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The Impact of Entrepreneurship, Sustainable Intellectual Capital and Environmental Supply Chain Management Practices on Jordanian Firm Performance

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Abstract

In the context of Jordan, the intricate relationships among business performance, environmental supply chain management, and sustainable intellectual capital are investigated. the data of 250 entrepreneurs from multiple fields, such as tourism, agriculture, manufacturing, and technology. The results clarified important factors impacting sustainable business practices and how they affect performance. The calculated coefficients provide actual proof of the complex relationships among these factors and emphasize the importance of a complete strategy for sustainability in the present competitive landscape. The findings show that a performance improvement is projected to follow an increase in sustainable intellectual capital. The study also clarifies how crucial a role environmental supply chain management practices play as a mediator. It emphasizes its function in mediating the link between influence on the relationship between sustainable intellectual capital and performance. This mediating function emphasizes how critical it is to adopt efficient environmental supply chain procedures to convert creative and entrepreneurial efforts into observable performance results. This study's conclusions have applications in both academics and practice. In the academic world, they offer actual proof of the connections between these crucial variables and deepen the body of knowledge already in place. The research's practical implications include advice for company leaders and entrepreneurs on how to use best their efforts in environmental supply chain management, and sustainable intellectual capital.

Keywords: *Entrepreneurship, Sustainable Intellectual Capital, environmental Supply Chain Management Practices, Firm Performance*

Introduction

For building capacities in environmentally conscious organizations, one needs to have a full understanding of the sustainable knowledge that involves human interpretational and structural aspects. Scholars describe this body of knowledge on environmental consciousness as sustainable intellectual capital. As per Omar et al. (2019) it includes sustainable relational capital, structural capital, and human resources that favour sustainability. It also involves the company's collective knowledge of environmental conservation. The intangible environmental assets, therefore benefit businesses in several ways.

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To fully realize these advantages, one must appreciate the interrelation between positions on intellectual capital and natural resources. According to Awad Bakry , 2021 . According to the approach of intellectual capital-based thinking, competitive advantage is achieved if an organization has intangibles that make it distinctive and hard to imitate.

Environmental supply chain management strategies used throughout the production process include measures directed at improving our environment (Cousins et al., 2019). Duties of these management approaches involve manufacturing environmentally friendly products and processes, acquiring environmental certifications from manufacturers, and developing innovative sustainable packaging. According to Kumar et al. 2023, the implementation of environmental supply chain management practices involves a combination of organizational capabilities and sustainable knowledge. A firm could benefit from the productive use of environmental supply chain management as it can save costs and increase its image (Kuwornu, et al., 2023). These strategies are characterized by lower costs, increased competitiveness, and improved market differentiation. Research has shown that a company's success and its sustainable entrepreneurial attitude are correlated. Examples of such studies include Habib et al.2020 and Afum et al.

Literature Review and Hypotheses Development

Sustainable Intellectual Capital and Firm Performance

Nowadays, companies aim not just to maximize profits, but also to improve society and the environment. In line with this paradigm, businesses ought to optimize their earnings while mitigating any adverse effects that their operations could have on the community (Duque-Grisales, & Aguilera-Caracuel, 2021). "Sustainable human capital" refers to the intangible environmental benefits that an organization's workforce's collective knowledge produces. This form of environmental intangible is crucial for long-term competitive advantage generation as workers' knowledge of it is firmly established, making rivals find it difficult to copy (Haldorai, et al., 2022). Businesses can improve their environmental performance by leveraging employees' pre-existing knowledge of environmental issues (Paillé et al., 2020, Fraihat et al., 2023a).

Alavi, & Aghakhani (2023) note that a higher level of sustainable human capital is associated with a larger pool of knowledge within the organization for offsetting negative impacts. To be sure, sustainable human capital does boost environmental efficiency. Saving money and increasing productivity are both outcomes of better resource management in the manufacturing process. An uptick in the economy can have a snowball effect, bolstering the firm's ability to last and, in turn, boosting worker satisfaction by protecting existing employment and opening the door to new ones (Weston et al., 2020). Furthermore, cooperative relationships between companies and their suppliers and customers can greatly increase an organization's ability to address environmental issues (Yu, et al., 2020, Fraihat et al.,2023b). Stakeholder engagement may improve a business's performance by fostering the development of knowledge and resource sharing. Collaboration on sustainable resources might yield ecological insights that could improve environmental performance. In addition to fostering regional growth, it provides social and economic advantages as a result of enhanced workplace perks and business competitiveness. Even if employees are well-versed in environmental issues and companies have strong stakeholder interactions, it is crucial to translate this knowledge into organizational capacities and routines to improve environmental management (Ozdemir, et al., 2023).

