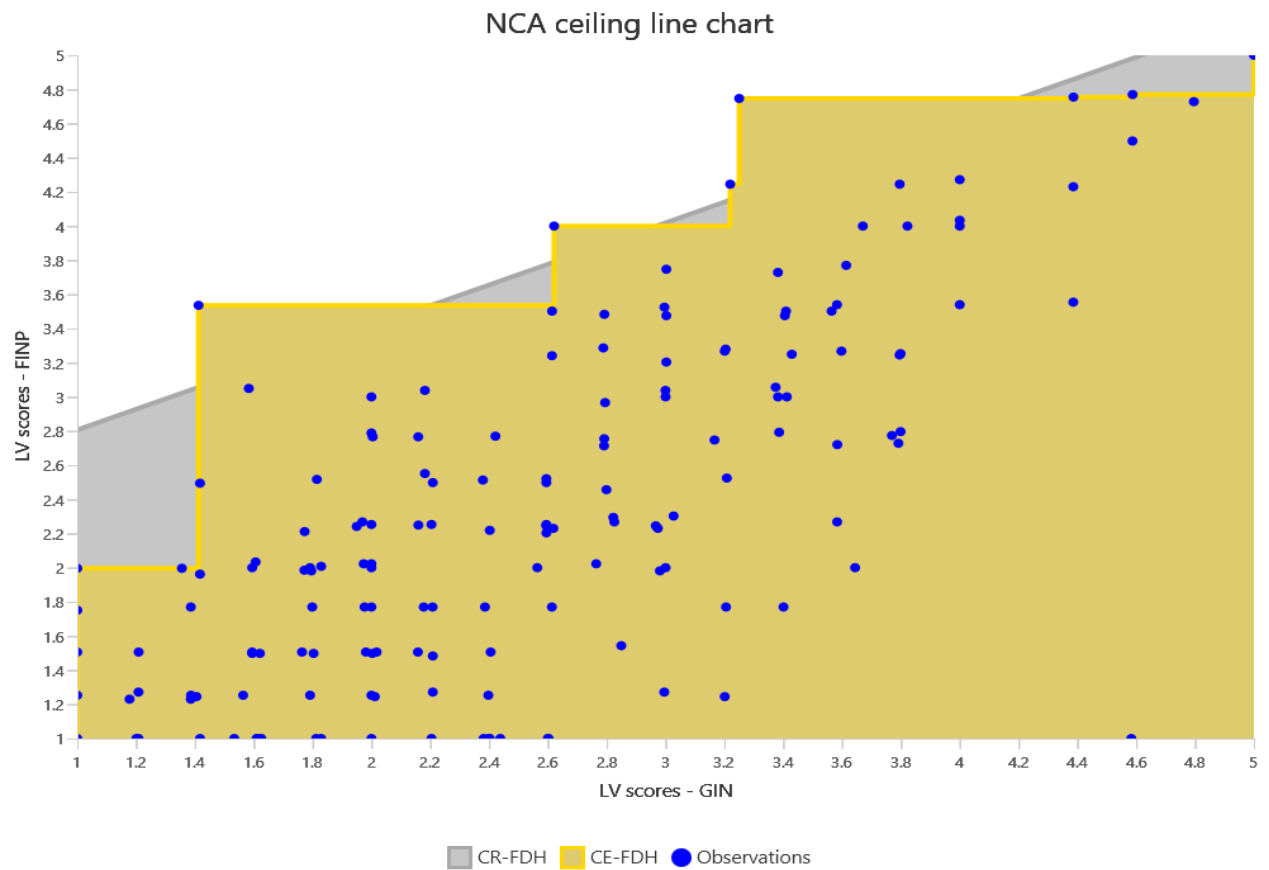


Figure 15. NCA Ceiling line for GIN for FINP

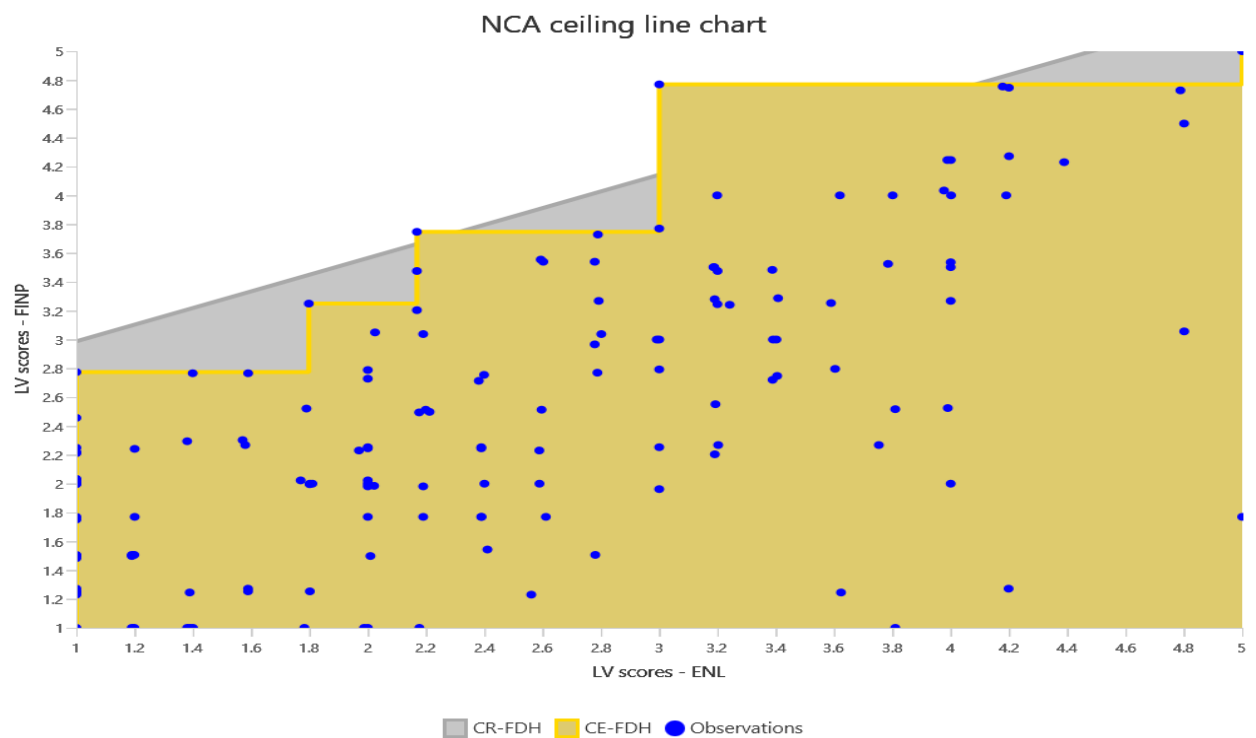


Figure 16. NCA Ceiling line for ENL for FINP

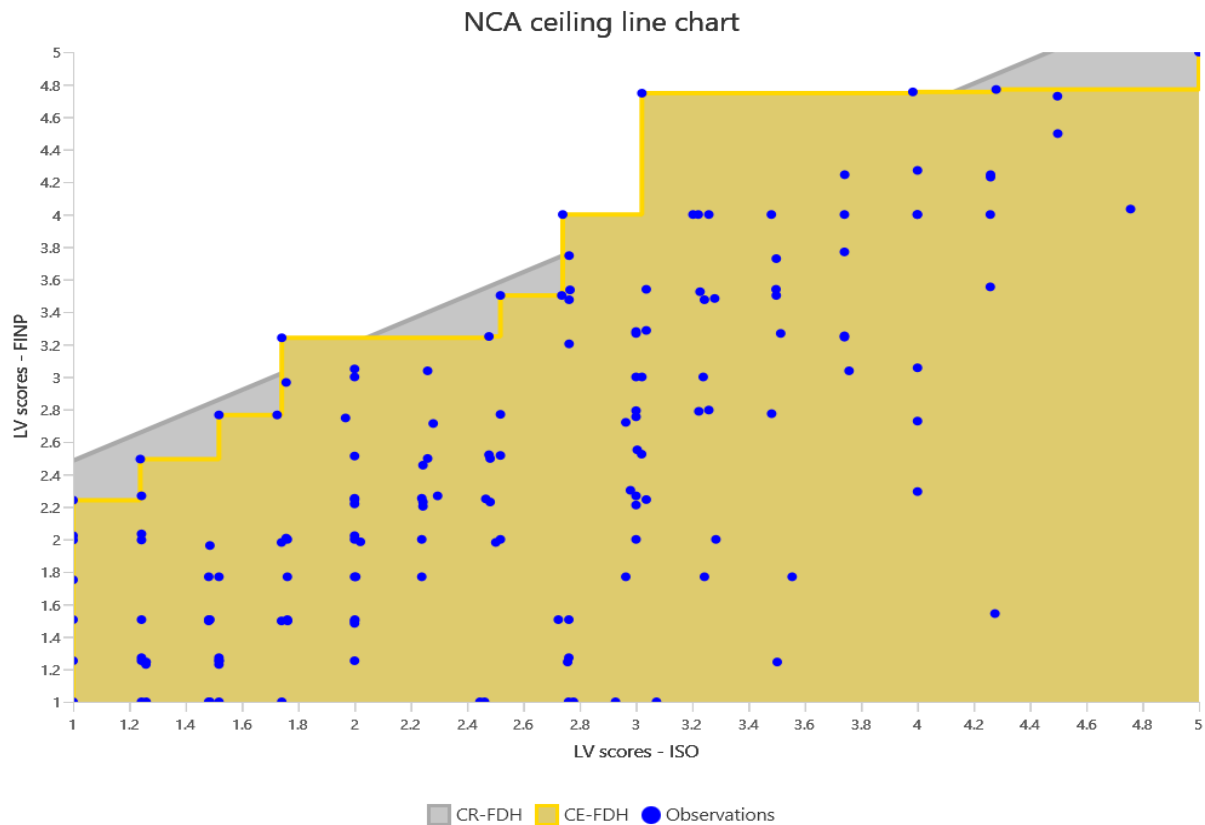


Figure 17. NCA Ceiling line for ISO 14001 for FINP

4.8 Important performance analysis

Important performance analysis (IPMA) is a robust analytical technique that not only assesses the significance of various constructs but also estimates their efficiency, thereby guiding institutions in prioritising their improvement efforts effectively (Sarstedt, 2024). Table 16, Figure 18, and Figure 19 show the total effects of various constructs on ENP and FINP within the context of CSR, GIN, ENL, and ISO within the manufacturing sector. There is a significant positive link between GIN and ENP, as it has the strong total influence on environmental performance at 0.791. This implies that enterprises that prioritise green innovation are likely to achieve significant appreciation in their ENP, as reflected in the performance score of 31.194. The total effect of CSR on environmental performance is 0.399, indicating a substantial positive link. This suggests that higher levels of CSR engagement are corroborated by improved environmental performance. The efficiency score of 34.377 reflects the efficacy

of CSR initiatives in enhancing environmental outcomes. This was followed by ENL, which shows a total effect of 0.397 on environmental performance, which is similar in magnitude to that of CSR. This indicates that strong environmental leadership is significant for driving environmental performance, with a performance score of 32.494. The close values of CSR and ENL imply that both constructs play substantial roles in promoting sustainable practices within organisations. However, ISO exhibited an inverse relationship of performance with environmental performance, with a total effect of -0.129.

Furthermore, Table 16 and Figure 19 established the total effect of CSR on FINP, which is 0.541, indicating a strong positive relationship. This implies that enterprises that engage in CSR activities are likely to experience improved financial outcomes, with a performance score of 34.377. This finding corroborate with the notion that CSR appreciate a firm's reputation and customer loyalty, thereby improving financial performance. Similarly, GIN shows a total effect of 0.463 on financial performance, indicating a significant positive link. This suggests that investments in green products and processes not only enhance ENP but also contribute to financial efficiency, as reflected in the performance score of 31.194. This finding emphasises the dual benefits of green innovation for firms. Again, ENL has a total effect of 0.233 on financial performance, which is lower than its effect on ENP (0.397). This indicates that while ENL contributes positively to financial outcomes, its impact is less pronounced compared to CSR. The performance score of 32.494 reflects a moderate influence of ENL on financial performance.

Besides the main variable's investigation with IMPA, the various indicators were assessed in Table 17 (see Figure 20 and Figure 21 for the indicators map). The constructs skewed to the right established the importance of explaining FINP and ENP among the manufacturing enterprises. The findings indicate the significance of CSR, GIN, ENL, and ISO in predicting enterprise performance within the manufacturing sector. The outcome serves as a policy and strategic guidance for managers and enterprises on areas of investment that should be direct and improve both financial and environmental performance.

Table 16. Important performance analysis.

	Environmental performance		Financial performance	
	Total effect	Performance	Total effect	Performance
CSR	0.399	34.377	0.541	34.377
ENL	0.397	32.494	0.233	32.494
GIN	0.791	31.194	0.463	31.194
ISO	-0.129	35.818	-0.075	35.818

Source: Author compilation from Smart PLS4

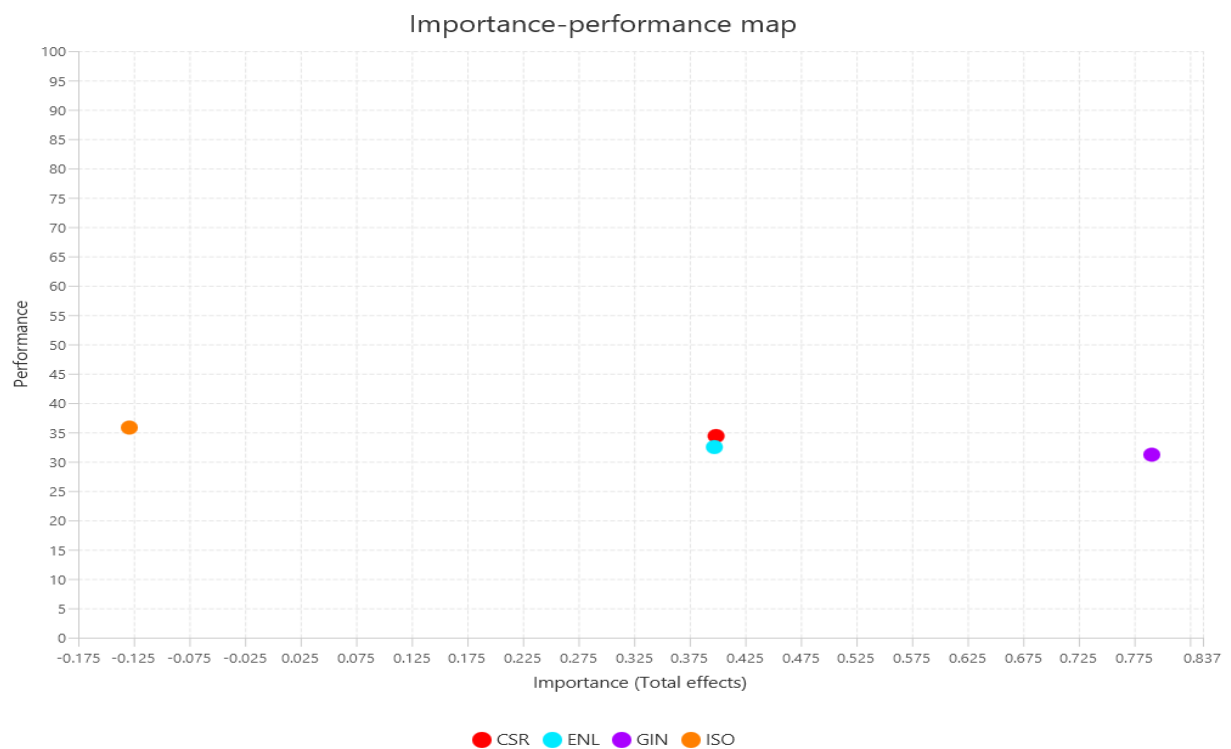


Figure 18. IMPA for each construct – Environmental Performance

Figure 10. Environmental performance

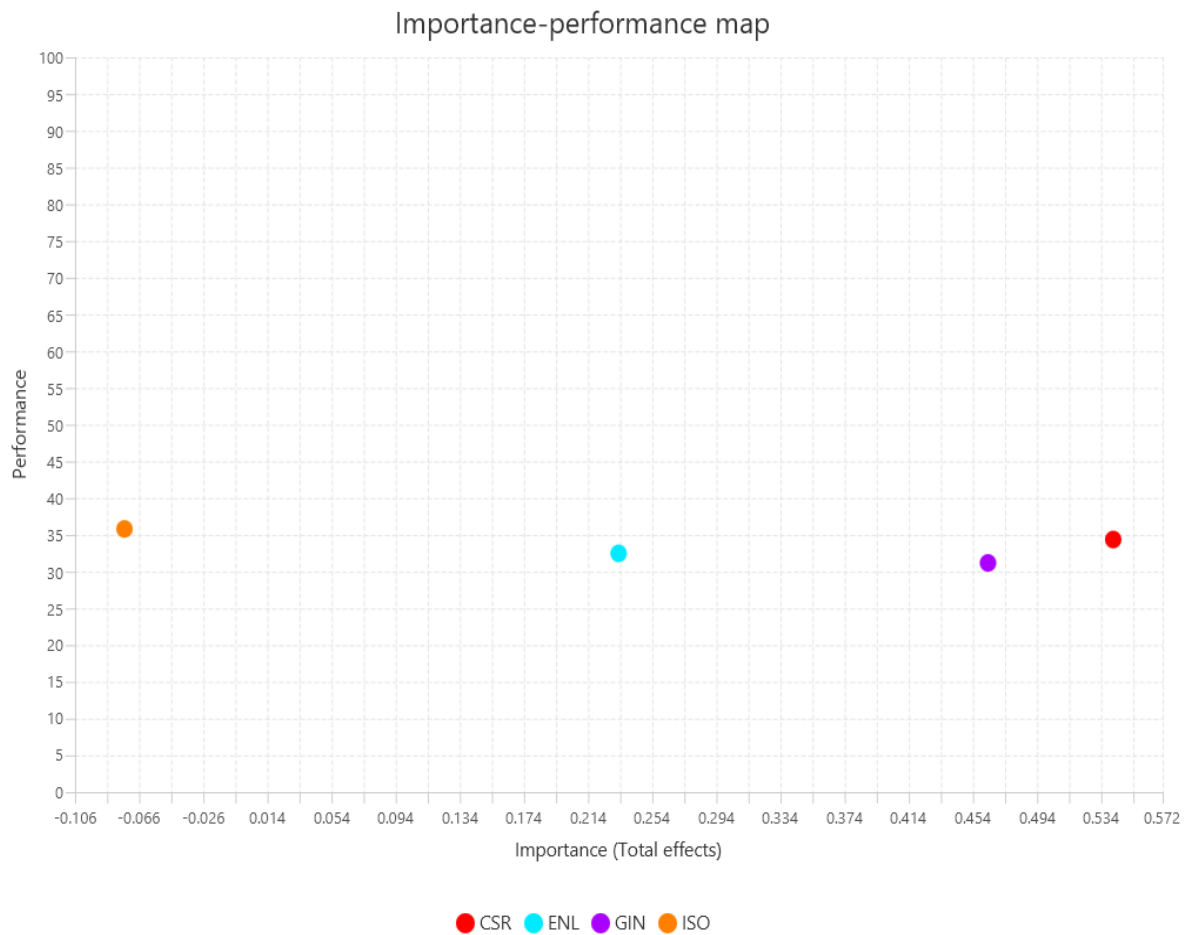


Figure 19. IMPA analysis for financial performance

Table 17. Important performance analysis for ENP and FINP indicators

	Environmental performance		Financial performance	
	Total effect	MV performance	Total effect	MV performance
CSR1	0.068	36.372	0.097	36.372
CSR2	0.079	30.122	0.114	30.122
CSR3	0.072	25.043	0.103	25.043

CSR4	0.065	36.806	0.092	36.806
CSR5	0.070	33.160	0.100	33.160
CSR7	0.056	39.800	0.080	39.800
CSR8	0.067	38.845	0.095	38.845
ENL1	0.114	23.698	0.065	23.698
ENL2	0.087	36.285	0.050	36.285
ENL3	0.084	37.153	0.048	37.153
ENL4	0.088	35.069	0.050	35.069
ENL5	0.088	33.203	0.050	33.203
GIN1	0.185	33.811	0.105	33.811
GIN2	0.180	33.333	0.103	33.333
GIN3	0.182	33.377	0.103	33.377
GIN4	0.163	27.431	0.093	27.431
GIN5	0.171	27.300	0.097	27.300
ISO1	-0.024	36.415	-0.013	36.415
ISO2	-0.023	39.019	-0.013	39.019
ISO3	-0.027	34.288	-0.015	34.288
ISO4	-0.026	34.549	-0.015	34.549
ISO5	-0.027	35.373	-0.015	35.373

Source: Author compilation from Smart PLS4

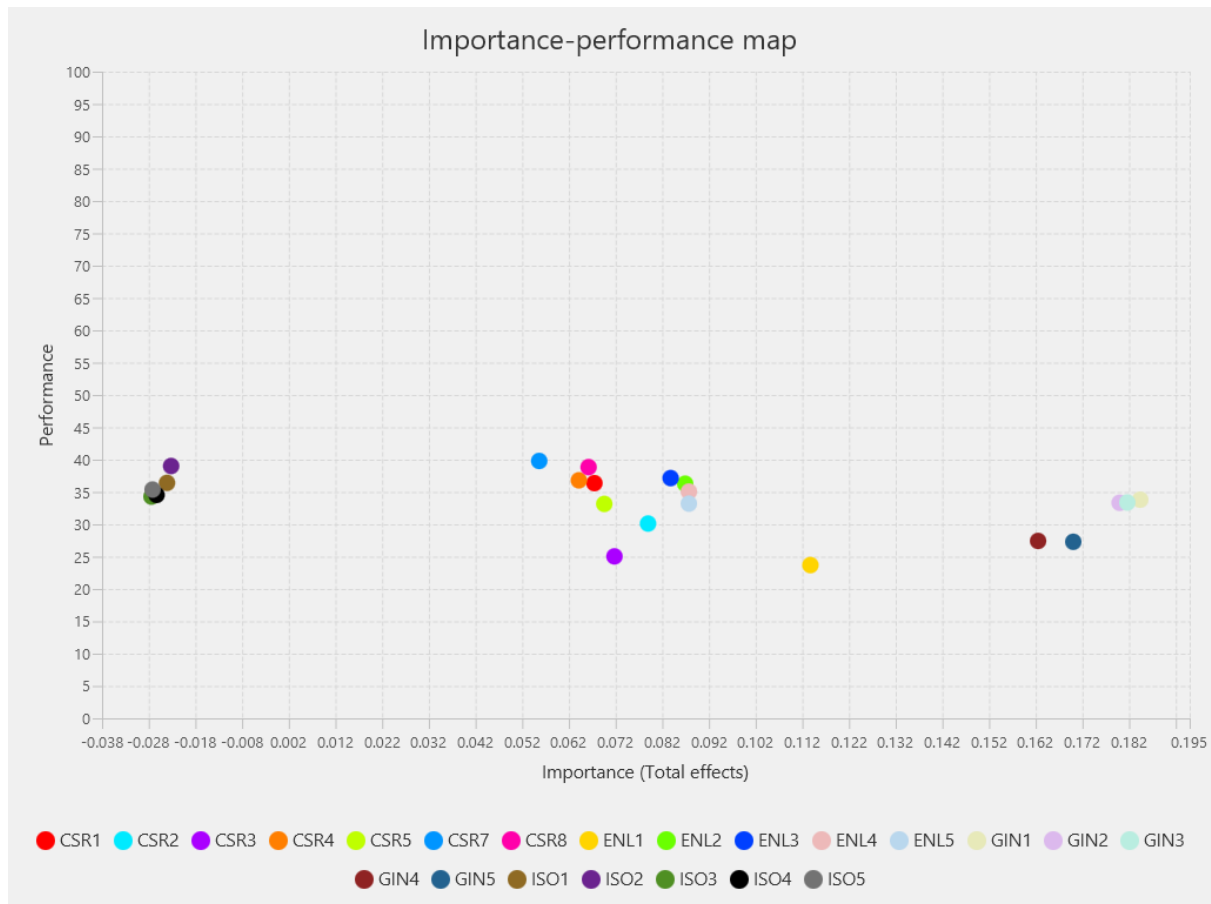


Figure 20. IMPA for each construct – Environmental Performance (indicators map).

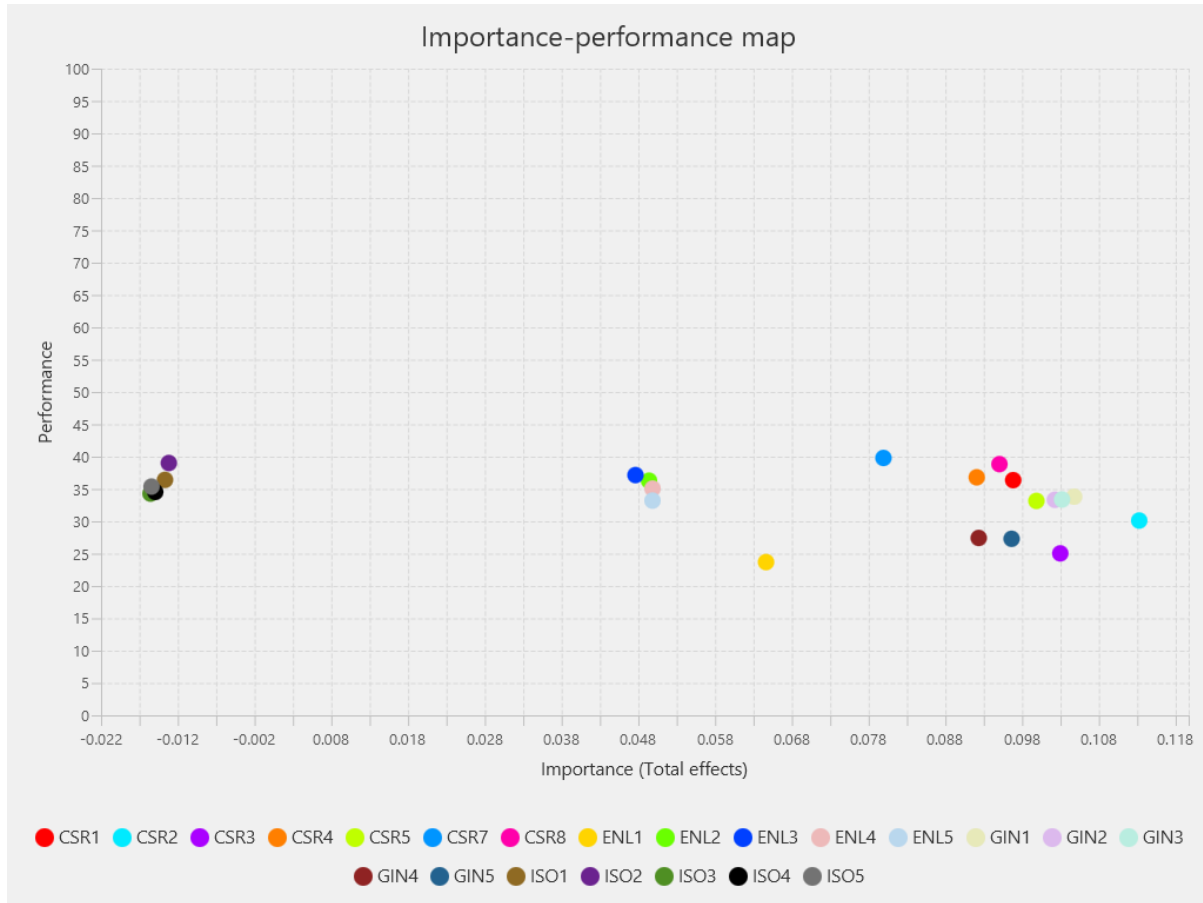


Figure 21. IMPA analysis for financial performance (indicators map)

4.9 Linearity of the model (Quadratic effect)

To ensure the robustness and linearity of the model among the variables under investigation, a quadratic effect was employed. This evaluation helps determine whether the model accurately exhibited the data and whether any non-linear relationship exists that could affect the evaluation (Göktaş & Dirsehan, 2024). Quadratic effects refer to the non-linear relationship between variables, where the effect of an exogenous construct on an endogenous construct is not constant but changes at different levels of the exogenous construct. In PLS-SEM, assessing these effects involves inspecting whether including quadratic terms improves the model fit and provides a better understanding of the link among constructs (Barnayha, 2024). As illustrated in Table 18, T statistics for all quadratic effects are below the threshold of 1.96, and the P values exceed 0.05. This established that none of the quadratic effects are statistically significant, implying that the relationship among the constructs can be adequately described

employing linear terms alone. Consequently, the model does not exhibit a significant non-linear relationship, reinforcing the assumption of linearity in the model.

Table 18. Robustness evaluation - Linearity of the model (Quadratic effect)

	Original sample	STDEV	T statistics	P values
QE (CSR) -> ENP	-0.017	0.021	0.770	0.442
QE (CSR) -> FINP	0.024	0.028	0.839	0.402
QE (CSR) -> GIN	0.013	0.024	0.541	0.342
QE (GIN) -> ENP	-0.016	0.023	0.704	0.482
QE (GIN) -> FINP	-0.027	0.038	0.707	0.480

Source: Author compilation from Smart PLS4

4.10 Unobserved heterogeneity

The issue of unobserved heterogeneity has been examined in previous empirical literature to enhance the quality of research. A finite mixture-PLS model was used to evaluate heterogeneity using various statistical criteria (Hahn et al., 2002). Recognising unobserved heterogeneity is crucial for making informed policy decisions. Fan et al. (2024) argue that ignoring unobserved elements can lead to inaccurate estimates and flawed policy recommendations, underscoring the need for comprehensive models that include all relevant variables. To estimate the number of models or segments, the research referred to power sampling technique in R software which produce a minimum of 83. With the assumption of FIMIX-PLS when we divide $576/83 = 6.9$ segments (576-total and 83-minimum sampling size).

Table 18 exhibits the results of the robustness assessment regarding unobserved heterogeneity across different models using multiple statistical criteria. Each criterion helps to evaluate the model's goodness of fit and complexity, enabling researchers to select the most suitable model for the data. The assessment across various models shows that a) AC13 and CAIC doesn't point to same model, b)

the point of MDL5 was different from AIC4 and BIC (model 6). Also, EN should be higher than 0.50 which meet the threshold criteria. These findings depict the importance of model selection and the value of considering multiple criteria to ensure robust results in PLS-SEM analyses involving the dissertation variables of CSR, GIN, ENL, and ISO 14001. This demonstrate that unobserved heterogeneity is not an issue when considering the entire date curation.

Table 19. Robustness Evaluation - unobserved heterogeneity

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
AIC (Akaike's information criterion)	3228.098	2727.47	2505.713	2357.851	2219.188	2159.302
AIC3 (modified AIC with Factor 3)	3240.098	2752.47	2543.713	2408.851	2283.188	2236.302
AIC4 (modified AIC with Factor 4)	3252.098	2777.47	2581.713	2459.851	2347.188	2313.302
BIC (Bayesian information criterion)	3280.372	2836.372	2671.245	2580.013	2497.979	2494.723
CAIC (consistent AIC)	3292.372	2861.372	2709.245	2631.013	2561.979	2571.723
HQ (Hannan-Quinn criterion)	3248.484	2769.941	2570.269	2444.492	2327.913	2290.112
MDL5 (minimum description length with factor 5)	3585.465	3471.983	3637.374	3876.659	4125.142	4452.404
EN (normed entropy statistic)	0.000	0.867	0.692	0.74	0.819	0.85

Source: Author compilation from Smart PLS4

5. DISCUSSIONS

This section presents the objectives, hypotheses, and compares them with the current literature works on the investigation of CSR, GIN, ENL, ISO 14001, ENP and FINP within the manufacturing enterprises in Ghana, an emerging community (see Table 20).

Table 20. Summary of the Hypothesis developed

	Hypothesis	Sign	Outcome
Direct path			
H1a	$CSR \rightarrow ENP$	+	Not rejected
H1b	$CSR \rightarrow FINP$	+	Not rejected
H2	$CSR \rightarrow GIN$	+	Not rejected
H3a	$GIN \rightarrow ENP$	+	Not rejected
H3b	$GIN \rightarrow FINP$	+	Not rejected
H5	$ENL \rightarrow GIN$	+	Not rejected
H6	$ISO \rightarrow GIN$	-	Rejected
Mediating path			
H4a	$CSR \rightarrow GIN \rightarrow ENP$	+	Complementary Partial mediation
H4b	$CSR \rightarrow GIN \rightarrow FIN$	+	Complementary Partial mediation
Moderating path			
H5a	$ENL * CSR \rightarrow GIN$	+	
H6a	$ISO * CSR \rightarrow GIN$	-	
Source: Author compilation from Smart PLS4			

The dissertation outlines research objectives aimed at addressing the ongoing challenges of sustainability in emerging economies. The researcher formulated a hypothesis for each objective to facilitate understanding.

RO1. To assess the role of CSR initiatives in the attainment of enterprise performance.

RO2. To determine the effect of CSR activities on the development of GIN.

RO3. To examine the mediating effect of GIN on the relationship between CSR and enterprise performance.

RO4. To investigate the role of ENL and ISO 14001 on GIN development in manufacturing enterprises.

RO5. To evaluate the moderating influence of ENL and ISO 14001 on the relationship between CSR and GIN.

5.1 RO1. To assess the role of CSR in the attainment of enterprise performance (ENP and FINP)

The link between CSR and performance in the manufacturing sector, particularly in developing economies, has garnered substantial attention due to its special impact on enterprise efficiency. As enterprises elevate the importance of sustainable practices, CSR programs are viewed not only as ethical commitments but also as tactical investments that enhance competitiveness and operational efficiency. Empirical evidence suggests that effective CSR initiatives can improve both ENP and FINP (Liu et al., 2024). Two hypotheses were formulated to achieve the RO1.

H1a: $CSR \rightarrow ENP$, with $\beta = 0.132$, $T = 4.390$, $P = 0.000$, and $F^2 = 0.044$. **H1b:** $CSR \rightarrow FINP$, with $\beta = 0.410$, $T = 9.087$, $P = 0.000$, and $F^2 = 0.205$. The empirical findings reveal a positive link between CSR, ENP, and FINP. The findings contribute to the role that CSR enhance ENP and FINP of manufacturing enterprises. The positive relationship of CSR on environmental efficiency is extensively documented in the literary assessments. In China, Lui et al. (2024) assessed the perception of top executives regarding CSR and performance within eight Chinese enterprises. The article argues that CSR can lead to appreciation in environmental outcomes by fostering a culture of responsibility and innovation within organisations. The outcome claim that CSR aids in the attainment of environmental objectives by setting up reward and recognition mechanism that push middle management to employ sustainable practices. This aligns with the dissertation outcome, which suggest that manufacturing enterprises that actively engage in CSR see an upsurge in ENP. Similarly, Kraus et al. (2020) examined Malaysian manufacturing enterprises from a data curation of 297. The econometric results revealed that CSR activities are a significant contributor to financial and environmental efficiency, thereby facilitating innovative actions that corroborate with sustainability goals. This

perspective supports the notion that CSR not only serves as a moral commitment but also as a strategic approach to improving environmental performance. Again, employing the Logit and Tobit econometric techniques, Sheikh (2022) investigation corroborates the current findings. The article argues that without a clear environmental strategy, CSR efforts may fail to yield significant improvements in environmental performance. This emphasise the importance of merging of CSR with comprehensive environmental management practices to attain the desired outcomes. Meanwhile, the outcome contradicts the emerging community of Nigeria. Shahzad Shabbir and Wisdom (2020) evaluated the performance of manufacturing enterprises. The inspection revealed that the CSR initiative had no role in the appreciation of the ENP and FINP of the firms investigated. The reason was that managers saw CSR as a cost rather than as a sustainability practice.

5.2 RO2. To determine the influence of CSR activities on the development of GIN

The outcome demonstrated that CSR had a positive and statistically significant relationship with GIN. **H2: $CSR \rightarrow GIN$** , with $\beta = 0.252$, $T = 3.518$, $P = 0.000$, and $F^2 = 0.034$. CSR initiative, according to Liu et al. (2024), can appreciate an enterprise's ability to innovate sustainably by fostering an institutional culture that values accountability and long-term planning. The results of their analysis show that enterprises with strong CSR programs are more probable to see pollution and other environmental threats as chances to innovate and create new environmentally friendly products and procedures. Consistent with the results of the present investigation, this indicates that CSR encourages industrial companies to implement environmentally friendly innovations. Likewise, Gao et al. (2023) assert that CSR performance not only upsurge green product and process innovation but also mitigates the dual externalities associated with environmental challenges. Their findings reinforce the notion that CSR is integral to driving green innovation, as it encourages firms to adopt sustainable practices that align with broader environmental goals. This association is particularly salient in the manufacturing sector, where environmental impacts are significant, and the need for sustainable practices is increasingly critical. Again, from Pakistan, Hang et al. (2022) employed the SPSS and Smart PLS technique on 259 participants within the SMEs. The inspection established that CSR had a substantial impact on green product. This was affirmed in the evaluation of Nsiah

et al. (2023) assessment of Ghanaian manufacturing enterprises. The article suggested that CSR had a positive impact on GIN initiatives. Furthermore, employing the stakeholder model, Fosu et al. (2024) examined employees' GIN from the angle of corporate image and CSR. They argue that while CSR can improve green innovation, it may also impose burdens that lead to avoidance behaviours in environmental governance. This perspective raises important questions about the conditions under which CSR effectively translates into green innovation, suggesting that firms must strategically affiliate their CSR exertions with their innovation objectives to realise the full potential of both.

5.3 RO3. To examine the mediating effect of GIN on the relationship between CSR and enterprise performance

An increasingly important component impacting ENP and FINP is the incorporation of GIN in the dynamic landscape of manufacturing firms. The hypothesis **H3a** posits a positive link between GIN and ENP, suggesting that firms adopting innovative and ecological friendly practices can significantly enhance their sustainability outcomes. Similarly, **H3b** asserts that GIN positively impacts FINP, indicating that investments in sustainable practices can yield economic benefits alongside environmental gains. The findings indicate a direct effect of GIN on environmental and financial efficiency. **H3a: $GIN \rightarrow ENP$** , with $\beta = 0.786$, $T = 27.314$, $P = 0.000$, and $F^2 = 0.546$. **H3b: $GIN \rightarrow FINP$** , with $\beta = 0.445$, $T = 9.537$, $P = 0.000$, and $F^2 = 0.315$. Likewise, the mediating role of GIN is explored through hypotheses **H4a** and **H4b**, which propose that GIN partially mediates the association between CSR and both ENP and FINP. This mediation suggests that CSR can lead to enhanced GIN, which in turn drives improvements in enterprise efficiency. **H4a: $CSR \rightarrow GIN \rightarrow ENP$** , with $\beta = 0.198$, $T = 3.470$, $P = 0.001$. **H4b: $CSR \rightarrow GIN \rightarrow FINP$** , with $\beta = 0.112$, $T = 3.776$, $P = 0.000$. Previous assessment have highlighted the significance of GIN in improving CSR efforts into tangible outcomes, with evaluation indicating that effective green practices can upsurge an enterprise's reputation and operational efficiency (Xu et al., 2022). The outcomes support the literature evaluation of Novitasari and Tarigan (2022) in Indonesia, demonstrating that enterprises adopting green innovations can decrease energy usage and trash disposal expenses and reduce emissions. Moreover, green innovations can optimise processes, leading to enhanced resource efficiency and diminished input expenses. As companies increasingly emphasise sustainability,

the initial expenditure on green technologies such as products and processes has a negative impact in the short term but appreciate efficiency in the long term (Azam et al., 2023). Moreover, the influence of GIN on institutional performance extends beyond financial indicators (net profit, sales revenue, and return on shares). Commitment to sustainability positively influences non-financial performance factors, including employee engagement and organisational culture (Aftab et al., 2022). Conversely, some studies produce a more wary view regarding the affiliation between CSR and enterprise performance. Yu et al. (2022) argue that while GIN activities are often associated with CSR fulfilment, they may not always translate into improved environmental performance, particularly for SMEs with limited resources. They suggest that excessive focus on green innovation can undermine the ability to fulfil CSR commitments, indicating that the relationship may not be as straightforward as it appears. This highlights the complexity of the $CSR \rightarrow GIN \rightarrow ENP$ and $CSR \rightarrow GIN \rightarrow FINP$ association and outline that additional factors, such as resource allocation and strategic focus, may influence the outcomes.

5.4 RO4. The direct and moderating influence of ENL on the relationship between CSR and GIN

The evaluation indicates that there is a direct positive affiliation between ENL and GIN (**H5**), $ENL \rightarrow GIN$ with $\beta = 0.477$, $T = 8.483$, $P = 0.000$, and $F^2 = 0.096$. Also, environmental leadership serve as a moderating association between CSR and GIN (**H5a**), $ENL * CSR \rightarrow GIN$ with $\beta = 0.198$, $T = 3.292$, $P = 0.000$ (see, Table 11, Figure 7).