In essence, companies must hone their sustainable strategic competencies to fully leverage the environmental knowledge that employees have gained via their engagement with diverse stakeholders. Several distinct intangible assets that are a component of corporate sustainable management might help

a firm consolidate its environmental expertise. According to Tirabeni et al. (2019), they include a corporate brand that is in line with sustainability, a business culture that is focused on sustainability, databases to improve organizational processes, and an organizational architecture that is arranged horizontally. By making a business stand out in a competitive market, these intangibles improve a company's social and environmental status in addition to its financial performance. This is achieved by reducing the amount of raw materials needed in manufacturing. In addition, workers are more likely to take pride in their jobs and be more productive as a whole when they know that their business is environmentally conscious. To address this research gap and build on a comprehensive literature review, the following Hypothesis was proposed:

H1*: sustainable intellectual capital positively and significantly impacts Firm performance.*

Sustainable Entrepreneurship Environmental Supply Chain Management Practices and Firm Performance, environmental Supply Chain Management Practices as a Mediator

The connection between company performance and environmental supply chain management practices has been extensively studied and experimentally validated in the field of production and operations management (Zraqat, 2019; Habib, et al., 2020). By lowering waste management expenses, lowering environmental hazards, and conserving energy, environmental supply chain management strategies enhance economic performance. According to Sroufe & Gopalakrishna-Remani (2019), a company's ability to develop its sales, return on assets, pre-tax earnings, and cash flows are all significantly impacted by maintaining internal environmental practices. A thorough meta-analysis by Yadav et al. (2023) confirmed that effective environmental supply chain management techniques and customer collaboration led to improvements in economic performance. limiting water and energy use, minimizing the use of hazardous materials, and decreasing waste generation, effluents, air emissions, and environmental mishaps, environmental supply chain management practices also improve the well-being of employees and communities (Martnez-Bravo, & Martnez-del-Ro, 2019). It has been demonstrated that using eco-design principles improves product functionality, reduces energy usage, lowers waste treatment costs, and therefore lessens environmental consequences throughout a product's lifecycle (Dahmani et al., 2022). environmental supply chain management techniques can help reduce overall environmental footprints by encouraging the development of eco-friendly products through sustainable marketing, sustainable research and development, and environmentally conscious production. Due to a growing awareness of issues like safety, job stability, equity, education, and ethical behavior in corporate operations, social sustainability has recently attracted a lot of attention within the manufacturing industry (Saeidi et al., 2022). The well-being, safety, and societal effects of persons are essentially covered under the scope of social sustainability (Fuchs et al., 2020).

Organizations gain regulatory compliance and competitive advantages by integrating social sustainability practices (Santos & Silva Bastos, 2021). According to a study on Malaysian manufacturing companies conducted by Rehman et al. in 2021, environmental supply chain management practices have a significant impact on social performance. According to Jermsittiparsert, et al. (2019), environmental supply chain management practices are anticipated to be crucial for preventing pollution and reaching performance targets. According to Cheng and Shiu (2022), these practices necessitating coordinated organisational initiatives and resource allocation, a factor that can be effectively operationalized through a sustainable entrepreneurial mindset. According to the perspective known as the "Natural Resource-Based View," businesses should strategically implement sustainable strategies to get a competitive advantage (Mishra, P., & Yadav, 2021). These tactics are examples of dynamic entrepreneurial initiatives that are intimately tied to long-term performance gains. Sustainable business practices, which include modern entrepreneurial activities, are a great asset for businesses, giving them particular advantages and boosting their competitiveness. The development of better company performance is not necessarily a

result of sustainable entrepreneurship, even though it embodies several entrepreneurial qualities and occupies a decision-making position in the formulation of strategies (Hristov & Appolloni, 2022, Fraihat et al., 2023c). Its impact needs to be translated into actual results through actions that can be seen, including environmental supply chain management techniques. A gap in the literature between sustainable entrepreneurship and performance is also highlighted (Qalati et al., 2022).