Recent studies have suggested that companies investing in environmental leadership can achieve significant operational advantages, such as cost reductions, increased productivity, and enhanced brand recognition (Nsiah et al., 2023; Zhu et al., 2022). The evaluation aligns with Soni (2022) study, which explored the effect of ENL on the CSR->GIN link in the manufacturing sector. Surveying registered manufacturing enterprises in India, the experiment established that ENL positively influence the connection between CSR initiatives and GIN. In the case of Taiwan, Hu et al. (2023) focused on the technology and electronics industry to examine the effect of sustainable leadership. Through a survey of technology firms, the assessment found that sustainable leadership significantly amplified the positive affiliation between CSR engagement and GIN. Also, Zhu et al. (2022) extended this inquiry into the technology industry

in China by examining how ENL influences the link between CSR and GIN. Their research, drawing on data from technology firms, revealed that ENL significantly strengthens the positive link between CSR engagement and GIN. SMEs with leaders committed to environmental deterioration are more probable to employ CSR efforts to drive GIN products. Likewise, in the context of Chinese manufacturing firms, Wang et al. (2023) inspected the impact of ENL on the link between CSR and GIN. The outcome revealed that firms with ecologically proactive leaders experienced a positive effect of CSR on GIN. Recently, the global environmental pollution and environmental disasters have exposed the need for responsible leadership to find solutions to environmental problems and achieve financial and environmental efficiency through GIN (Begum et al., 2022; Niazi et al., 2023).

5.5 RO5. The direct and moderating influence of ISO 14001 on the association between CSR and GIN

Finally, the direct relationship between ISO 14001 and GIN was examined, and its interaction effect with CSR on GIN. (**H6**), $ISO \rightarrow GIN$ with $\beta = -0.095$, $T = 1.407$, $P = 0.000$, and $F^2 = 0.006$. (**H6a**), $ISO * CSR \rightarrow GIN$ with $\beta = -0.102$, $T = 1.841$, $P = 0.030$. The findings revealed a direct negative effect of ISO 14001 and GIN. The outcome suggests that ISO 14001 is not considered to help interweave innovation into sustainability within manufacturing enterprises. A 1% increase in ISO 14001 certification will result in a 0.95% reduction towards the GIN development initiative. Also, the moderating influence of ISO 14001 on the link between CSR and GIN revealed a statistically insignificant effect. This implies that a percentage change in ISO 14001 will result in a 10.20% decline in CSR activities regarding innovation practice by manufacturing enterprises (see, Table 11, Figure 8). The outcome corroborates the empirical evidence indicating that ISO 14001 does not mitigate ecological externalities. In a hierarchical linear regression, Duque-Grisales et al. (2020) examined 86 registered enterprises between 2016 and 2017 in Latin America. The study utilised ISO 14001 as a moderator to assess the link between GIN and financial efficiency. The findings illustrated that ISO 14001 did not affect the financial performance of the enterprises. The outcome did not align with prior literature, including the study of Bravi et al. (2020), which investigated enterprises that have certified ISO 14001 in Italy. The analysis demonstrated that ISO 14001 helps to reduce waste management and energy utilisation. From the

lens of the fishbone and RBV model, the moderating role of EMS ISO 14001 was assessed by Toha et al. (2020). The findings revealed that EMS ISO 14001 enhances the products and processes of enterprises. Ofori et al. (2023) explored ISO 14001 and its effects on the environment regarding the adoption of innovation. The findings revealed that countries that obtained ISO 14001 certification reduce carbon emissions. Therefore, it is recommended that proper measurement and cost analysis should be conducted when managers want to integrate ISO 14001 into their policy. This will aid its implementation as ISO 14001 is not a compulsory policy for mitigating environmental deterioration and achieving the Sustainable Development Goals.

5.6 Qualitative remarks from management

5.6.1 Green innovation

This section of the qualitative assessment outlines the various themes and subthemes on the effect of GIN of enterprises in their pursuit for ecological sustainability (Table 21).

Table 21. Themes and subthemes on green innovation.

Themes	Subthemes
1.Process and product innovation	a) Sustainable product development b) Process innovation is frequently described as modifications to production processes c) ISO standards
2. Drivers of green innovation	a) Regulatory compliance b) Market dynamics and customer preferences c) Internal organizational culture d) Environmental objectives e) Corporate reputation and branding
3. Operational and financial benefits	a) Resource efficiency improvement b) Process standardization and quality enhancement.
4. Market and strategic advantages	a) Access unavailable market segments

	b) Industry standing and competitive positioning. c) Customer segments and strengthens brand loyalty
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Source: Authors compilation 2025

Themes on GIN (process and product)

The outcomes established that product innovation is consistently framed around sustainable product development across multiple organizations, while process innovation primarily manifests as environmental modifications to existing production and supply chain operations. Both forms of innovation are frequently mentioned but generally lack detailed descriptions of specific innovative techniques, technologies, or implementation methodologies, suggesting organizations may conflate basic sustainability practices with genuine innovation. The integration of ISO standards emerges as one of the few concrete frameworks that organizations explicitly link to innovation processes, providing structure for systematic changes. Notably, many respondents fail to distinguish between process and product innovation or describe innovations with sufficient specificity, indicating a potential gap between innovation rhetoric and documented implementation. This pattern suggests organizations recognize the value of environmental innovation but struggle to articulate or document the specific innovative elements that differentiate their practices from standard sustainability measures. The synthesis underscores the need for organizations to develop clearer frameworks for identifying, implementing, and communicating the distinctive aspects of their innovation efforts.

1. Sustainable product development emerges as the primary form of product innovation across multiple respondents. Respondent 1. and Respondent 8. independently state, 'I lead projects focused on developing sustainable products,' revealing a clear pattern where environmental sustainability drives new product development initiatives. This recurring theme demonstrates that organizations are actively directing innovation resources toward products with reduced environmental impact, though the respondents provide minimal detail about specific product features or technical innovations. The identical wording used by different respondents from presumably separate organizations suggests industry-wide adoption of sustainable product development as a standard innovation strategy. Rather than pursuing innovation solely for competitive

advantage, these organizations explicitly frame their product development efforts within environmental sustainability contexts. This alignment of product innovation with sustainability goals represents a significant strategic shift in how organizations approach new product creation.

2. Process innovation is frequently described as modifications to production processes aimed at environmental improvement but lacks detailed implementation specifics. Respondent 4. mentions 'reducing waste in production,' indicating changes to manufacturing processes focused on resource efficiency and example of process innovation for environmental sustainability. Similarly, Respondent 7. states, 'I manage our supply chain to ensure sustainability in sourcing and logistics,' suggesting process changes in how materials are acquired and moved through the organization. Both examples reveal that organizations are implementing environmental considerations into operational workflows, though neither respondent elaborates on the specific innovative methodologies, technologies, or systematic changes that distinguish these practices from standard environmental management. The responses consistently frame process innovation as 'greening' existing processes rather than fundamentally reimagining production systems or developing novel operational techniques. This pattern indicates that while innovation process modifications are recognized as innovation, organizations often fail to articulate what makes these changes genuinely innovative versus basic sustainability implementations.

3. ISO standards, particularly ISO 14001, function as formal frameworks that catalyze both process and product innovation within organizations. Respondent 1. explicitly states, 'We integrated ISO requirements into our product development processes,' demonstrating how compliance with environmental management standards prompts systematic changes to operational workflows. This integration represents process innovation where existing development methodologies are modified to incorporate environmental considerations at each stage of product creation. Unlike the vague references to green initiatives found in other responses, this statement shows a deliberate transformation of core business processes guided by an established standard. The implementation of ISO requirements creates structural changes that go beyond simple sustainability additions, requiring organizations to innovate in how they approach both product design and manufacturing.

Theme on drivers of green innovation

The analysis presented different landscape of GIN drivers that operate across regulatory, market, internal, and strategic dimensions. Regulatory compliance emerges as the most frequently cited driver, indicating how legal frameworks establish baseline requirements that catalyse sustainable innovations across diverse sectors. Market forces, particularly customer demand and expectations, represent equally powerful external drivers that transform sustainability from a compliance issue into a competitive advantage. Internally, employee engagement demonstrates significant potential as a bottom-up catalyst for green initiatives, suggesting that enterprise culture plays a favourable role in innovation adoption. While these shared perspectives dominate the narrative, unique viewpoints also highlight important nuances—economic efficiency considerations, specific environmental targets like carbon reduction, and strategic brand enhancement all represent specialized motivations that extend beyond conventional compliance frameworks. Together, these diverse drivers form an interconnected ecosystem that reflects the complex interplay between external pressures and internal strategic choices in advancing sustainable innovation.

1. Regulatory compliance emerges as the predominant external driver of green innovation across multiple organizations. Respondent 1 'specifically asserts that 'Innovation is propelled by the necessity to adhere to environmental standards and commercial trends.', highlighting how legal frameworks mandate sustainable practices. Similarly, Respondent 5, representing a sustainability officer with six years of experience, concisely identifies 'regulatory compliance' as the primary motivation for pursuing green innovation. This pattern continues with Respondent 8, where an R&D professional with eight years of experience articulates the same regulatory-market duality. Perhaps most comprehensively, Respondent 10 notes that 'Our organization is motivated by regulatory compliance and the desire to enhance our brand image', suggesting that legal requirements often work in tandem with reputation management. These consistent references across diverse organizational roles indicate that regulatory pressures function not merely as constraints but as active catalysts for environmental innovation, compelling companies to develop sustainable solutions to meet mandatory standards.

2. Market dynamics and customer preferences constitute a powerful external force, driving green innovation across various sectors. Respondent 9.

clearly articulates this perspective, stating 'We are motivated by customer demand for sustainable products', indicating direct responsiveness to evolving consumer expectations. Complementing this, Respondent 3. identifies 'customer expectations for sustainable products' as the key motivator for their green innovation initiatives in manufacturing. The interplay between market trends and regulatory requirements appears in multiple documents, including Respondent 1. and Respondent 8. Additionally, Respondent 10. explicitly connects customer-facing concerns to innovation strategy through 'the desire to enhance our brand image'. This shared perspective reveals how organizations increasingly view sustainability as a strategic market consideration rather than merely an operational requirement, with competitive positioning and consumer preferences playing decisive roles in shaping green innovation agendas. Collectively, these accounts demonstrate that businesses recognize sustainability as both a compliance issue and a market opportunity.

3. Internal organizational culture and employee participation represent a critical bottom-up driver of green innovation according to multiple organizational perspectives. Both Respondent 2, representing someone with twelve years of experience overseeing sustainability training in Maintenance, and Respondent 6., featuring a Human Resources professional with one year of experience, use identical language to describe how 'Employee engagement in sustainability drives our green initiatives'. This parallel testimony from different departments and roles suggests that grassroots involvement in sustainability matters creates organizational momentum for green innovation, regardless of seniority or functional area within the company. The fact that these two respondents from distinct organizational contexts independently identified the same driver underscores the significance of internal human capital in advancing environmental initiatives. Rather than treating sustainability as a purely top-down mandate, these organizations appear to harness the collective commitment and creativity of their workforce as a fundamental innovation catalyst. This shared viewpoint positions employees not merely as implementers of green policies but as active sources of innovation who propel environmental initiatives forward through their engagement and involvement.

4. Specific environmental objectives, particularly direct carbon reduction, emerge as a targeted driver of green innovation that transcends mere compliance or market positioning. Respondent 7, representing Supply Chain Management,

articulates this distinctive perspective by stating they are 'motivated by the need to reduce our carbon footprint', which focuses the organization's innovation efforts on a specific measurable environmental outcome rather than broader sustainability goals or external pressures. This viewpoint represents a more internally driven environmental consciousness that positions carbon management. Unlike the regulatory or market-oriented motivations cited by others, this approach suggests deeper organizational commitment to addressing climate change as a primary innovation driver. This specialized focus on carbon footprint reduction indicates a potential evolution from general sustainability compliance toward more targeted environmental interventions, where innovation is directed at solving specific ecological challenges rather than merely satisfying regulatory frameworks or customer expectations.

5. Corporate reputation and strategic branding represent a distinctive motivation for green innovation that extends beyond mere regulatory compliance into proactive image management. While several respondents mention regulatory compliance, Respondent 10. uniquely pairs it with 'the desire to enhance our brand image', suggesting strategic recognition that sustainability initiatives serve dual purposes: fulfilling legal obligations while simultaneously strengthening market position. This perspective reveals how green innovation operates within a broader business strategy where environmental performance directly affects corporate identity and competitive differentiation. Unlike respondents who view green innovation as primarily responsive to external pressures, this viewpoint acknowledges the proactive potential of sustainability as a value-creation mechanism that enhances organizational prestige and market appeal. The integration of compliance and branding considerations demonstrates a sophisticated understanding of how environmental innovation can simultaneously satisfy regulatory requirements and generate positive stakeholder perceptions and positioning sustainability.

Theme on operation and financial benefits

The evaluation shows that operational improvements through resource efficiency and process optimization represent the most consistently documented benefits of green innovation across organizations. Multiple respondents identified concrete examples of cost savings from reduced energy and water use, waste reduction, and logistics improvements, demonstrating a clear pathway from operational changes to financial benefits. However, most organizations struggle

to articulate the complete cause-and-effect relationship between specific sustainability initiatives and bottom-line impacts, with only one respondent explicitly connecting operational improvements to overall profitability. The variability in reporting specificity highlights a gap in how organizations measure and communicate the financial value of sustainability efforts, suggesting that while operational benefits are widely recognized, systematically tracking and reporting their financial implications remains a challenge for many businesses. This pattern indicates that while companies are successfully implementing green initiatives that yield operational benefits, there is room for improvement in developing robust metrics to demonstrate their comprehensive financial impact.

1. Several organizations have documented direct financial benefits stemming from resource efficiency improvements. Respondent 10. explicitly states, 'We've seen a down surge in waste and energy costs, which has improved our bottom line,' demonstrating the clear operational-to-financial benefits pathway through resource conservation. Respondent 4. confirms 'cost savings from efficiency' as both a motivation for and outcome of sustainability initiatives, indicating that efficiency gains directly translate to financial performance. Similarly, Respondent 7. reports that 'Green initiatives have led to cost savings in logistics,' showing how sustainable practices in supply chain operations create measurable financial benefits. These consistent findings across different functional areas (production, general operations, and supply chain) demonstrate that resource optimization through green initiatives represents a reliable source of operational cost reductions that directly impact financial performance. The convergence of these reports suggests that operational efficiency gains in resource utilization are among the most tangible and universally recognized financial benefits of sustainability initiatives.

2. GIN efforts consistently yield operational improvements through process standardization and quality enhancements. Respondent 5. identifies 'Standardization of processes' as a key motivation for pursuing sustainability certification, indicating that organizations recognize the operational value of creating consistent, repeatable environmental management procedures. The same respondent also notes 'improved compliance' as a positive outcome, reflecting more effective integration of regulatory requirements into business processes. Respondent 9. similarly reports that 'Green innovation has led to higher customer satisfaction and fewer product returns,' demonstrating how sustainability

initiatives can enhance product quality and reduce operational inefficiencies associated with handling returns. These operational benefits represent improvements in process reliability, regulatory adherence, and product performance that form the foundation for subsequent financial gains. The fact that multiple respondents across different organizations identify these operational improvements suggests they represent fundamental outcomes of well-executed green innovation strategies, even when specific financial metrics aren't explicitly stated.

Themes on Market and strategic advantages

The inspection depicted that market and strategic advantages derived from environmental initiatives primarily manifest through four interconnected dimensions: market expansion via sustainable products, strategic industry positioning through environmental leadership, competitive differentiation via CSR, and targeted consumer loyalty within sustainability-focused demographics. These advantages are consistently identified across multiple organizations, suggesting they represent fundamental business transformations rather than isolated successes. The strategic value lies not just in individual initiatives but in how these elements combine to create sustainable competitive positioning in increasingly environmentally conscious markets. While most perspectives emphasize broad strategic benefits, the unique viewpoint regarding certification requirements in bidding processes highlights more concrete, transactional advantages that directly impact market access.

1. Sustainable product innovation consistently enables organizations to access previously unavailable market segments and drive business growth. Respondent 8. states that 'Our green products have opened new market opportunities,' indicating how environmentally friendly product development has expanded their customer base. Similarly, Respondent 1. confirms this advantage with the identical statement that 'Our green products have opened new market opportunities,' establishing a clear pattern where green innovation translates to tangible market expansion. Respondent 3. reinforces this theme by identifying 'new market opportunities' as a direct outcome of green innovation efforts. These consistent findings across multiple organizations demonstrate that sustainable product development serves as a strategic pathway to market diversification, allowing companies to reach environmentally conscious consumers and capitalize on emerging sustainability-focused markets. The convergence of evidence from different respondents suggests this represents a fundamental

business advantage rather than an isolated occurrence, with organizations strategically leveraging green products to access revenue streams that would otherwise remain inaccessible through conventional offerings.

2. Environmental leadership serves as a strategic differentiator that elevates companies' industry standing and competitive positioning. Respondent 8. explicitly avers that 'Strong environmental leadership has positioned us as industry leaders,' connecting environmental stewardship directly to strategic market positioning rather than merely operational improvements. Respondent 9. echoes this perspective, noting that 'Our commitment to environmental leadership has enhanced our standing in the industry,' which indicates that sustainable practices contribute to enhanced credibility and influence within the business sector. Both respondents, coming from different organizations, independently identify environmental leadership as a material component in establishing competitive advantage and market differentiation.

3. Strategic CSR implementation cultivates dedicated customer segments and strengthens brand loyalty within sustainability-focused consumer demographics. Respondent 8. specifically identifies how 'CSR has strengthened our brand loyalty,' highlighting the targeted market advantage of building retention within a growing demographic segment that values environmental responsibility. Respondent 10. complements this perspective by noting that 'Environmental leadership has significantly improved our reputation, making us a preferred partner for many clients,' which illustrates how sustainability commitments translate to concrete business relationships and client preference. These insights collectively demonstrate that organizations recognize specific market advantages in cultivating loyalty among environmentally conscious consumers, who increasingly factor sustainability into purchasing decisions. The strategic value lies not just in attracting these customers initially but in building ongoing loyalty that creates sustainable competitive advantage through higher retention rates and lower customer acquisition costs. This targeted approach represents a sophisticated market strategy where companies deliberately position themselves to serve and retain consumers whose values align with their sustainability commitments, creating a dedicated customer base that provides stable revenue streams in increasingly values-driven markets.

5.6.2 Environmental Leadership

Environmental leadership consistently emerges as a strategic paradigm that prioritizes long-term ecological health over short-term financial gains while actively fostering innovation through creative risk-taking. Organizations increasingly recognize stakeholder expectations as primary drivers for environmental initiatives, yet mature approaches integrate these external pressures with genuine ethical motivations to create dual-framework leadership models. Despite widespread consensus on strategic positioning and innovation benefits, significant gaps remain in how organizations implement environmental leadership, particularly regarding the integration of proactive and transparent management practices as complementary elements rather than isolated concepts. The outcome demonstrates that effective environmental leadership represents both a philosophical shift in organizational priorities and a practical approach to creating business value, though implementation details and operational translation remain relatively underdeveloped across the discourse (Table 22).

Table 22. Themes and subthemes on ENL

Themes	Subthemes
1. Sustainability-oriented leadership	a) Long-term ecological health b) Cultivates innovation environments c) Primary driver for adopting sustainability d) Strategic differentiator
2. Proactive and transparent management	a) Proactive approaches to environmental management b) Transparency is a leadership principle
3. Employee Empowerment	a) Environmental leadership through the lens of employee empowerment
4. Ethical and stakeholder-driven motivation	a) Identify stakeholder expectations b) Ethical motivations through explicit commitments. c) Integrates both ethical considerations and stakeholder-driven factors.

Subthemes on Sustainability-oriented leadership

Sustainability-oriented leadership consistently emerges across manufacturing contexts as a strategic paradigm that prioritizes long-term ecological health over short-term financial gains, actively fosters innovation through creative risk-taking, responds to stakeholder expectations, and generates competitive differentiation. These shared perspectives demonstrate an evolution from demonstrating sustainability as a compliance saddle to recognizing it as a core strategic leadership function with tangible business benefits. While most respondents emphasize strategic positioning and innovation aspects, unique viewpoints reveal important nuances regarding collaborative decision-making processes and employee capability development as implementation mechanisms. The synthesis reveals that sustainability-oriented leadership represents both a philosophical shift in organizational priorities and a practical approach to creating business value, though implementation details remain relatively underdeveloped in the discourse. These findings collectively suggest that effective sustainability leadership integrates strategic vision with practical execution while navigating the complex affiliation between environmental stewardship and institutional efficiency.

1. Sustainability-oriented leadership fundamentally reorients organizational priorities by emphasizing long-term ecological health over immediate financial returns. Respondent 10. explicitly states that 'Our leadership emphasizes sustainability, which contrasts with traditional leadership that often prioritizes profit over environmental concerns', establishing a clear distinction between conventional and sustainability-focused leadership paradigms. Similarly, Respondent 3. articulates this strategic shift as prioritizing 'long-term sustainability over short-term profits', indicating a philosophical realignment in decision-making criteria. This long-term perspective is further reinforced by Respondent 9., which asserts that 'We believe that being environmentally responsible is essential for long-term success', connecting sustainability practices directly to enduring business viability. The consistency across these perspectives demonstrates that sustainability-oriented leadership represents a paradigm shift where environmental considerations are foundational to business strategy rather than peripheral concerns. This orientation toward intergenerational responsibility appears consistently throughout multiple organizational contexts as a defining

characteristic of authentic sustainability leadership that addresses core business strategy rather than representing merely tactical or compliance-oriented approaches.

2. Sustainability-oriented leadership actively cultivates innovation by creating environments where creative risk-taking is encouraged and valued. Respondent 8. and Respondent 1. provide identical articulation of this principle, stating that 'Environmental leadership encourages creativity and risk-taking in innovation', suggesting widespread recognition of this dynamic in manufacturing contexts. This recurring theme demonstrates that sustainability-oriented leadership goes beyond compliance or cost management to actively harness organizational creativity in developing novel environmental solutions. The emphasis on 'risk-taking' is particularly significant as it acknowledges that meaningful sustainability innovation often requires venturing beyond established practices and potentially accepting short-term uncertainties for long-term environmental benefits. This perspective frames sustainability leadership not as a constraint but as a catalyst for organizational transformation, where environmental challenges become opportunities for creative problem-solving and competitive differentiation. The replication of this exact language across multiple respondents suggests this innovation dimension represents a well-established understanding of sustainability leadership's functional role within progressive manufacturing organizations.

3. Organizations consistently identify stakeholder expectations as a primary driver for adopting sustainability-oriented leadership practices. Respondent 8. and Respondent 1. explicitly state that 'We prioritize environmental responsibility to meet stakeholder expectations.', indicating a shared understanding that sustainability leadership responds to external pressures and demands. This recurrent theme suggests that modern manufacturing organizations perceive sustainability leadership as strategically necessary to maintain legitimacy and trust among various stakeholder groups. Rather than viewing these expectations as burdensome constraints, the respondents frame them as legitimate considerations worthy of leadership attention and resource allocation. The identical wording across these independent respondents highlights stakeholder expectations as a fundamental justification for sustainability initiatives that has become normalized in organizational discourse. However, these statements focus on the motivation for adoption rather than

detailing how leaders specifically engage with diverse stakeholders or navigate potentially conflicting stakeholder demands in sustainability decision-making processes.

4. Sustainability-oriented leadership is consistently understood as a strategic differentiator that enhances market position and industry standing. Respondent 8. declares that 'Strong environmental leadership has positioned us as industry leaders', directly connecting sustainability practices to organizational prestige and market leadership. This theme is reinforced by Respondent 9., which states that 'Our commitment to environmental leadership has enhanced our standing in the industry', indicating reputational benefits from sustainability-focused leadership. The perspective finds further validation in Respondent 4. concise description of 'competitive differentiation' as the outcome of sustainability leadership, highlighting its value as a strategic business advantage rather than merely an ethical consideration. Similarly, Respondent 1. echoes this sentiment with the identical statement that 'Strong environmental leadership has positioned us as industry leaders'. Collectively, these perspectives demonstrate that organizations perceive sustainability leadership as creating tangible business value through market differentiation, reputation enhancement, and positioning within industry hierarchies. The recurrence of this theme across multiple respondents suggests that sustainability leadership has evolved from a compliance or public relations concern to a recognized strategic imperative with clear competitive implications in the manufacturing sector.

Subthemes on proactive and transparent management

The outcome demonstrated a vital gap in how organizations conceptualize and implement proactive and transparent management as an integrated approach. While several organizations reference proactive environmental management strategies and a few mentions transparency as a leadership value, these concepts are consistently treated in isolation rather than as complementary elements of a unified management philosophy. The documentation frequently lacks concrete implementation details about how transparency mechanisms support proactive decision-making or how proactive approaches are made visible to stakeholders through transparent practices. This disconnect suggests organizations may be missing opportunities to strengthen stakeholder trust through visible proactive measures while simultaneously limiting the effectiveness of their proactive initiatives due to insufficient transparency. Without integrating both dimensions,

organizations risk implementing initiatives that either lack the visibility needed for stakeholder confidence or fail to anticipate challenges despite being well-communicated. A more comprehensive approach that systematically connects proactive environmental management with transparent communication and accountability mechanisms could significantly enhance organizational credibility and effectiveness.

1. Organizations occasionally reference proactive approaches to environmental management but seldom connect them to transparent practices. Several organizational representatives mentioned forward-looking strategies for environmental challenges, with Respondent 9. stating 'Our leadership is proactive in addressing environmental issues, which is a shift from the reactive approach seen in traditional management.' Similarly, Respondent 6. noted that 'Environmental leadership is about empowering employees to take initiative,' indicating a management style that encourages employee-driven proactive measures. These references suggest a growing awareness among organizations of the value in anticipating rather than merely reacting to environmental challenges. However, the documentation consistently lacks detail about how these proactive approaches are systematically integrated with transparent management practices. The mentions indicate recognition of proactive approaches but fail to establish clear connections to transparency as a complementary management principle, suggesting these concepts are often considered in isolation rather than as an integrated management philosophy.

2. Transparency is occasionally mentioned as a leadership principle but without implementation details or connection to proactive management. Respondent 5. briefly states that 'Leaders emphasise transparency' in response to questions about how their environmental leadership approach differs from traditional manufacturing leadership. This indicates that transparency is positioned as a distinguishing characteristic of their leadership philosophy compared to conventional approaches. However, this single reference provides no explanation of what specific transparent management practices are implemented, how transparency is operationalized across different organizational levels, or what mechanisms ensure consistent application. Moreover, there is no linkage between this transparency principle and proactive management elements within the same document or across other documents. The minimal treatment of transparency as a leadership value mentioned but not elaborated—suggests it may

be treated as an aspirational concept rather than an implemented management practice with concrete procedures and accountability measures.

Subthemes on employee empowerment

The assessment depicted a narrow and conceptually limited understanding of employee empowerment within the organization, manifested only through a single recurring definition connecting environmental leadership to employee initiative-taking. Despite consistent conceptual framing across HR and Maintenance departments, there is a notable absence of practical implementation details, specific empowerment mechanisms, or measurable outcomes related to employee empowerment across the vast majority of documentation. The conflation of related concepts like training, creativity, and collaboration with actual empowerment practices suggests potential gaps between organizational rhetoric and substantive empowerment structures. This limited perspective on empowerment reduced to initiative-taking within environmental leadership—fails to address the multidimensional nature of employee empowerment including decision-making authority, autonomy in role execution, and meaningful participation in organizational governance. Consequently, while the organization has established a basic conceptual link between environmental leadership and employee initiative, a comprehensive employee empowerment framework with clearly defined practices, accountability structures, and measurable outcomes appears to be largely absent from the documented organizational practices.

1. Two separate respondents from different departments consistently define environmental leadership through the lens of employee empowerment. Respondent 6, an HR professional with one year of experience, explicitly stated that 'Environmental leadership is about empowering employees to take initiative,' framing empowerment as a core component of their organizational leadership philosophy. Similarly, Respondent 2, a Maintenance department employee with 12 years of experience, provided the identical conceptual definition, indicating this understanding transcends departmental boundaries and tenure levels within the organization. This consistent phrasing across different organizational functions suggests a deliberate organizational narrative that positions employee initiative-taking as fundamental to environmental leadership. However, both statements remain purely conceptual without elaborating on specific empowerment mechanisms, practical implementation examples, or measurable outcomes of this empowerment approach. The recurrence of this exact phrasing

implies it may represent official organizational messaging rather than organic employee perspectives on empowerment practices.

Subthemes on ethical and stakeholder-driven motivation

The analysis demonstrated that ethical and stakeholder-driven motivations for environmental responsibility and CSR initiatives frequently operate as complementary rather than competing forces within organizations. Multiple respondents consistently articulated dual-motivation frameworks that integrate ethical considerations with stakeholder expectations, suggesting mature organizations increasingly recognize the interdependence between genuine ethical commitments and successful stakeholder relationships. While stakeholder expectations particularly from customers, investors, and general stakeholder groups serve as prominent external drivers, ethical motivations often manifest through values-based commitments to social responsibility and community engagement. Distinctive perspectives reveal additional complexity, with some organizations emphasizing employee-led sustainability movements and others prioritizing stakeholder trust-building as the core purpose of their initiatives. The synthesis demonstrates that effective organizational approaches typically blend principled ethical commitments with responsive stakeholder engagement, creating integrated motivation systems that transcend simplistic either/or dichotomies between internal values and external pressures.

1. Multiple organizations explicitly identify stakeholder expectations as the primary driver for their environmental responsibility efforts. Several respondents (Respondent 1. and Respondent 8.) used identical statements that 'We prioritise environmental responsibility to meet stakeholder expectations,' demonstrating a clear consensus that external stakeholder demands shape environmental decision-making. Respondent 4. specified 'customer requirements' as motivation for pursuing ISO 14001 certification, while Respondent 5. cited 'investor pressure' as a key factor in prioritizing environmental responsibility. These examples collectively illustrate how diverse stakeholder groups including general stakeholders, customers, and investors exert influence that organizations actively respond to in their environmental practices. The recurrence of this pattern across multiple organizations suggests stakeholder expectations serve as a fundamental benchmark for environmental action, positioning external demands as central to sustainability decision-making processes rather than merely supplementary considerations. This shared orientation toward stakeholder-driven environmental

responsibility reveals a common understanding that organizational legitimacy and market position are closely tied to responsiveness to stakeholder expectations.

2. Organizations commonly express ethical motivations through explicit commitments to social responsibility and community engagement. Respondent 1. demonstrated this dual ethical perspective by stating 'We aim to contribute positively to our community' and elaborating that 'CSR is about balancing profit with social and environmental responsibilities,' framing ethical behaviour as an essential counterbalance to financial interests. Respondent 9. reinforced this view by asserting that 'CSR involves our commitment to ethical practices and community engagement,' which explicitly links organizational values to ethical action. Similarly, Respondent 2. emphasized their goal to 'foster a culture of social responsibility,' revealing how ethical motivations become embedded in organizational culture. These shared perspectives indicate that ethical motivation is often conceptualized as an intrinsic value system that extends beyond regulatory compliance or business advantage. The consistent emphasis on community engagement and balancing profit with social considerations reveals a common ethical framework where organizations view themselves as having moral obligations to society that transcend purely commercial objectives.

3. A significant number of organizations articulate a dual motivation framework that explicitly integrates both ethical considerations and stakeholder-driven factors. Respondent 10. clearly articulated this integrated approach stating, 'We prioritise environmental responsibility because it aligns with our corporate values and customer expectations,' highlighting the convergence of internal ethical standards and external stakeholder demands. This dual-motivation perspective is directly confirmed by Respondent 7. statement: 'We are motivated by both ethical considerations and market demands,' which explicitly names both drivers without subordinating one to the other. Respondent 5. Similarly identified 'Aligning with company values' as the primary CSR motivation, positioning internal ethical frameworks as equally important alongside stakeholder considerations. This shared viewpoint reveals sophisticated motivation structures where organizations do not see ethics and stakeholder responsiveness as competing forces but rather as complementary foundations for decision-making. The prevalence of this dual-framework perspective suggests mature organizations increasingly recognize the interdependence between genuine ethical

commitments and successful stakeholder relationships, viewing them as mutually reinforcing elements of responsible business practice rather than isolated concerns.

5.6.3 ISO 14001 certification and implementation

The results outline in Table 23 that organizations pursue ISO 14001 certification for interconnected motivations spanning external credibility enhancement and internal operational standardization. While workflow integration into existing business processes emerges as the predominant implementation strategy, organizations demonstrate considerable diversity in how they approach operational integration, with some embedding environmental considerations deeply within product development, HR, quality assurance, and procurement functions. Stakeholder engagement consistently appears as both a motivation for certification and a resulting benefit, with organizations reporting strengthened relationships across multiple stakeholder groups though regulatory relationships maintain a more transactional character compared to collaborative partnerships with other stakeholders. The documented implementation approaches range from systematic integration within operational workflows to more distinctive approaches leveraging technology or direct managerial oversight, suggesting that organizational context significantly influences implementation methodology.

Table 23. Themes and subthemes on ISO 14001

Themes	Subthemes
1. Motivation for certification	a) External credibility b) Standardize environmental management practices c) Existing environmental training initiatives d) External market or regulatory requirements
2. Implementation processes	a) Workflow integration strategy b) Implementation methodology across several organizations c) Regular or iterative audit processes

3. Stakeholder engagement	a) A catalyst for strengthening relationships across multiple stakeholder groups. b) Stakeholder expectations c) Shared sustainability values d) Both internal and external relationship
4. Operational integration	a) Product development workflows b) Sustainability awareness c) Environmental compliance checks d) Structured green procurement policies

Source: Authors compilation 2025

Subthemes on motivation for certification

Organizations pursue ISO 14001 certification for diverse yet interconnected motivations that generally fall into external and internal categories. External motivations include enhancing credibility with stakeholders, meeting customer requirements, and demonstrating commitment to environmental responsibility, while internal drivers focus on standardizing processes, formalizing environmental management practices, and structuring training programs. The synthesis reveals that some organizations adopt certification primarily as a strategic business tool to improve market positioning, while others implement it as an operational framework to systematize existing practices. Notably, regulatory compliance serves as a significant motivator for some organizations, though this appears less frequently than credibility and standardization motives in the data. The unique perspective connecting certification to both regulatory alignment and competitive bidding requirements suggests that certification motivations can be multifaceted, with organizations often navigating multiple overlapping drivers when deciding to pursue formal environmental management certification.

1. Organizations pursued ISO 14001 certification primarily to enhance external credibility and demonstrate environmental commitment to stakeholders. Respondent 1. explicitly stated 'We sought ISO 14001 certification to enhance our credibility' as their primary motivation for obtaining certification. Similarly, Respondent 8. shared the identical motivation, emphasizing how the organization

viewed certification as a strategic tool to improve their perceived trustworthiness in the eyes of external parties. Additionally, Respondent 9. framed this motivation slightly differently but with the same underlying purpose: 'ISO 14001 was pursued to depict our commitment to environmental management,' indicating that certification served as tangible evidence of the organization's environmental dedication. This shared perspective reveals how companies strategically leverage certification as a credibility mechanism, though as noted in the analysis, these statements typically lack specification about which particular stakeholders (customers, regulators, or the general public) were the primary target of these credibility-building efforts.

2. Several enterprises implement ISO 14001 certification specifically to standardize environmental management practices across their operations. Respondent 5. provided a concise statement that 'Standardization of processes' was their primary motivation for obtaining certification, highlighting the organizational need for consistent implementation of environmental procedures. Respondent 7. elaborated more specifically that 'ISO 14001 certification was pursued to standardize our environmental practices,' indicating this standardization was internally driven to establish uniform environmental management protocols throughout their organization. Meanwhile, Respondent 10. framed it as a formalization effort, stating they 'pursued ISO 14001 certification to formalize our environmental management practices,' suggesting they already had informal practices in place that needed structured implementation. These responses collectively demonstrate how organizations view certification as a mechanism for creating systematic, standardized approaches to environmental management rather than merely pursuing external validation, though the analysis notes that most responses lacked contextual details about why standardization was particularly necessary for their specific operations.

3. Numerous firms specifically pursued ISO 14001 certification to formalize and structure their existing environmental training initiatives. Respondent 2. clearly stated 'We pursued ISO 14001 to formalize our environmental training programs,' indicating that the organization already had environmental training in place but sought certification to give these programs formal recognition within an established international standard framework. Similarly, Respondent 6., coming from an HR perspective focused on

sustainability training, provided the identical motivation: 'We pursued ISO 14001 to formalize our environmental training programs,' suggesting this was a strategic priority for institutionalizing employee development in environmental practices. Both responses demonstrate an internally focused motivation for certification that centers on improving and systematizing existing human resource practices rather than responding to external pressures. The analyses of both responses note that while this provides clear specific motivation, neither elaborates on whether there were additional strategic motivations or how formalizing training programs was expected to deliver broader organizational benefits beyond structural organization.

4. Some organizations pursued ISO 14001 certification in response to external market or regulatory requirements rather than strategic choice. Respondent 4. directly identified 'customer requirements' as the primary motivation for certification, with the analysis noting this came from a production department respondent with 18 years' experience who explained they sought certification because customers mandated it as a prerequisite for business relationships. This represents a clear market-driven external motivation where certification became necessary for maintaining commercial operations. Separately, Respondent 3. identified 'regulatory alignment' as a motivation for certification, indicating that ensuring compliance with environmental regulations served as a primary driver for seeking standardization. While the same respondent also mentioned 'competitive bids requiring certification,' the analysis correctly notes this was presented in the context of certification's effects rather than motivations for obtaining it. These examples demonstrate how external pressures can be decisive factors in the certification decision-making process, contrasting with internally driven motivations like those focused on standardization or credibility enhancement described by other respondents.

Subthemes on implementation processes

The investigation established three main ways to implement ISO 14001: 1) workflow integration methods that add requirements to existing operational processes; 2) organized policy frameworks that follow assessment-policy-audit sequences; and 3) iterative audit systems that see verification as an important part of the implementation process. Organizations implementing ISO 14001 appear to balance the need for systemic integration with structured compliance requirements, often combining elements from multiple approaches to suit their

operational context. The variations in implementation depth and detail across respondents suggest that organizations prioritize different aspects of the implementation process based on their size, industry, and pre-existing environmental management maturity. These findings indicate that successful implementation processes for environmental management systems are characterized by strategic alignment with organizational workflows, deliberate policy development, and mechanisms for continuous improvement, with the most effective approaches likely integrating multiple methodologies rather than relying on a single strategy.

1. Multiple organizations adopted a workflow integration strategy for ISO 14001 implementation rather than establishing separate systems. Respondent 8. explicitly stated they 'integrated ISO requirements into our product development processes,' demonstrating how environmental management was embedded within core operational activities. Similarly, Respondent 2. described how they 'integrated ISO training into our employee onboarding process,' illustrating the deliberate incorporation of environmental standards into existing HR procedures. Respondent 1. reinforced this approach by confirming they 'integrated ISO requirements into our product development processes,' suggesting this represents a deliberate strategic choice to make environmental reflexions an inherent part of enterprise operations rather than an add-on requirement. Respondent 6. This strategy echoed by mentioning they 'integrated ISO training into our employee onboarding process,' indicating a consistent pattern across multiple organizations of leveraging established workflows for smoother implementation. This approach appears to be a preferred implementation methodology that reduces resistance to change by working within existing organizational structures while simultaneously building environmental management capabilities organically within routine operations. Organizations adopting this integration strategy likely recognized that embedding environmental requirements within daily workflows would create more sustainable compliance than maintaining separate environmental management systems.

2. A structured implementation framework incorporating policy development, assessment activities, and training emerged as a distinct implementation methodology across several organizations. Respondent 10. provided a comprehensive description of this approach by stating they 'conducted a gap analysis, trained staff, and established an environmental policy as part of

our ISO implementation,' revealing a sequential process that begins with assessing current practices against standards, building capability through training, and formalizing commitment through policy. Respondent 9. similarly described their approach with 'We developed an environmental management plan and conducted regular audits,' indicating that formal planning followed by systematic verification constituted their implementation process. Respondent 7. reflected a specialized application of this framework through 'We established a green procurement policy and trained our team,' demonstrating how organizations tailored the policy-driven approach to specific operational areas. This structured implementation methodology appears to follow logical progression from assessment to policy formation to verification, creating a more systematic and documentable implementation process compared to purely integration-based approaches. Organizations employing this framework likely prioritized clear accountability and measurable progress through formal documentation and structured verification mechanisms, suggesting they valued auditability and formal compliance alongside operational integration.