According to the resource-based view, it has been discovered that organisational resources and competencies frequently moderate the link between performance and entrepreneurial orientation. For instance, Susanto et al. (2023) discovered that marketing aptitude acts as a bridge between entrepreneurial orientation and performance in innovation. The positive mediating function of organisational learning capability between entrepreneurial attitude and innovation performance was examined by Gomes et al. in their study from 2022. In a different investigation, Habib et al. (2020) discovered a favourable mediation association between environmental supply chain management practises and organisational performance in the context of market orientation. However, empirical research into the intricate interactions between a sustainable entrepreneurial attitude, environmental supply chain management techniques, and business performance is lacking. Since the environmental insights that come from employees, the organisation itself, and its relationships with stakeholders all work to promote improved environmental management throughout the value chain, increasing sustainable intellectual capital can act as a catalyst for promoting environmental supply chain management (Luthra, et al., 2022). As a result, the presence of sustainable intangible assets in a business makes it easier to incorporate environmental considerations into every stage of production, improving sustainability performance. By using environmentally friendly procedures and incorporating technology to lessen the negative effects of conventional supply chain management approaches, improved environmental supply chain management practises bring value to businesses (Tumpa, et al., 2019).

There are several advantages to assessing environmental effects at various production phases, including lower costs and more brand recognition. Numerous studies illustrate the synergistic relationship between sustainable intellectual capital and environmental supply chain management solutions. Employees who continuously own their knowledge can eventually make breakthroughs that provide them a sustainable competitive advantage, even if it may be difficult to remember information. Maaz et al. (2022) state that employee sustainability knowledge is necessary for the implementation of environmental supply chain management practices because it helps address environmental issues, improves production process efficiency, and encourages the development of sustainable innovations that support the supply chain. A greater propensity to participate in the organization's environmental management training is positively correlated with more sustainable intellectual capital. Thus, environmental supply chain management solutions become more effective. Sustainable intellectual capital serves as a cornerstone for environmental projects by providing support structures such as databases, best practice standards, and decentralized organizational structures (Laallam et al., 2020; Alotaibi et al., 2021).

These intangibles belonging to this category are a promoter of green best practices and corporate culture among the senior management that is environmentally conscious. Therefore, sustainable intellectual capital increases the usage of technical know-how and ecologically oriented information that strengthens environmental supply chain management practices and enhances performance. Sustainable entrepreneurship has been variously defined and discussed using a number of ideas but all are based on the assumption that there is an important link between sustainable entrepreneurship, social responsibility and performance. Biodiversity Entrepreneurship, Eco-entrepreneurship also called entrepreneurship; Arafat&Buchdadi2019Jayasinghe et al. 2021.

Recent studies show that intellectual capital improves sustainability performance and the connection to eco-

friendly supply chain management methods is positive. This presents a new opportunity to understand the workings of these important elements more fully. This unifies many of these concepts under the emphasis on striking a balance between environmental responsibility and requirement to make some profit.

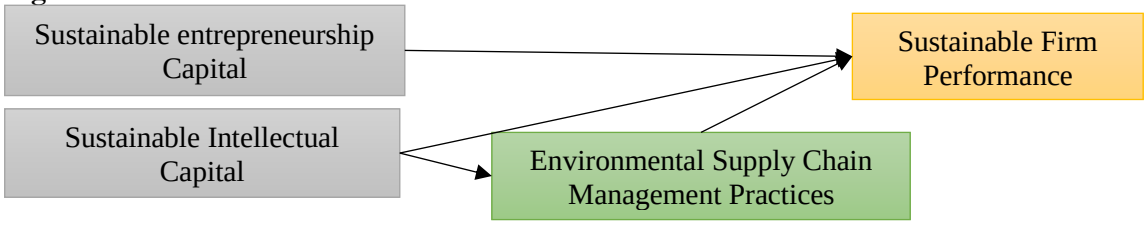
AntolinLopez, et al. (2019) define sustainable entrepreneurship as "innovative practices within organizations that not only involve developing new products or processes to make money but also show a sense of responsibility towards conserving the environment." Our conceptual framework in this study aligns with these definitions Sustainable innovation, which is a subset of sustainable entrepreneurship appears to be an effective solution in this context for maintaining the environment while making the highest possible profits (LüdekeFreund2020). Sustainable entrepreneurship includes methods of business practice that support longevity sustainably and in an environment-friendly manner. The shift in focus is occurring, but the overarching goal of promoting entrepreneurship that makes use of innovations to solve environmental problems and bring financial rewards along with it stays intact. This confluence highlights the importance of businesses in developing sustainable and future performance. Thus, expanding on the above, posit the following:

H2: *Sustainable Entrepreneurship positively and significantly impacts Firm performance.*
H3: *There is a positive and significant effect of sustainable intellectual capital on environmental supply chain management practices.*
H4: *environmental supply chain management practices mediate the effect between sustainable intellectual capital on performance.*

Model

The mediating role of environmental supply chain management practises on the impact of sustainable intellectual capital and sustainable entrepreneurship on sustainable business performance in Jordan is depicted diagrammatically in Fig. 1 of the research model.