3. The implementation of regular or iterative audit processes as a core component of ISO 14001 adoption emerged as a distinct implementation methodology across multiple organizations. Respondent 9. directly articulated this approach by stating they 'developed an environmental management plan and conducted regular audits,' positioning audit activities as an integral element of their implementation strategy rather than merely a compliance verification tool after implementation. Respondent 5. provided even greater specificity by mentioning 'iterative audits,' suggesting a cyclical implementation approach where each audit iteration informed subsequent improvements in a continuous refinement process. This audit-centric implementation methodology indicates that organizations viewed the audit function not merely as a verification mechanism but as an active driver of the implementation process itself, using findings from each audit cycle to guide implementation progression and adaptation. Organizations adopting this approach likely recognized that environmental management systems require ongoing adjustment rather than one-time implementation and strategically embedded the audit function within the implementation process to facilitate continuous improvement from the outset. The emphasis on regular or iterative audits suggests these organizations prioritized learning and adaptation throughout implementation rather than viewing it as a linear process with a defined endpoint.

Subthemes on Stakeholder engagement

The investigation illustrated that stakeholder engagement is predominantly viewed as a relationship-enhancing outcome of environmental certification and responsibility rather than a detailed process with specific methodologies. Organizations consistently report stronger connections with various stakeholder groups including suppliers, customers, community members, employees, and NGOs as a result of ISO 14001 implementation, though specific engagement mechanisms remain largely undetailed across most documents. While most organizations present stakeholder engagement as positively influenced by certification, notable distinctions emerge between transactional relationships (particularly with regulators and in competitive bidding contexts) and more collaborative partnerships based on shared sustainability values. Stakeholders exert significant influence on environmental decision-making, with organizations increasingly aligning their practices to meet diverse stakeholder expectations. However, the limited description of actual engagement processes rather than outcomes suggests organizations may prioritize the results of engagement over methodical implementation of structured stakeholder engagement frameworks.

1. ISO 14001 certification consistently serves as a catalyst for strengthening relationships across multiple stakeholder groups. As documented in Respondent 8., the organization noted that 'It has improved our engagement with environmental NGOs' which indicates how formal certification creates credibility with environmental watchdog organizations. Similarly, both Respondent 2. and Respondent 6. independently confirmed that 'It has strengthened our relationships with employees and community stakeholders,' demonstrating the certification's impact on both internal and local external relationships. The business value of certification extends to supplier relationships as well, with Respondent 7. stating 'It has improved our relationships with eco-conscious suppliers,' suggesting that shared environmental values create stronger business connections. Additionally, Respondent 10. specifically highlighted how 'ISO 14001 has improved our relationships with customers and regulators, as they appreciate our commitment to environmental standards,' illustrating that certification functions as tangible proof of environmental commitment that enhances credibility with key stakeholders. These consistent patterns across multiple organizations suggest that ISO 14001 certification operates as a unifying framework that facilitates trust-building across diverse stakeholder groups through demonstrated environmental commitment.

2. Stakeholder expectations serve as primary motivators for organizational environmental responsibility across multiple sectors. According to Respondent 8., the organization explicitly states that 'We prioritise environmental responsibility to meet stakeholders' expectations,' positioning stakeholders as key drivers of environmental decision-making rather than internal considerations alone. This customer-driven motivation is further validated by Respondent 9. who noted they are 'motivated by customer demand for sustainable products,' indicating that market forces actively shape product development and innovative strategies. The influence extends beyond business relationships to social dimensions, as Respondent 5. described how environmental leadership has led to 'stronger community ties,' suggesting that community stakeholders' expectations also influence organizational behaviour. This recurring theme demonstrates that organizations are increasingly responsive to the environmental expectations of their various stakeholder groups, with these expectations directly translating into concrete environmental actions and initiatives. The consistent recognition of stakeholder influence across different organizations highlights a fundamental shift toward more accountable and responsive environmental management practices that prioritize stakeholder concerns.

3. Shared sustainability values with suppliers create deeper, more strategic partnerships beyond transactional relationships. Documented in Respondent 9., organizations report that certification 'has strengthened our relationships with suppliers who value sustainability,' indicating that environmental alignment serves as a foundation for stronger business relationships. This perspective is reinforced by Respondent 7. which states that ISO certification 'has improved our relationships with eco-conscious suppliers,' suggesting that the certification process helps identify and strengthen connections with environmentally aligned business partners. Even the more minimal reference in Respondent 4. mentioning 'supplier partnerships' in the perspective of ISO 14001 implementation implies that EMS facilitate more meaningful supplier engagement. These examples collectively demonstrate that sustainability values function as a differentiator in supplier selection and relationship development, moving beyond price and quality considerations to incorporate environmental compatibility as a key relationship factor. The emphasis on 'eco-conscious' and 'sustainability-valuing' suppliers indicates a strategic shift toward building supply chains that reflect shared environmental commitments, creating more resilient and ethically aligned business networks.

4. Both internal (employees) and external (community) stakeholders are recognized as critical partners in sustainability implementation with engagement driving tangible outcomes. As noted in Respondent 2., the organization states 'It has strengthened our relationships with employees and community stakeholders,' demonstrating that ISO 14001 certification serves as a bridge for engagement with both internal and local external stakeholders. This internal engagement perspective is complemented by Respondent 5. which connects environmental leadership directly to 'stronger community ties,' suggesting that organizations view community relationships as essential outcomes of their sustainability efforts. The consistent mention of both employee and community stakeholders highlights a comprehensive approach to stakeholder engagement that recognizes the material of both internal culture and external social license to operate. These relationships appear reciprocal, where effective engagement leads to stronger initiatives, which in turn further strengthens stakeholder connections in a positive feedback loop.

Theme on operational integration

Incorporating ISO 14001 standards into fundamental company operations like product creation, hiring, quality control, and purchasing is the main way operational integration of environmental management systems shows itself, according to the synthesis. While multiple organizations independently report similar integration approaches in these functional areas, the depth of integration and implementation details remain variably described across the documentation. The recurring pattern of integrating environmental considerations into existing operational workflows rather than maintaining them as separate initiatives suggests an industry evolution toward treating sustainability as an inherent business requirement. However, the documentation consistently lacks comprehensive information about integration challenges, measurement of effectiveness, and cross-functional coordination, with only one respondent highlighting a distinctive technological approach through digital monitoring tools. These findings indicate that while operational integration is occurring across key business functions, organizations may be at different stages of maturity in fully embedding environmental management into their operational DNA, with significant opportunity for deeper integration and more systematic implementation approaches across the organizational ecosystem.

1. Enterprises have strategically embedded environmental management standards directly into their product development workflows. Respondent 9. and Respondent 1. independently reported that they 'integrated ISO requirements into our product development processes,' demonstrating how environmental considerations are being woven into core product innovation stages rather than being treated as separate compliance requirements. This approach represents a fundamental shift from viewing environmental management as an external obligation to incorporating it as an intrinsic element of the product lifecycle. By integrating these standards during the design and development phase, organizations can address environmental impacts at the point of greatest leverage, potentially reducing downstream environmental consequences and creating more sustainable products from inception. The consistency across these two independent accounts suggests this is an emerging industry best practice for operationalizing sustainability principles, though both sources acknowledge limitations in describing the depth and methodology of this integration beyond the product development context.

2. Organizations are incorporating environmental management training into foundational HR processes to establish sustainability awareness from employees' first days. Respondent 5. and Respondent 6. reported identical approaches, stating 'We integrated ISO training into our employee onboarding process,' which indicates a strategic decision to treat environmental management not as a specialized function but as a core organizational competency required of all staff. This onboarding integration demonstrates how companies are institutionalizing sustainability practices within their operational culture by ensuring new employees immediately understand environmental responsibilities as part of their standard job expectations. The consistency across these two responses suggests this is a deliberate operational strategy to create organization-wide environmental accountability rather than siloing responsibility within a single department. By embedding this training in onboarding procedures, organizations establish sustainability as a baseline operational expectation rather than an optional initiative, though neither source provides details about how this training is maintained or reinforced beyond the initial orientation period.

3. Environmental compliance checks are being systematized within standard quality assurance workflows as routine operational procedures. Respondent 9., a Quality Assurance department employee, stated 'I ensure that

our products meet environmental standards and regulations,' demonstrating how environmental considerations are no longer treated as separate compliance concerns but have become integrated components of standard product quality evaluation. This reflects an operational approach where environmental performance metrics are evaluated alongside traditional quality parameters during standard inspection protocols, suggesting environmental requirements have achieved parity with other quality considerations in the production workflow. The integration into QA systems represents a critical operational advancement because it positions environmental compliance as an inherent aspect of product readiness rather than a discretionary initiative. While this indicates significant progress in operational integration within quality systems, the document provides limited information about how this integration affects traditional quality metrics or whether conflicts between environmental and conventional quality priorities have emerged during implementation.

4. Organizations are transforming supply chain operations through structured green procurement policies integrated with staff capability development. Respondent 7. indicated that they 'established a green procurement policy and trained our team,' demonstrating a two-pronged operational integration approach that simultaneously modifies purchasing procedures while ensuring staff can effectively implement these changes. This represents a significant operational shift where environmental considerations directly influence purchasing decisions and supplier relationships, moving beyond voluntary initiatives to embedded operational requirements. The establishment of formal procurement policies suggests environmental criteria have become structural elements of sourcing workflows rather than ad-hoc considerations, while the emphasis on team training indicates recognition that successful integration requires both procedural changes and staff capability development. This operational integration in procurement demonstrates how environmental management is becoming woven into strategic purchasing decisions that affect the entire supply chain, though the response provides limited detail about specific procurement criteria or how this integration has affected supplier relationships and cost structures.

5.6.4 Corporate social responsibility.

The assessment demonstrated significant diversity in how organizations conceptualize and implement CSR, with both consistent patterns and distinctive

variations emerging across the respondents (Table 24). While a clear consensus exists around CSR as the integration of economic, social, and environmental responsibilities, substantial variation appears in the depth and comprehensiveness of these understandings, ranging from holistic triple bottom line frameworks to narrow, dimension-specific conceptualizations. Organizations increasingly view CSR as integral to their identity and culture rather than merely compliance requirements, with many deliberately fostering cultures of social responsibility as strategic priorities. The motivations for CSR initiatives demonstrate maturation from purely altruistic community contributions to sophisticated dual frameworks that recognize both ethical imperatives and business benefits, though defensive risk mitigation perspectives remain less common. These findings suggest CSR is evolving from peripheral activity to core business philosophy, though significant gaps persist between aspirational rhetoric and concrete operational implementation across many organizations.

Table 24. Themes and subthemes on CSR

Themes	Subthemes
1. Definition and Scope of CSR	a) Integration of economic, social, and environmental dimensions b) Ethical responsibility and accountability mechanism c) CSR as focused on specific dimensions
2. Motivations for CSR Initiatives	a) Identify community and societal contribution b) CSR primarily as a vehicle for transforming internal organizational culture c) Acknowledge the dual nature of CSR motivations
3. Brand and Reputation Enhancement	a) Emerges as a powerful driver of industry standing and reputation b) Measurable impact on strengthening brand loyalty c) Enhance organizational reputation as socially responsible employers

4. Internal Culture and Identity.	a) CSR is fundamentally embedded within their corporate identity b) Approach to cultivating social responsibility c) environmental responsibility as connected to their core values and long-term success
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Source: Authors compilation 2025

Subthemes on definition and scope of CSR

The analysis demonstrates considerable variance in organizational definitions and conceptualizations of CSR, highlighting both commonalities and unique differences across the respondents. A clear consensus exists among several organizations that CSR fundamentally involves balancing economic aspirations with societal and environmental considerations, reflecting widespread adoption of the triple bottom line approach within business practice. However, equally prominent is a pattern of narrower, dimension-specific definitions where organizations focus exclusively on particular aspects such as environmental stewardship, community development, or labour practices without acknowledging broader multidimensional frameworks. This variation suggests differing levels of CSR maturity and conceptual understanding across organizations, with some adopting comprehensive approaches while others maintain more limited, fragmented perspectives. The frequent occurrence of definitions that prioritize CSR's symbolic importance to corporate identity while lacking operational specificity further indicates a gap between aspirational rhetoric and practical implementation guidance in many organizational contexts.

1. Corporate social responsibility (CSR) is defined by a number of institutions by viewing economic, social, and environmental factors as complementary rather than antagonistic aspects of an organization's mission. Respondent 8. articulated the definition using identical phrasing that 'CSR is about balancing profit with social and environmental responsibilities', demonstrating a shared conceptual framework that affiliates to corporate responsibility. This definition presents CSR not as peripheral philanthropy but as fundamental to business operations where economic performance is actively balanced with social welfare and environmental protection considerations. The convergence of language across these distinct organizations suggests a growing

industry consensus that authentic CSR requires addressing all three dimensions simultaneously rather than treating them as sequential concerns. While these definitions provide a comprehensive conceptual foundation, both documents acknowledge that they offer minimal information about the specific operational scope or implementation boundaries of CSR activities within their respective organizations, highlighting a common gap between theoretical understanding and practical application.

2. Several organizations frame CSR primarily as an ethical responsibility and accountability mechanism rather than a strategic business function. Respondent 7. explicitly stated that 'CSR encompasses our ethical obligations to society and the environment', positioning CSR within an ethical framework that extends beyond mere regulatory compliance. Similarly, Respondent 10. from the Production department defined CSR by emphasizing accountability: 'CSR for us means being accountable for our environmental and social impacts'. These definitions collectively suggest that for these organizations, CSR represents a moral commitment to transparency and responsibility regarding business consequences rather than simply engaging in voluntary social programs. Both perspectives highlight environmental and social dimensions as core components of CSR understanding, reflecting a shared belief that businesses bear ethical responsibilities extending beyond shareholder interests to include broader societal and ecological considerations. However, the document elaborates on specific boundaries or practical implementation details of these ethical obligations, indicating a common limitation in translating ethical frameworks into operational guidelines.

3. Institutions conceptualize CSR as focused on specific, limited dimensions rather than comprehensive frameworks encompassing multiple responsibility areas. Respondent 5. provided an extremely concise definition of CSR as simply 'environmental stewardship', indicating a narrow conceptualization that focuses exclusively on ecological responsibility while omitting social and economic dimensions. Similarly, Respondent 4. defined CSR solely as 'community development', suggesting an organizational understanding limited to external community initiatives. Respondent 3. further exemplifies this pattern by defining CSR narrowly as 'Ethical labour practices', focusing specifically on workforce-related ethical considerations without acknowledging environmental or broader social responsibilities. These definitions collectively

reveal a significant trend where some organizations operate CSR through a single lens rather than adopting more holistic approaches. While each of these perspectives addresses important aspects of corporate responsibility, they represent fragmented understandings that fail to capture the multidimensional nature of CSR as typically conceptualized in academic and professional literature, suggesting varying levels of maturity in organizational CSR frameworks.

Sub-theme on motivations for CSR Initiatives

The motivations for CSR initiatives revealed across these documents demonstrate a complex landscape ranging from fundamentally altruistic perspectives to strategic business considerations. While many organizations frame their social responsibility efforts as driven by authentic desires to contribute positively to communities and society, others explicitly acknowledge the dual nature of CSR motivations that combine ethical imperatives with market demands. The evidence suggests that CSR has evolved from being viewed primarily as an external obligation to becoming integrated into organizational identity, culture, and strategic planning processes. Some companies treat CSR as an extension of their core values and cultural identity, while others recognize its strategic value in talent acquisition, stakeholder trust-building, and reputation management. These diverse motivations reflect the maturation of CSR as a business practice that can simultaneously address societal needs and create organizational value, though the relative emphasis on different drivers varies significantly based on organizational context and leadership perspective.

1. Firms identify community and societal contribution as the fundamental drivers behind their CSR initiatives. As Respondent 1. states, 'We aim to contribute positively to our community', reflecting the perspective shared by Respondent 8. with the identical statement: 'We aim to contribute positively to our community'. This community-focused motivation appears across different organizational contexts, suggesting a common altruistic foundation for CSR efforts. Complementing this local community perspective, Respondent 9. expands the scope to broader societal impact by declaring, 'We are steered by a plea to make a positive impact on society'. These statements collectively reveal that for some organizations, CSR is primarily framed not as a business strategy or compliance requirement, but as a genuine commitment to creating positive social value. The absence of references to business benefits, regulatory pressures, or market advantages in these responses indicates that these companies view

community and societal contribution as ends in themselves rather than means to business-oriented outcomes.

2. Several organizations view CSR primarily as a vehicle for transforming internal organizational culture rather than merely addressing external obligations. Respondent 6. independently express this perspective when they state, 'Our goal is to encourage a sense of civic duty among our employees', indicating that cultivating values-centered workplace environments represents a core motivation for these companies' CSR efforts. This alignment across different respondents suggests a strategic approach where CSR initiatives are integrated into the organization's foundational identity. The repetition of this specific language about fostering a culture of social responsibility demonstrates that for these organizations, CSR serves as a mechanism for internal value transformation that shapes how employees think, act, and make decisions in their day-to-day operations. By focusing on cultural integration rather than external benefits, these companies adopt a more authentic and deeply embedded approach to social responsibility that extends beyond public relations or strategic advantage considerations.

3. Some organizations explicitly acknowledge the dual nature of CSR motivations, recognizing both ethical imperatives and market pressures as equally important drivers. Respondent 7. articulates this balanced perspective by stating 'We are motivated by both ethical considerations and market demands', which reflects a sophisticated understanding of the complex reality that shapes CSR initiatives in contemporary business environments. This statement acknowledges that CSR cannot be reduced to a single motivation but rather emerges from the intersection of internal moral commitments and external commercial realities. The respondents' phrasing suggests a strategic integration of social responsibility into the core business model rather than treating ethical and market considerations as competing priorities. This dual-motivation framework recognizes that authentic social responsibility can simultaneously fulfil moral obligations and create competitive advantage, representing a more nuanced and realistically grounded perspective on what drives CSR implementation in complex business contexts.

Sub-theme on Brand and Reputation Enhancement

The analysis reveals a strong consensus across multiple organizations that environmental leadership and CSR initiatives significantly enhance brand reputation through multiple pathways, including industry positioning, consumer loyalty, and employer branding. Environmental stewardship has progressed from a compliance alarm to a strategic differentiator that elevates companies' standing among industry peers and business partners, while CSR efforts consistently strengthen relationships with environmentally conscious consumers and improve talent attraction. Notably, the pattern of identical phrasing across respondents regarding eco-conscious consumer loyalty and employer reputation suggests these have become recognized business outcomes rather than isolated experiences.

1. ENL consistently emerges as a powerful driver of industry standing and reputation enhancement across multiple organizations. Respondent 8. states that 'Strong environmental leadership has positioned us as industry leaders,' demonstrating a direct correlation between environmental stewardship and elevated market positioning. Similarly, Respondent 9. confirms that 'Our commitment to environmental leadership has enhanced our standing in the industry,' highlighting how environmental practices translate into tangible reputation benefits. The most comprehensive perspective comes from Respondent 10. which explains that 'Environmental leadership has significantly improved our reputation, making us a preferred partner for many clients,' connecting environmental leadership directly to client acquisition and business development outcomes. These consistent viewpoints reveal that environmental leadership has elevates companies' positions within their respective industries, enhances trust among business partners, and creates competitive advantages in stakeholder relationships. The pattern across these responses suggests that proactive environmental stewardship is increasingly perceived as a marker of organizational excellence and forward-thinking leadership rather than merely an operational requirement.

2. CSR initiatives consistently demonstrate a measurable impact on strengthening brand loyalty among environmentally conscious consumer segments while enhancing overall market competitiveness. Respondent 1. provide identical confirmation that 'CSR has strengthened our brand loyalty among environmentally conscious consumers,' indicating that this phenomenon

represents a consistent pattern observed across different organizations rather than an isolated experience. The repetition of this exact phrase across respondents suggests industry-wide recognition of the connection between CSR efforts and loyalty among this specific, growing customer demographic. Complementing this, Respondent 10. expands the perspective by stating that 'Our CSR efforts have positively impacted on our brand, making us more competitive in the market,' demonstrating how the benefits of CSR extend beyond niche customer segments to influence broader competitive positioning. However, functions as a strategic asset that resonates with value-driven consumers, creates deeper emotional connections with target audiences, and ultimately translates into tangible business advantages through enhanced customer retention and market differentiation. This pattern indicates that businesses are increasingly recognizing the commercial value of authentic CSR engagement in building sustainable brand equity.

3. Corporate Social Responsibility initiatives consistently enhance organizational reputation as socially responsible employers, creating tangible benefits in talent acquisition and retention. Respondent 2. and Respondent 6. independently state that 'CSR has enhanced our reputation as a socially responsible employer,' demonstrating remarkable consensus across different organizations about this specific aspect of reputational enhancement. This identical phrasing suggests that employer branding through CSR has become a well-recognized phenomenon within these industries, where social responsibility directly influences perceptions of what it's like to work for a company. The recurrence of this exact statement across separate respondents indicates that organizations are increasingly viewing their CSR efforts not only through a customer lens but also recognizing the significant impact on human capital strategy. This shared perspective reveals that a strong CSR profile has evolved into a strategic recruitment tool, helping organizations attract talent that prioritizes ethical workplace practices and social impact, particularly among younger generations of workers who place high value on corporate purpose. The consistency of this viewpoint across documents suggests that employer reputation through social responsibility has become a measurable business outcome of authentic CSR engagement.

Sub-theme on Internal Culture and Identity

The analysis reveals a consistent pattern across multiple organizations where CSR has evolved beyond a tactical initiative to become fundamentally embedded in organizational identity and consciously cultivated as part of internal culture. Organizations frequently describe CSR as 'integral' to their corporate identity and deliberately 'foster' cultures of social responsibility, suggesting a strategic shift toward viewing sustainability as part of their core self-definition rather than an external requirement. While most organizations present a unified vision of values integration, one organization demonstrates a more modular approach with distinct cultural dimensions operating in different contexts, highlighting varying levels of maturity in cultural integration. The emphasis on 'shared beliefs' and 'alignment with corporate values' indicates organizations increasingly see internal culture as the foundation for sustainable business practices, with leadership playing a critical role in intentionally shaping these cultural elements. This evolution represents a significant development in organizational thinking, where identity itself becomes the driving force behind sustainable practices rather than external pressures being the primary motivator.

1. Two organizations explicitly state that CSR is fundamentally embedded within their corporate identity rather than merely an external practice. Respondent 2. stated, 'CSR is integral to our corporate identity'. The precise wording across these distinct organizations suggests CSR forms part of their core self-perception rather than being positioned as a peripheral activity. The term 'integral' indicates that CSR shapes organizational values and decision-making frameworks without which their corporate identity would be incomplete. This perspective represents a significant evolution from employing CSR as a compliance requirement to identifying it as fundamental to organizational identity. When CSR becomes part of identity rather than simply strategy, it influences how employees understand their purpose within the organization and guides ethical decision-making at all levels. The consistency of language across multiple organizations suggests this may represent an emerging paradigm where sustainability and responsibility are woven into the fabric of corporate identity itself, rather than added as appendages to existing business models.

2. Two organizations demonstrate a deliberate approach to cultivating social responsibility as a core cultural element rather than allowing culture to emerge passively. Respondent 2. explicitly stated, 'We aim to foster a culture of

social responsibility' while Respondent 6. echoed this with identical language. The verb 'foster' indicates active nurturing and deliberate shaping of specific cultural attributes throughout the organization. This suggests social responsibility isn't viewed as optional or peripheral but as a core cultural value worthy of intentional development. Such deliberate cultural engineering indicates organizations recognize that values alignment requires active cultivation rather than simply stating principles. When organizations articulate specific goals for cultural development, it reflects a sophisticated understanding that internal identity shapes external behaviour. The consistency of language across different organizations suggests this represents a strategic approach where cultural values are carefully designed to align with organizational purpose. This intentional cultural development appears to be a response to the recognition that sustainable business requires deeply embedded values rather than temporary initiatives.

3. Organizations describe environmental responsibility as connected to their core values and long-term success rather than being driven solely by external pressures. Respondent 9. stated, 'We believe that being environmentally responsible is material for long-term success', positioning sustainability as fundamental to the organization's understanding of its own viability. Similarly, Respondent 10. explained, 'We prioritise environmental responsibility because it aligns with our corporate values and customer expectations', indicating environmental stewardship is viewed internally as aligned with core principles rather than merely responsive to market demands. Respondent 5. reinforced this perspective with the statement, 'Aligning with company values', which suggests values serve as internal compass guiding CSR initiatives. The use of 'we believe' and 'aligns with' indicates these perspectives represent shared organizational understandings rather than individual opinions. This values-based approach suggests organizations view sustainability not as a constraint but as an expression of their identity, with environmental stewardship becoming part of their organizational strategy. When values become integrated with business strategy in this manner, they create self-reinforcing systems where ethical decision-making becomes second nature rather than requiring constant justification.

5.6.5 Summary of qualitative assessment

Contemporary enterprises are increasingly aligning their operational strategies, innovation initiatives, and leadership philosophies with environmental sustainability and CSR. Demonstrated by a confluence of regulatory mandates,

dynamic market outlooks, and internal cultural shifts, GIN has transitioned from a compliance-based obligation to a core strategic function that influences product development, process optimization, brand positioning, and stakeholder engagement. Regulatory compliance emerges as the most consistent external driver of GIN, compelling organizations to adapt to legal frameworks while simultaneously leveraging these requirements as catalysts for competitive advantage. This transformation is mirrored in the growing emphasis on sustainability-oriented leadership, which reorients decision-making toward long-term ecological health, encourages creative risk-taking, and positions environmental stewardship as a source of innovation and differentiation.

Furthermore, CSR is no longer perceived as a peripheral philanthropic effort but as an integral component of corporate identity, embedded in values, culture, and strategic planning. Organizations increasingly recognize that authentic sustainability efforts yield tangible benefits, including cost savings through resource efficiency, access to new markets via sustainable products, enhanced reputation, and stronger affiliation with employees, customers, investors, and communities. The adoption of standardized frameworks like ISO 14001 further highlights this institutional shift, serving both as a tool for internal process standardization and an external signal of credibility. Collectively, these trends reflect a fundamental evolution in business strategy, where environmental responsibility is not only ethically justified but also strategically advantageous, sparingly beneficial, and essential for long-term organizational resilience (see Table 26).

6. THEORETICAL AND PRACTICAL RELEVANCE

6.1 Theoretical relevance

This dissertation theoretical contributions center on two frameworks: the resource-based view and stakeholder theory, which assess the effects of CSR and GIN on the financial and environmental performance of enterprises. An enterprise efficiency and competitive advantage are heavily dependent on its distinctive resources and competencies, as evidenced by the RBV (Huang et al., 2023). This evaluation adds to the RBV by showing how companies may improve their financial and environmental performance by developing and employing CSR and GIN as valuable resources. Specifically, the assessment highlights that: Firms that effectively implement CSR initiatives and invest in

green innovation can differentiate themselves in the marketplace, thereby appreciating in sustainable competitive advantage. According to the RBV, resources that lead to better efficiency should be valued, rare, inimitable, and non-substitutable (Chen et al., 2023; Sarwar et al., 2023). The results outline in the dissertation shed light on CSR and GIN to improve the strategic resources and upsurge enterprise reputation, operational efficiency, and stakeholders trust. Likewise, ENL outcome exhibited that enterprise must invest in capabilities of management and policies strategies. Sustainable leadership direct and develop ecological products and process that are less environmental harmful. While ISO 14001 is voluntary, the outcome from the investigation established that it has no significance to impact either financial or environmental performance of manufacturing firms.

In addition, Stakeholder Theory (Freeman et al., 2020; Tufani, 2024) stresses the significance of stakeholders' interests and influences being considered when corporations make decisions. This research contributes to Stakeholder Theory by depicting how effective stakeholder engagement in CSR and GIN initiatives can lead to an upsurge in organisational performance. The assessment highlights that Companies that actively include their stakeholders, including customers, employees, and local communities, through CSR programs have a better chance of creating shared value (Bansal et al., 2023). This is in line with the first principle of stakeholder theory, which states that institutions should prioritize the needs of their stakeholders over those of their shareholders. The research provides empirical evidence that stakeholder engagement can enhance corporate reputation and loyalty, ultimately leading to better financial performance. The empirical outcome also establishes the need of stakeholder engagement in effectively tackling environmental issues. As the outcome affirm a positive association with environmental performance, integrating stakeholder perspectives into CSR strategies, firms can better collaborate their initiatives with societal needs and expectations, thereby enhancing the legitimacy and effectiveness of their efforts (Góes et al., 2023; Santos & Fernandes, 2024). This contribution extends Stakeholder theory by providing insights into how firms can organize cooperation among diverse stakeholders to achieve common goals, particularly in the context of sustainability.

Furthermore, the dissertation assessment established that GIN is the practise to mitigate the ecological footprint of manufacturing enterprises in emerging communities. As stakeholder are concern of the impact of emissions, enterprise that exhibits and adopt innovative approaches build good image for

sustainable investors. Finally, the research contributes to the amalgamation of RBV and Stakeholder theory, offering a more comprehensive framework for understanding the dynamics between corporate practices, stakeholder engagement, adoption of EMS ISO 14401, and performance outcomes. Examining how CSR and green innovation serve as resources that facilitate stakeholder engagement, the dissertation illustrates the interconnectedness of these theories. This amalgamation approach can provide a robust foundation for future research exploring the synergies between resource management and stakeholder relations in achieving sustainable business practices.

6.2 Practical relevance

The dissertation offers policy recommendations to managements and other interested parties within the emerging communities in the deployment and implementation of CSR, GIN, ENL, and ISO 14001 and promote sustainable practices within the manufacturing sector. These suggestions are aimed at policymakers, industry leaders, and stakeholders involved in environmental governance and corporate management. First, policymakers should consider implementing financial incentives for companies that actively engage in CSR and GIN. This could include tax breaks, grants, or subsidies for firms that achieve ISO 14001 certification or invest in sustainable technologies (Lawton et al., 2025). Such incentives would encourage more businesses to employ environmentally friendly techniques, thereby enhancing their financial performance while contributing to broader environmental goals. Second, a clear and comprehensive regulatory framework is essential for guiding companies in their CSR and environmental initiatives. Policymakers should develop regulations that define the expectations for CSR practices, particularly in emerging economies and within the SMEs where such frameworks may be lacking (Hu et al., 2023; Baah et al., 2021). This includes establishing standards for environmental reporting and accountability, which can help firms measure their impact and improve transparency in their operations. Additionally, encouraging stakeholder engagement in the progress and execution of CSR policies is significant. Policymakers should facilitate platforms for dialogue between businesses, communities, and other stakeholders to ensure that CSR align with societal needs and expectations (Mill Cox, 2025). This collaborative approach can appreciate the effectiveness of CSR programs and foster trust between companies and the communities they serve.

More importantly, investing in R&D for green technologies and sustainable practices is vital for advancing CSR and environmental performance.

Enterprises should allocate funding for R&D initiatives that focus on innovative techniques to environmental externalities faced by the manufacturing sector. This support can spark technologies that upsurge operational efficiency and reduce environmental impact (development of green product, service, and process). Furthermore, to effectively implement CSR and green innovation strategies, companies require skilled personnel who understand sustainability principles. Enterprises should promote educational programs that focus on ecosystem management, sustainability practices, and corporate governance (Hu et al., 2023). Enhancing the skill set of sustainable workforces, companies can better implement CSR initiatives and drive innovation in their operations. Likewise, policymakers should create mechanisms for knowledge transfer and sharing of best practices among businesses, particularly in emerging economies. This could involve establishing networks or partnerships that connect firms with successful CSR and green innovation strategies (Ahmed et al., 2023). Learning from each other, ENL within these companies can adopt effective practices that enhance their environmental and financial performance.

Finally, establishing a robust monitoring and evaluation framework for ISO 14001 initiatives is essential for assessing their effectiveness and impact. Policymakers should develop metrics and indicators that allow for the systematic evaluation of ISO 14001 practices in the manufacturing sector. This framework can help identify successful strategies and areas for improvement, ensuring that ISO 14001 system efforts are aligned with desired outcomes. Also, public-private partnerships serve a significant function in advancing CSR, ISO 14001, and green innovation. Policymakers should encourage collaborations between government agencies and private enterprises to address ecosystem challenges and promote sustainable practices. These partnerships can improve resources and expertise from both sectors, leading to more effective and impactful CSR, GIN, and ISO 14001 initiatives among manufacturing enterprises within emerging countries.

7. CONCLUSION, LIMITATIONS, AND FUTURE INSPECTION DIRECTIONS

7.1 Conclusion

Premised on mitigation and attain an economy free from ecological footprint and environmental deterioration, institutions and governments are putting policies in place to reduce the emissions caused by manufacturing enterprises. The empirical evaluation has indicated that enterprises are under pressure to develop innovative products and processes to mitigate their operational effect on the ecosystem. Current research has been focused on how to balance CSR and enterprise performance. While other investigations have explored the influence of GIN on the nexus between CSR and enterprise environmental efficiency. Even more so, investigations have convened for the role of sustainable leadership in developing strategies for sustainable products and processes for manufacturing enterprises. Similarly, academics are calling for the integration of EMS into the operation and strategic policies of manufacturing enterprises in emerging communities. There are scant gaps in the prior literary works on the affiliation between CSR, GIN, ENL, ISO 14001, and enterprise performance within the emerging regions. As such, the dissertation closes the scant literary gaps through examining the impact of CSR and GIN on enterprise performance. Considering the serial moderating role of ENL and ISO 14001 on the relationship between CSR and GIN. The investigation put forward five (5) evaluation objectives with an accompanying hypothesis developed from literary works. **RO1.** To assess the role of CSR initiatives in the attainment of enterprise performance. **RO2.** To determine the influence of CSR activities in the development of green innovation. **RO3.** To examine the mediating effect of green innovation on the relationship between CSR and enterprise performance. **RO4.** To investigate the role of environmental leadership and ISO 14001 on green innovation development in manufacturing enterprises. **RO5.** To evaluate the moderating influence of environmental leadership and ISO 14001 on the relationship between CSR and GIN. Also, the RBV and stakeholders' theories were employed as recommended in previous literature investigation when assess the relationship between CSR, GIN, ENL, ISO 14001, and enterprise efficiency with manufacturing firms. The dissertation design was on quantitative and qualitative techniques (explanatory sequential mixed method). The quantitative survey was conducted through questionnaires in an online curation, while the qualitative model took the form of interviews. Data curation was on managers,

owners, and key individuals who are significant for the dissertation objectives. The data curation consists of two sections: a) August - November 2024 and b) December 2024 – January 2025. In total, five hundred and seventy-six (576) questionnaires were considered valid employing the purposive sampling technique. The qualitative section consisted of ten (10) interviews covering CSR, GIN, ENL, and ISO 14001 across the 16 regions of Ghana. The quantitative questionnaire was evaluated with Smart PLS 4 SEM approach on the constructs of CSR, GIN, ENL, ISO 14001, ENP, and FINP.

The findings from the estimates on the developed hypothesis are as follows: **H1a, H1b:** *CSR has a positive effect on enterprise environmental and financial performance.* The findings depict that CSR had a positive, statistically significant effect on ENP and FINP of the investigated manufacturing firms in Ghana. As a result, it is recommended that enterprise that adopt CSR initiatives can increase their enterprise efficiency. Again, **H2:** *CSR had a statistically positive effect on green innovation.* The empirical outcome indicates that CSR had a positive effect on GIN. Green innovation in the form of products and processes are considered a desirable method for the environment as it is ecologically friendly. Additionally, **H3a, H3b:** *There is a positive link between GIN, ENP and FINP.* The direct relationship of GIN on ENP and FINP had a statistically significant effect on enterprise performance. Also, **H4a, H4b:** the mediating impact of GIN was estimated with CSR, ENP, and FINP. The outcome established a full mediating effect of GIN on CSR, ENP, and FINP. The researcher suggests to management that when the enterprise channels the relationship between CSR and enterprise efficiency through GIN, they will be able to appreciate their performance and reduce their environmental deterioration from operations. Furthermore, **H5:** *Environmental leadership, had a positive impact on green innovation.* **H5a:** *Environmental leadership moderate the relationship between CSR and green innovation.* The findings illustrated the direct positive influence of ENL on GIN. The ENL served as a significant moderating effect on the relationship between CSR and GIN among SMEs. Indeed, the outcome affirms the empirical assertion that enterprises that want to be considered ecologically firms must employ the service of environmental leadership. Finally, **H6:** *EMS ISO 14001 had a negative influence on green innovation.* **H6a:** *EMS ISO 14001 moderates the relationship between CSR and green innovation.* The analysis unveiled an inverse nexus between ISO 14001 and GIN. Also, ISO 14001 had an insignificant negative moderating effect on the relationship between CSR and GIN. In the case of the qualitative outcome, the

assessment revealed that GIN initiatives are driven by regulatory and cost-saving pressures, highlighting energy efficiency and new product lines as key outcomes. ENL diverges from traditional models by prioritising transparency and employee engagement in sustainable practices.

ISO 14001 adoption is largely motivated by standardisation and compliance. **CSR** is broadly defined as ethical operations and community engagement. Motivations align with company values and risk mitigation, while brand benefits include loyalty and investor appeal.

7.2 Limitations and Future research

As with any dissertation and evaluation, this dissertation has some short fall though the dissertation outcome illustrates significant influence of CSR and GIN on enterprise performance. Taking into perspective the moderating effect of ENL and ISO 14001 on the association between CSR and GIN. The dissertation has drawback on the theories of RBV and Stakeholder's adopted for the assessment of dissertation. The researcher points to academics on the other theories such as the dynamic capability theory could influence on the dissertation outcomes. First, the investigation outcome is premised on a specific sample of manufacturing enterprises. While the results may be applicable to similar regions, the generalizability of the findings to other enterprises or developed economies may be constrained. Future evaluation could benefit from a larger and more diverse test to enhance the sturdiness of the dissertation outcome. Similarly, the utilisation of survey results reliant on self-reporting entails the possibility of bias. This occurs because individuals tend to offer individually correct responses during surveys slightly than candid assessments of their true conducts and beliefs. The results are likely erratic due to the existence of this possible bias. The CMB problem was examined by two frameworks employing collinearity techniques and data curation technique. Future research should facilitate data triangulation by the utilisation of metrics that estimate innovation and objective performance. Second, the investigation was limited to CSR constructs of social and environmental not considering governance constructs of CSR initiatives. Also, GIN constructs of product and process was combined to measure GIN. On financial efficiency was proxied on subjective rather than objectivity. Next evaluation could include variables such as regulatory environments, market specifications, and cultural differences can significantly impact these dynamics. Future research should consider these technique elements to provide an upsurge

nuanced understanding of the relationship. Next line of evaluation should consider sector-specific assessment. While this dissertation concentrations on manufacturing firms, future assessment could expand to other sectors, such as services or agriculture, to assess how CSR and GIN link vary across different industries. These comparative estimates could provide a broader understanding of the applicability of the findings and the unique challenges faced by various sectors in implementing CSR and GIN. Future research could explore the impact of different leadership styles, such as transformational and servant leadership, on the association between CSR and GIN. Understanding how various leadership approaches influence GIN initiatives can provide valuable insights for institutions aiming to enhance their environmental performance. Furthermore, while the assessment explores the moderating roles of ENL and ISO 14001, there may be other relevant moderating or mediating constructs that were not included in the analysis. Factors such as enterprise culture, stakeholder engagement, and technological capabilities could also influence the relationships and warrant further investigation. Also, future evaluation could focus on the specific instruments through which ISO 14001 certification influences the CSR-GIN link. Investigating how enterprise facilitate ISO 14001 to implement effective environmental management practices could yield significance into best practices for achieving sustainability goals. Again, the dissertation was explored in the region of Ghana an emerging community considered as the gate way to African industrial sector. Therefore, the results are not applicable to developed and other communities with differential characterises as that of Ghana. Finally, there is methodological limitation of the dissertation, as the investigation only considered PLS SEM. Though PLS SEM is robust then other regression econometric estimations. Its findings will offer different output and results on the direct, mediating, and moderation influence. Future investigations could employed econometric techniques of hierarchical regression and general method of moment analysis to examine CSR, GIN, ENL, and ISO 14001 on enterprises ENP and FINP among SMEs in the manufacturing sector.

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CURRICULUM VITAE



KWABENA NSIAH TAKYI

Home: Mostni 5139, 76001 Zlin, 760 01, Zlín, Czechia

Email: takyinsia@outlook.com / takyi@utb.cz

Phone: (+420) 723961120

Nationality: Ghanaian

ABOUT ME

An academic researcher deeply concerned with acquiring skills, knowledge, and new experience in a challenging environment through professionalism. Prepared to work in both research centres and teaching in institutions.

Research interest: Sustainability (SDGs 7, 9, 12, and 13), Green finance, Sustainable leadership, green innovation, and digitalization of SMEs performance.

EDUCATION AND TRAINING

**2022 – Current Doctoral degree in Economics and Management
(Specialization in Economics)**

Tomas Bata University, Zlin Czech Republic

<https://www.utb.cz/en/>

2019-2021 Masters in Accounting

Jiangsu University, Zhenjiang China

<https://eng.ujs.edu.cn/>

2011-2014 BSc Banking and Finance

University of Professional Studies Accra (UPSA), Accra Ghana.
<https://upsa.edu.gh/>

WORK EXPERIENCE

2023-current Master Data & Invoice Specialist

Aptar Czech Republic s.r.o Ceske Budejovice Czech Republic.

-
- **Maintain the master data across various systems (ERP and CRM) ensuring consistency and accuracy.**
 - **Perform data quality checks and audits to identify and correct errors and inconsistencies.**
 - **Provide training and support to end-users on data management with best practices and tools.**
 - **Daily tracking of Invoices and Issuing to them the appropriate customers.**
 - **Working with credit management and finance control to resolve dispute issues.**
-

2019-2021 Teaching Assistance Department of Finance, Jiangsu University, Zhenjiang China.

Duties

- **Occasionally, teach portions of the class or lead entire lectures when the professor is unavailable or requires assistance (Accounting theory and Practice, Advance financial accounting research).**
 - **Prepare a report on class management.**
 - **Help design and develop educational resources like slideshows, online content, and interactive activities.**
-

2015-2018 Accounts Manager Ghana statistical Service, Accra Ghana.

Duties:

- **Payment of Field Staff.**
 - **Preparing of the Cashbook and reconciliation statement.**
 - **Keeping accurate records pertaining to inventory and accounts.**
-

2014-2015 Accounts Analyst (National Service Personnel) Ministry of Finance, Accra, Ghana.

Duties:

- **Preparation of weekly treasure issues.**
 - **Preparation of National budget**
 - **Formulate recommendations, plans, and policies which could be used to solve economic problems.**
-

2013 Data Entry Clerk National Health Insurance Scheme, Sunyani, Ghana.

Duties:

- **Payment of claims**
 - **Auditing claims forms from Pharmacy providers**
-

2012 Accounts Payable Wamfie Rural Bank, Sunyani, Ghana.

Duties:

- **Keeping track of all payments and expenditures.**
- **Paying vendors by scheduling pay checks and ensuring payment is received for outstanding credit.**
- **Paying employees by verifying expense reports and preparing pay checks**

COMPLETE AND ONGOING PROJECTS

2025 Central European Exchange Programme for University Studies (CEEPUS). University of Natural Resources and Life Sciences Vienna.

Visting Researcher (Cultural Technology and Water Management)

Internal Grant Agency projects for Ph.D. Students

- **Management of companies' strategies to support companies' sustainability via digital transformation and development of brand equity. Project ID: IGA/FaME/2025/003.**
- **Enterprise performance and innovation: the role of corporate social responsibility, digitalization, servant leadership, and uncertainty. Project ID: IGA/FaME/2025/010.**
- **Digitalization of the CRM process and its impact on brand image: A comparative study in Europe, Asia, and Africa. Project ID: IGA/FaME/2023/010.**

2024 Central European Exchange Programme for University Studies (CEEPUS). University of Natural Resources and Life Sciences Vienna.

Visting Researcher (Cultural Technology and Water Management)

TECHNICAL SKILLS

Computer: Ms 360 (word, PowerPoint, Excel), SAP S/4 Hanna

Statistical tools: STATA, E-Views, SPSS, Smart PLS.

INTEREST

Teaching and Research, Baking, Traveling, and Football.

LANGUAGE

English (Advance), Twi (Advance), Chinese (Moderate), and Czechia (Basic).

APPENDIX A.

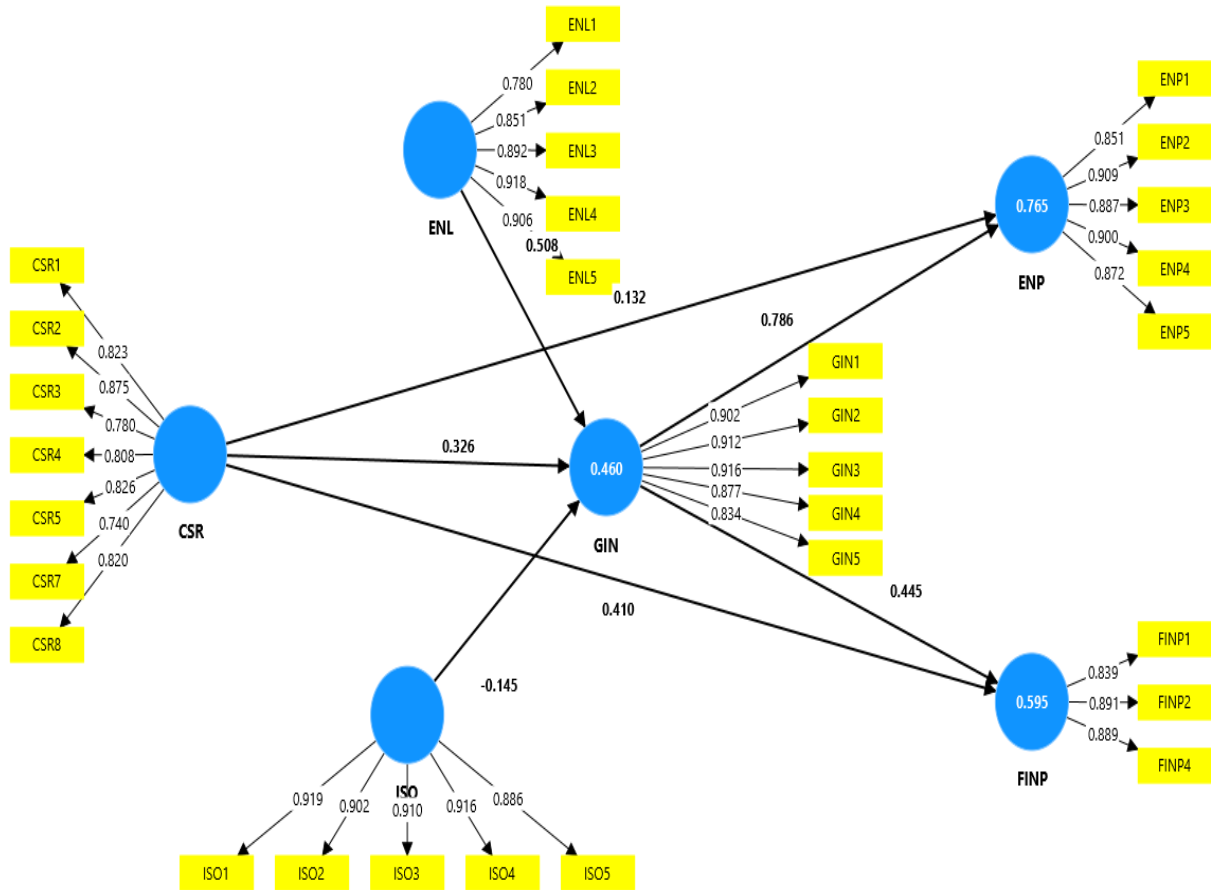


Figure 22. Measurement model

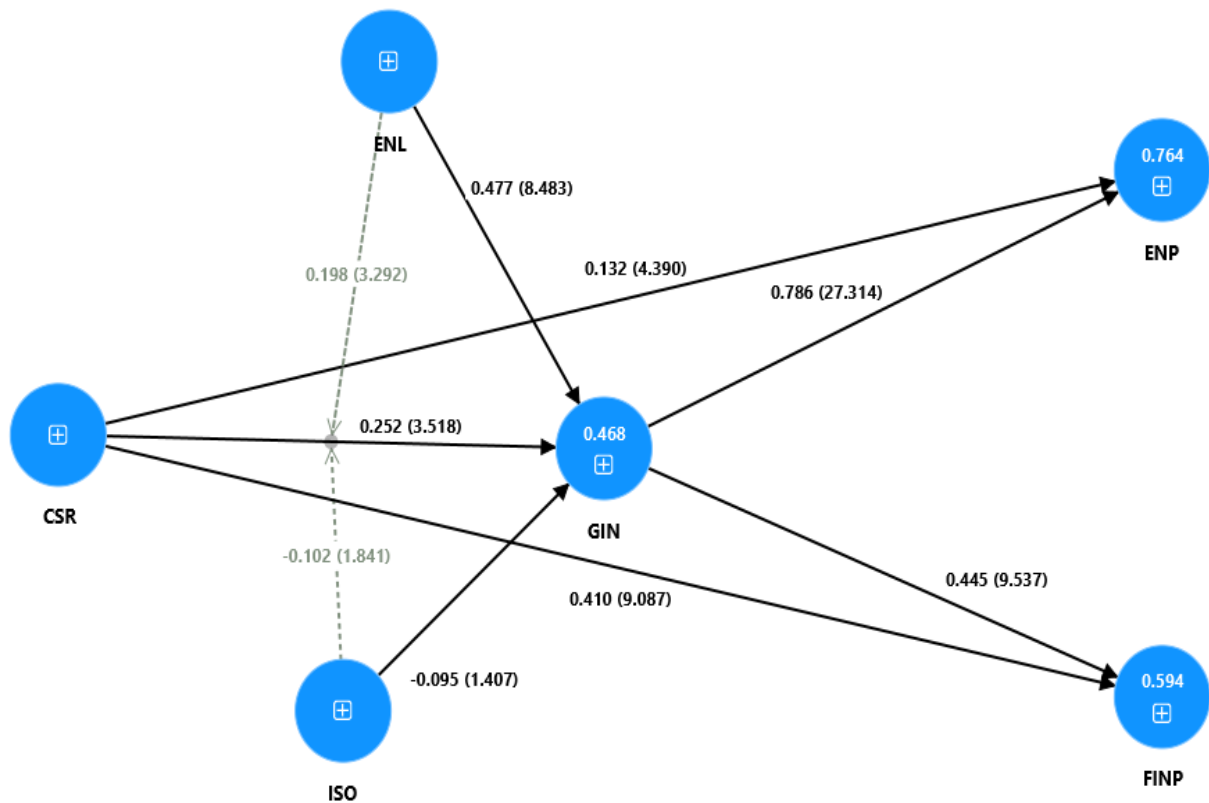


Figure 23. Direct path without moderating effect

Table 25. Structural model assessment with control variables

series	Beat	Std.dev	T statis	P values
CSR -> ENP	0.121	0.029	4.111	0.000
CSR -> FINP	0.374	0.047	7.948	0.000
CSR -> GIN	0.278	0.071	3.897	0.000
ENL -> GIN	0.464	0.056	8.299	0.000
GIN -> ENP	0.790	0.028	27.817	0.000
GIN -> FINP	0.463	0.047	9.801	0.000
ISO -> GIN	-0.106	0.069	1.530	0.126
ENL x CSR -> GIN	0.211	0.061	3.451	0.001

ISO x CSR -> GIN	-0.123	0.057	2.169	0.030
Age -> ENP	-0.038	0.042	0.889	0.374
Age -> FINP	0.011	0.056	0.205	0.838
Employment -> ENP	0.003	0.019	0.156	0.876
Employment -> FINP	0.044	0.027	1.629	0.103
Educational -> ENP	-0.001	0.019	0.052	0.958
Educational -> FINP	0.016	0.028	0.569	0.569
Gender -> ENP	0.023	0.042	0.547	0.584
Gender -> FINP	-0.004	0.055	0.072	0.943

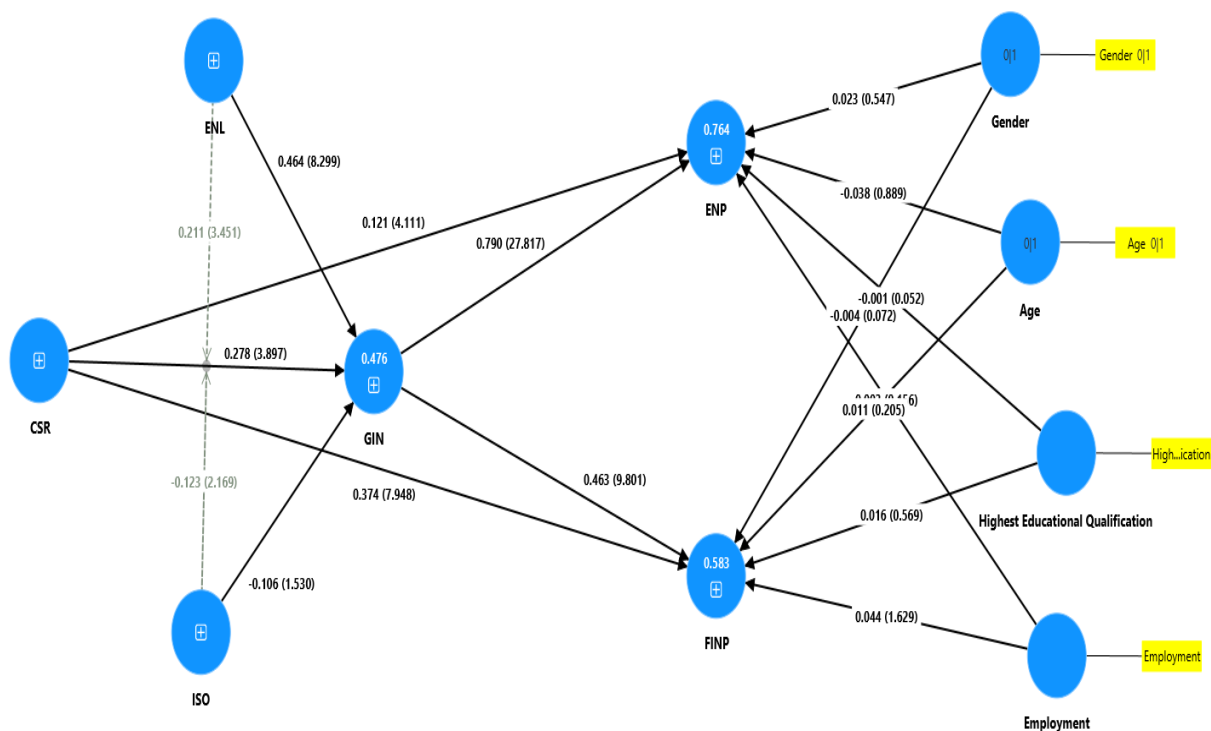


Figure 24. Structural model assessment with control variables

Table 26. Qualitative survey output

Resp onde nt			Green innovation			Environmental leadership			EMS ISO 14001			Corporate Social Responsibility		
	Depar tment	Wor king exp erie nce	1.Can you please tell me about your role and experi ence with green innov ation initiati ves?	2.Wh at motiv ates your organ isation to pursu e green innov ation?	3.Wh at positi ve outco mes has your organ isation exper ience becau se of green innov ation	1.How does your leader ship appro ach to enviro nment al respon sibilit y differ	2.Wha t motiva tes you and your organi sation to prioriti se enviro nment al respon sibility ?	3.In what ways do you feel enviro nment al leader ship influe nces your	1.Wha t motiv ated your organi sation to pursue ISO 14001 certifi cation ?	2.Ho w does ISO 14001 affect relati onshi ps with extern al stake holde rs, such as custo mers,	3.Can you descri be the steps your organi sation took to imple ment the ISO 14001 Enviro nment al Manag ement	1.Can you descri be your organi sation' s under standi ng and definit ion of Corpo rate Social Respo nsibili	2.Wh at are the prima ry motiv ations drivin g your comp any's CSR initiat ives?	3.How do you percei ve the impact of CSR efforts on your organi sation' s brand and reputat ion within the

					efforts?	from traditional leadership in manufacturing?		company's reputation and industry standing?		suppliers, and regulators?	System?	ty (CSR)?		industry?
Respondent 1	Environmental Management	4 years	I lead projects focused on developing sustainable	Innovation is driven by the need to comply	Our green products have opened new market	Environmental leadership encourages creativity and	We prioritize environmental responsibility to meet	Strong environmental leadership has positioned	We sought ISO 14001 certification to enhance our	It has improved our engagement with environmental	We integrated ISO requirements into our product	CSR is about balancing profit with social and enviro	We aim to contribute positively to our	CSR has strengthened our brand loyalty among environment

			products	with environmental regulations and market trends	opportunities	risk-taking in innovation	stakeholder expectations.	us as industry leaders	credibility	NGOs	development processes	mental responsibilities	community	ally conscious consumers
Respondent 2	Maintenance	12 years	I oversee training programs related to sustainability and green	Employee engagement in sustainability drives our green initiatives	Our green training programs have improved employee morale and	Environmental leadership is about empowering employees to take	We prioritize environmental responsibility to attract talent	Our commitment to environmental leadership has made us an employer	We pursued ISO 14001 to formalize our environmental training	It has strengthened our relationships with employees and community	We integrated ISO training into our employee onboarding processes	CSR is integral to our corporate identity	We aim to foster a culture of social responsibility	CSR has enhanced our reputation as a socially responsible employer."

			practices		productivity	initiative		type of choice	programs	stakeholders				
Respondent 3	R&D	3 years	pilotin g renew able energ y syste ms	custo mer expec tation s for sustai nable produ cts	new mark et oppor tuniti es	long- term sustai nabilit y over short- term profits	Ethical respon sibility	Enhanced brand trust	regula tory align ment	comp etitive bids requir ing certifi cation	digital tools for monit oring	Ethica l labour practi ces	mitig ating reputa tional risks	Increa sed custo mer loyalty
Respondent 4	Production	18 years	reduci ng waste in produ ction	cost savin gs from effici ency	Reduced energ y/water use	emplo yee trainin g	industr y leaders hip goals	comp etitive differ entiation	custo mer requir ement s	suppli er partne rships	emplo yee trainin g	comm unity devel opme nt	attract ing talent	media recogn ition
Respondent 5	sustain ability	6 years	leadin g eco- design	regula tory compl iance	impr oved comp liance	Leade rs empha size	invest or pressu re	strong er comm	Stand ardiza tion of	Impro ved credib ility	iterati ve audits	enviro nment al	Align ing with comp	invest or confid ence

	office rs		projec ts			transp arency		unity ties	proces ses	with regula tors		stewar dship	any value s	
Resp onde nt 6	Huma n Resou rces	1 year	I overse e trainin g progra ms relate d to sustai nabilit y and green practi ces	Empl oyee engag ement in sustai nabilit y drives our green initiat ives	Our green traini ng progr ams have impro ved empl oyee moral e and produ ctivit y	Envir onme ntal leader ship is about empo werin g emplo yees to take initiati ve	We prioriti se enviro nment al respon sibility to attract talent	Our comm itment to enviro nment al leader ship has made us an emplo yer of choic e	We pursue d ISO 14001 to formal ize our enviro nment al trainin g progra ms	It has streng thene d our relati onshi ps with emplo yees and comm unity stake holde rs	We integra ted ISO trainin g into our emplo yee onboar ding proces s	CSR is integr al to our corpor ate identit y	We aim to foster a cultur e of social respo nsibil ity	CSR has enhanc ed our reputat ion as a sociall y respon sible emplo yer."
Resp onde nt 7	Suppl y Chain	5 year s	I manag e our	We are motiv	Gree n initiat	Our leader ship	Enviro nment al	It has enhan ced	ISO 14001 certifi	It has impro ved	We establi shed a	CSR enco mpass	We are motiv	CSR has positiv

	Management		supply chain to ensure sustainability in sourcing and logistics	ated by the need to reduce our carbon footprint	ives have led to cost savings in logistics	promotes a collaborative approach to environmental issues	responsibility is crucial for our long-term viability	our reputation among suppliers and customers	cation was pursued to standardize our environmental practices	our relationships with eco-conscious suppliers	green procurement policy and trained our team	es our ethical obligations to society and the environment	ated by both ethical considerations and market demands	ely influenced our brand image
Respondent 8	Research and Development	8 years	I lead projects focused on developing sustainable	Innovation is driven by the need to comply	Our green products have opened new market	Environmental leadership encourages creativity and	We prioritize environmental responsibility to meet	Strong environmental leadership has positioned	We sought ISO 14001 certification to enhance our	It has improved our engagement with environmental	We integrated ISO requirements into our product	CSR is about balancing profit with social and enviro	We aim to contribute positively to our community	CSR has strengthened our brand loyalty among environment

			products	with environmental regulations and market trends	opportunities	risk-taking in innovation	stakeholder expectations.	us as industry leaders	credibility	NGOs	development processes	management responsibilities		ally conscious consumers
Respondent 9	Quality Assurance	3 years	I ensure that our products meet environmental standards and	We are motivated by customer demand for sustainable products	Green innovation has led to higher customer satisfaction and	Our leadership is proactive in addressing environmental issues, which is a	We believe that being environmentally responsible is essential for long-term	Our commitment to environmental leadership has enhanced our	ISO 14001 certification was pursued to demonstrate our commitment to	It has strengthened our relationships with suppliers who value sustain	We developed an environmental management plan and conducted regula	CSR involves our commitment to ethical practices and community	We are driven by a desire to make a positive impact on	Our CSR initiatives have differentiated us from competitors

			regulations		fewer product returns	shift from the reactive approach seen in traditional management	success	standing in the industry	environmental management	ability	audits	engagement	society	
Respondent 10	Production	12 years	I oversee the implementation of green initiatives in our	Our organization is motivated by regulatory compliance	We've seen a reduction in waste and energy	Our leadership emphasizes sustainability, which contrasts	We prioritize environmental responsibility because it	Environmental leadership has significantly improved	We pursued ISO 14001 certification to formalize our	ISO 14001 has improved our relationships with	We conducted a gap analysis, trained staff, and established	CSR for us means being accountable for our environment	The primary motivation is to build trust with our	Our CSR efforts have positively impacted our brand, making

			production processes	iance and the desire to enhance our brand image	y costs, which has improved our bottom line	sts with traditional leadership that often prioritises profit over environmental concerns	aligns with our corporate values and customer expectations	our reputation, making us a preferred partner for many clients	environmental management practices	customers and regulators, as they appreciate our commitment to environmental standards	shed an environmental policy as part of our ISO implementation.	al and social impacts	stakeholders	g us more competitive in the market
--	--	--	----------------------	---	---	---	--	--	------------------------------------	--	---	-----------------------	--------------	-------------------------------------

Source: Author's own compilation

APPENDIX B

1. SECTION ON QUALITATIVE QUESTIONNAIRE

This section of the questionnaire or interview covers the qualitative part of the thesis on the topic: Impact of Corporate Social Responsibility and Green Innovation on Enterprise performance. Empirical evidence from manufacturing enterprises in emerging economy. Information you will provide will be utilised pure for the purpose of this thesis work. Your participation in completing this questionnaire (or interview) is greatly valued, and your information will be handled with confidentiality. Additionally, there are no right or wrong responses to the posed questions; therefore, respond accordingly. For your suggestion or concerns, kindly contact me through the following:

WhatsApp: +420 723 961 120

Email: takyi@utb.cz

1. Kindly indicate your department

Your answer

2. How many years of working experience.

Your answer

GREEN INNOVATION

Can you please tell me about your role and experience with green innovation initiatives?

Your answer

What motivates your organisation to pursue green innovation?

Your answer

Have you encountered any resistance (internal or external) to implementing green innovations? If so, can you describe it?

Your answer

What positive outcomes has your organisation experienced because of green innovation efforts?

Your answer

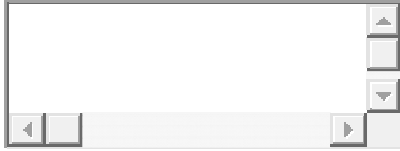
What advice would you give to other organisations looking to start or improve their green innovation initiatives?

Your answer

ENVIRONMENTAL LEADERSHIP

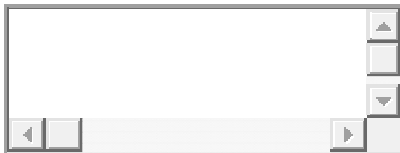
How does your leadership approach to environmental responsibility differ from traditional leadership in manufacturing?

Your answer



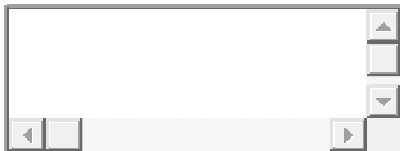
What motivates you and your organisation to prioritise environmental responsibility?

Your answer



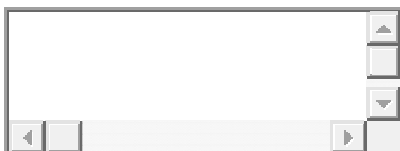
In what ways do you feel environmental leadership influences your company's reputation and industry standing?

Your answer



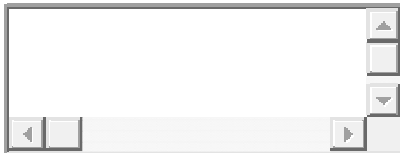
What steps are taken to ensure that employees at all levels understand and support environmental initiatives?

Your answer



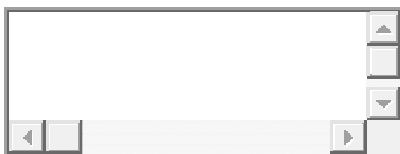
How does environmental leadership influence employee engagement and morale?

Your answer

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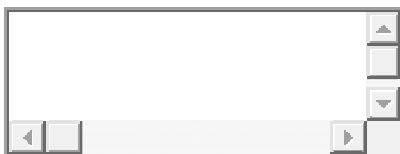
Can you describe any training or development programs aimed at fostering environmental awareness and leadership skills?

Your answer

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What are the primary challenges your organisation faces in implementing environmental leadership practices?

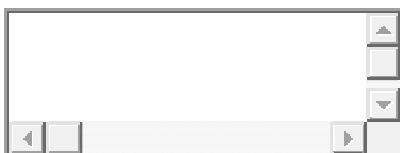
Your answer

A rectangular text input box with a light gray border. It contains no text. On the right side, there are three small square buttons stacked vertically, each with a downward-pointing arrow. On the bottom left, there are two small square buttons side-by-side, each with a leftward-pointing arrow. On the bottom right, there is a single small square button with a rightward-pointing arrow.

ENVIRONMENTAL MANAGEMENT SYSTEM ISO 14001

What motivated your organisation to pursue ISO 14001 certification?

Your answer

A rectangular text input box with a light gray border. It contains no text. On the right side, there are three small square buttons stacked vertically, each with a downward-pointing arrow. On the bottom left, there are two small square buttons side-by-side, each with a leftward-pointing arrow. On the bottom right, there is a single small square button with a rightward-pointing arrow.

What training or development programs have been introduced to ensure that employees understand ISO 14001 and its importance?

Your answer

How does ISO 14001 affect relationships with external stakeholders, such as customers, suppliers, and regulators?

Your answer

Can you describe the steps your organisation took to implement the ISO 14001 Environmental Management System?

Your answer

CORPORATE SOCIAL RESPONSIBILITY

Can you describe your organisation's understanding and definition of Corporate Social Responsibility (CSR)?

Your answer

What are the primary motivations driving your company's CSR initiatives?

Your answer

How do you perceive the impact of CSR efforts on your organisation's brand and reputation within the industry?

Your answer

How does your organisation engage with these stakeholders to understand their expectations around CSR?

Your answer

Can you describe any collaboration with external organisations (e.g., NGOs, governments) to support CSR initiatives?

Your answer

Submit

2. SECTION ON QUANTITATIVE SURVEY

Research questionnaire on manufacturing managers towards corporate social responsibility, green innovation, environmental leadership, EMS ISO 14001, and enterprise performance.

I am Kwabena Nsiah Takyi, a PhD student at the Faculty of Management and Economics, Tomas Bata University in Zlin, Czech Republic. My field of study is Economics and Management. As part of the programme's requirement, I am to submit a dissertation, and enhance, I am currently working on Green Innovation, Corporate Social Responsibility and their impact on Performance. The study specifically focuses on managers and key individuals who are directly involved in the strategic and operational decisions of their organisation. The research is conducted for purely academic purposes. All information provided will be treated confidentially, anonymously, and will only be used for the intended purpose of the study. Therefore, your sincere opinion is very much appreciated and valued.

For your suggestions or concerns, kindly contact me through the following:

WhatsApp +420 720961120 Email. takyi@utb.cz

Participance information

1. Gender

- a) Male
- b) Female

2. Age

- a) 25-30
- b) 31-35
- c) 36-40
- d) 41-45
- e) 46-50
- f) 50 and above

3. Educational - Kindly select according to your association

- a) Bachelor / HND/Diploma
- b) Master's
- c) PhD and above

4. Position - Kindly select according to your association

- a) Line / Plant Manager
- b) Business Owner
- c) Quality Assurance manager
- d) Executive Manager

5. Sector (Sub-Sector) - Kindly select according to your association

- a) Food and Beverage
- b) Textile and Garment
- c) Metal Fabrication and Machinery
- d) Woodworking and Furniture

6. Regional and Zonal of your enterprise - Kindly select according to your association.

Zone 1 (Northern, Upper Est and West)

Zone 2 (Ahafo, Bone, Bone East, Savannah)

Zone 3 (Ashanti)

Zone 4 (Central, Western North)

Zone 5 (Oti, Volta)

Zone 6 (Greater Accra)

How much do you agree or disagree with the following assertions on a 5-point Likert-scale? (Strongly Agree=1, Strongly Disagree=5).

Proxy	Measurement	1	2	3	4	5
-------	-------------	---	---	---	---	---

	Corporate social responsibility (CSR) Achi et al., 2022; Padilla-Lozano & Collazzo, 2022; Sarfraz et al., 2023					
CSR1	Customer happiness is a key performance factor for the enterprise's product and service marketing efficiency.					
CSR2	It is the enterprise's goal to understand its customers' demands.					
CSR3	Profit maximization is the company's primary objective.					
CSR4	Workplace safety is a priority for this organisation.					
CSR5	Opportunities for advancement and training are available to workers at this organisation.					
CSR6	To help the most disadvantaged members of society, the corporation donates to charitable causes and funds social programs.					
CSR7	There is more to the company's social responsibility than just making money.					
CSR8	As far as the environment is concerned, the corporation acts responsibly.					
	Green innovation (GIN) (Xie et al., 2019; Bedi et al., 2025; Takyi et al., 2024; Marfo, 2024)					
GIN1	When developing or designing a product, our organisation prioritises using materials that have a low environmental impact.					
GIN2	When developing or designing a product, our organisation prioritises using materials that are					

	environmentally friendly, recyclable, reusable, and biodegradability.					
GIN3	Our enterprise reduced emissions of hazardous chemicals or wastes are a result of our company's production method.					
GIN4	Our company's production technique efficiently recovers treatable and reusable materials from trash and pollution.					
GIN5	Our company's production method efficiently decreases the usage of water, power, coal, gas, and oil.					
	<i>Environmental Leadership (ENL)</i> (Begum et al., 2022; Aftab et al., 2022; Nsiah et al., 2023)					
ENL1	Executives have said that the low-carbon idea is the organisation's long-term goal.					
ENL2	Education on low-carbon practices is the responsibility of executives.					
ENL3	Leadership offers financial incentives to promote carbon-light operations.					
ENL4	Company culture is infused with environmental initiatives, strategies, and objectives.					
ENL5	At the highest level of government, there is a designated fund for protecting the environment.					
	ISO 14001 (Lawton et al., 2025; Labella et al., 2024; Bravi et al., 2020)					
ISO 1	ISO 14001 helps the firm in monitoring of environmental performance.					

ISO 2	ISO 14001 encourages businesses to track the environmental consequences of their goods and services over their entire life cycle and take action to mitigate them.					
ISO 3	Integration of the EMS ISO 14001 with enterprise activities.					
ISO 4	Environmental, social, financial, regulatory, and technical factors are all parts of the enterprise's operational context.					
ISO 5	A more accurate assessment of potential dangers and opportunities					
	Enterprise performance (Financial) (Dua & Kumar, 2023; Duque-Grisales et al., 2020; Jing et al., 2023 ; Vij et al., 2016)					
FINP1	Does your organisation implement green innovation practices to enhance its overall organisational performance.					
FINP2	Has your organisation observed an improvement in financial performance because of integrating green innovation and CSR into its business strategy.					
FINP3	Do you believe that CSR initiatives favourably influence your organisation's green innovation efforts.					
FINP4	Does the adoption of green innovation practices contribute to employee satisfaction and organisational growth in your enterprise.					
	Enterprise performance (Environmental) (Nsiah et al., 2023; Niazi et al., 2023; Rehman et al., 2022)					

ENP1	The enterprise has ecological certification to mitigate environmental externalities.					
ENP2	On average, our company's environmental performance during the last five years has improved.					
ENP3	Over the last three years, our company has reduced its consumption of water, power, and gas.					
ENP4	There has been an improvement in our organisation's environmental compliance.					
ENPT5	When it comes to things like garbage disposal and carbon dioxide emissions, our business follows all the requirements.					

Submit

Table 27. Indicator descriptive evaluation (N = 576)

Name	No.	Mean	Median	Scale min	Scale max	min	max	STD	Excess kurtosis	Skewness
CSR1	21	2.455	2	1	5	1	5	1.26	-1.017	0.399
CSR2	22	2.205	2	1	5	1	5	1.21	-0.618	0.709
CSR3	23	2.002	1	1	5	1	5	1.23	-0.419	0.942
CSR4	24	2.472	2	1	5	1	5	1.12	-0.868	0.349
CSR5	25	2.326	2	1	5	1	5	1.21	-0.86	0.552
CSR6	26	2.479	2	1	5	1	5	1.12	-0.775	0.299
CSR7	27	2.592	2	1	5	1	5	1.2	-0.867	0.309
CSR8	28	2.554	2	1	5	1	5	1.16	-0.775	0.386
ENL1	29	1.948	1	1	5	1	5	1.23	0.099	1.134
ENL2	30	2.451	2	1	5	1	5	1.21	-1.102	0.335
ENL3	31	2.486	2	1	5	1	5	1.25	-1.02	0.391
ENL4	32	2.403	2	1	5	1	5	1.28	-0.805	0.607
ENL5	33	2.328	2	1	5	1	5	1.21	-0.712	0.6

ENP1	6	2.618	3	1	5	1	5	1.32	-1.104	0.257
ENP2	7	2.37	2	1	5	1	5	1.25	-0.797	0.539
ENP3	8	2.227	2	1	5	1	5	1.22	-0.708	0.63
ENP4	9	2.502	2	1	5	1	5	1.37	-1.019	0.487
ENP5	10	2.323	2	1	5	1	5	1.3	-0.763	0.654
FINP1	17	2.592	2	1	5	1	5	1.16	-0.814	0.33
FINP2	18	2.575	2	1	5	1	5	1.22	-1.173	0.185
FINP3	19	2.625	2	1	5	1	5	1.29	-1.096	0.283
FINP4	20	2.58	2	1	5	1	5	1.34	-1.05	0.454
GIN1	11	2.352	2	1	5	1	5	1.24	-0.717	0.596
GIN2	12	2.333	2	1	5	1	5	1.22	-0.886	0.522
GIN3	13	2.335	2	1	5	1	5	1.2	-0.942	0.442
GIN4	14	2.097	2	1	5	1	5	1.17	-0.17	0.86
GIN5	15	2.092	2	1	5	1	5	1.27	-0.391	0.913
GIN6	16	2.736	3	1	5	1	5	1.19	-0.88	0.09
ISO1	34	2.457	2	1	5	1	5	1.24	-0.897	0.452
ISO2	35	2.561	2	1	5	1	5	1.2	-0.905	0.334
ISO3	36	2.372	2	1	5	1	5	1.18	-0.661	0.559
ISO4	37	2.382	2	1	5	1	5	1.21	-0.774	0.527
ISO5	38	2.415	2	1	5	1	5	1.16	-0.596	0.503
Gender	1	1.484	1	1	2	1	2	0.5	-2.003	0.063
Age	2	1.514	2	1	2	1	2	0.5	-2.004	-0.056
Edu	3	1.91	2	1	4	1	4	0.82	-0.092	0.657
job	5	2.358	2	1	4	1	4	0.8	-0.507	0.047

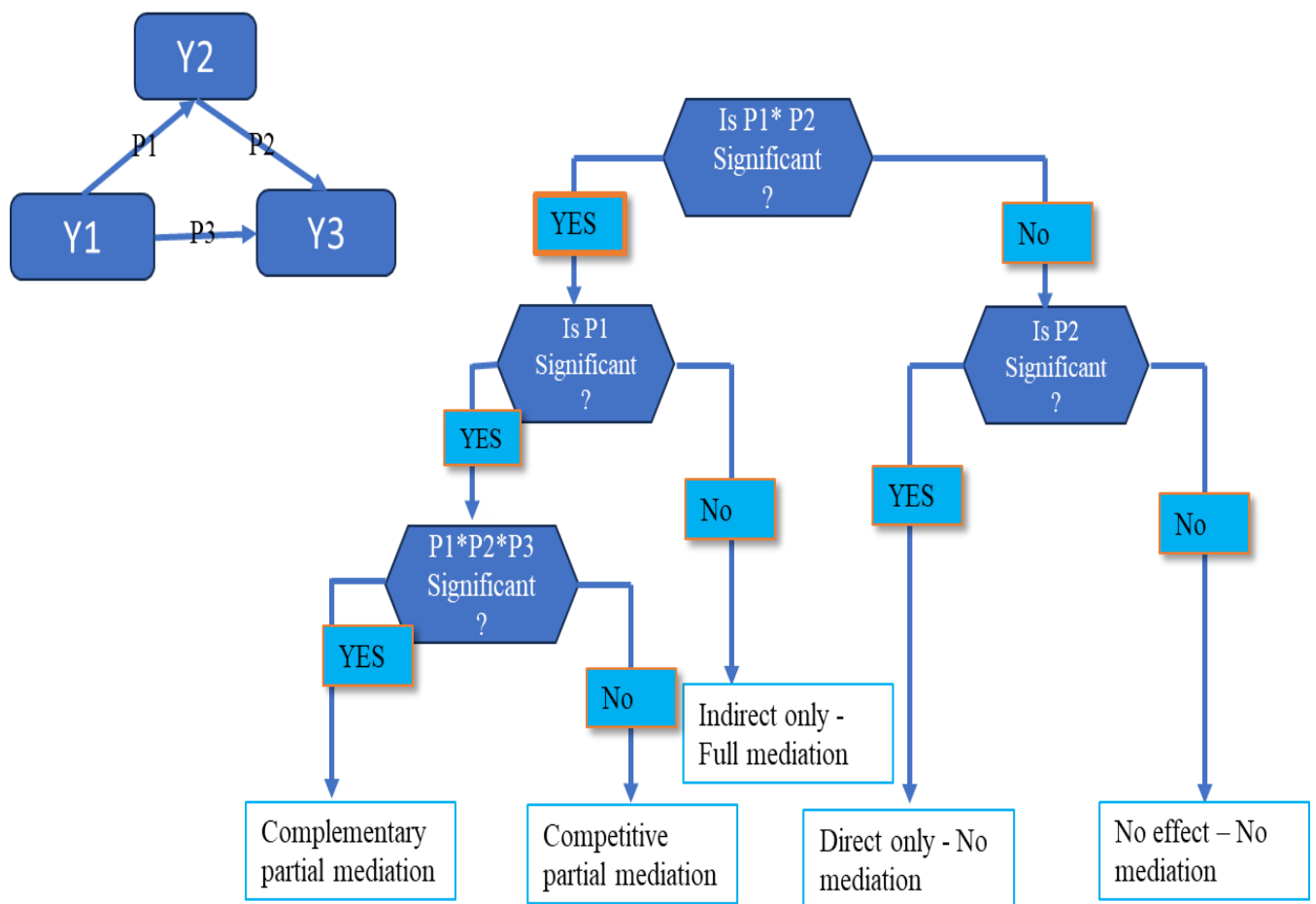


Figure 25. Mediation Analysis (Zhao et al., 2010)

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To whom it maybe concern

Ethical Concern to obtain research data

Dear Sir/Madam,

On behalf of abovementioned faculty, I confirm to you that the bearer of this letter: **Mr. Kwabena Nsiah Takyi**, born on November 28th, 1989, Bono region of Ghana, is currently our student in doctoral study programme of Economics and Management.

He is gathering field data on his doctoral thesis on the topic: **Impact of Corporate Social Responsibility and Green Innovation on Enterprise performance. Empirical evidence from manufacturing enterprises in emerging economy.**

The faculty, therefore, would like to acknowledge his interest in the chosen topic whiles we kindly ask you as a participant to corporate and offer him the necessary information needed for a successful doctoral thesis execution.

Mr. Kwabena Nsiah Takyi doctoral thesis is supervised by prof. Ing. Beata Gavurova, PhD., MBA (gavurova@utb.cz)

Your support and cooperation are highly appreciated.

Thank you.

Sincerely,



prof. Ing. Boris Popesko, Ph.D.

Vice-Dean for Research and Development

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Tomas Baťa University in Zlín

E-mail: popesko@utb.cz | web: www.utb.cz/fame.



Figure 26. Ethical form obtains for Survey data curation

Kwabena Nsiah Takyi

The impact of corporate social responsibility and green innovation on enterprise performance. Empirical evidence from manufacturing enterprises in emerging economy

Dopad společenské odpovědnosti podniků a zelených inovací na výkonnost podniků. Empirické důkazy z výrobních podniků v rozvíjejících se ekonomikách.

Doctoral Thesis

Published by: Tomas Bata University in Zlín,
nám. T. G. Masaryka 5555, 760 01 Zlín.

Edition: 6 pcs

Typesetting by: Kwabena Nsiah Takyi
The publication has not undergone any proofreading or editorial review.

Publication year: 2026