Fig 1: Model.



Research Methodology

the study respondents are entrepreneurs in Jordan using a cross-sectional survey design. Purposeful sampling, a form of non-probability sampling, was used to choose the study's sample population. The sample includes 250 sustainable entrepreneurs in a variety of Jordanian sectors, such as manufacturing, tourism, agriculture, and construction. The investigation's data is gathered using a questionnaire, which includes sustainable intellectual capital, environmental supply chain management practices, and firm performance. To measure the relevant variables, the study used validated scales. the Sustainable Intellectual Capital (SIC) items were taken from Martínez-Falcó et al., (2023), the environmental Supply Chain Management Practices (SCMP) items were taken from Habib et al., (2020), and Martínez-Falcó, et al., (2023), and the Firm Performance items were taken from Habib, et al., (2020), and Martínez- Bravo, et al., (2019).

Measurement Model

Three types of validity were Examined: internal, convergent, and discriminant. Internal consistency is assessed using Cronbach's alpha (CA), while convergent validity is assessed using the composite reliability (CR) coefficient and average variance extracted (AVE). The discriminant validity of a hypothesis is assessed using the Fornell-Larcker criteria. The dependability of each item was evaluated using Cronbach's alpha coefficients; following Hair et al. (2022), all variables had alpha values of more than 0.70 (Table 1). Additionally, the composite reliability was assessed, and the findings revealed that all variables had reliability coefficients greater than 0.80. (Table 1). Using Dijkstra-rho Hensele values above 0.70 and all AVE values over 0.50 allowed for the assurance of convergent validity (Table 1). All variance inflation factors (VIFs) were below 3.3, indicating that multicollinearity was not significantly problematic. (Table 3). To make sure that the study's components can be easily distinguished from one another, discriminant validity was verified using a variety of techniques. The loading values were all more than 0.6, which means that each component is distinct and has its definition (Table 2). EC1 was excluded from the analysis because of its low factor loading (Hair et al., 2022). The discriminant validity of the construct was established using the Heterotrait-Monotrait ratio (HTMT) method, and the discriminant validity of each component was evaluated using the Fornell and Lacker criterion (Table 4), which compares the square root of AVE from each component to the correlation between constructs. The totals are all less than 0.9. (Table 5) The discriminant validity of the study's components was demonstrated by the significant correlations between the variables that were found by both approaches. Participants were given the assurance that their responses would be kept private and that there was no wrong answer to lessen the risk of common method variance (CMV). This study used the Harman's one-factor test (Table 5) to identify the existence of CMV, which involves choosing one component from all components and determining if it accounts for less than 50% of the variation. The data, which are shown in Table 6, show that CMV explained 44.669% of the variation—just shy of 50%. In addition, Kock (1987) suggested that for a model to be regarded as free of common method bias, the VIFs from a collinearity test should be less than or equal to 5. All structural model components with VIFs under 3 indicated that there was no CMV in this investigation.Table 1 Validity and Reliability.

Table 1: Validity and Reliability.

Variables	CA	CR (rho_a)	CR (rho_c)	AVE
SE	0.866	0.873	0.897	0.594
SIC	0.894	0.910	0.921	0.700
SMP	0.867	0.888	0.882	0.584
P	0.884	0.886	0.916	0.686

Table 2: Factor Loading.

Items	SE	SIC	SMP	P
SE1	0.788			
SE2	0.782			
SE3	0.798			
SE4	0.798			
SE6	0.720			
SE7	0.734			
SIC1		0.731		
SIC2		0.861		
SIC3		0.858		
SIC4		0.883		
SIC5		0.842		
SMP1			0.654	
SMP2			0.632	
SMP3			0.603	
SMP4			0.739	
SMP5			0.686	
SMP6			0.751	
SMP7			0.781	
SMP8			0.697	
P1				0.778

P2	0.884
P3	0.870
P4	0.826
P5	0.776

Table 3: Variance Inflation Factor (VIF).

Variables	SMP	P
SE	1.098	2.855
SIC	2.297	1.626
SMP	-	2.602

Table 4: The Fornell and Lacker Discriminant Validity.

Variables	SE	SIC	SMP	P
SE	**0.771**			
SIC	0.635	**0.837**		
SMP	0.560	0.542	**0.695**	
P	0.611	0.474	0.558	**0.828**

Table 5: Heterotrait-Monotrait ratio Discriminant Validity.

Variables	SE	SIC	SMP	P
SE	-			
SIC	0.651			
SMP	0.759	0.715		
P	0.873	0.82	0.802	-

Table 6: Common Method Bias.

C	I.E			E.S.S. L		
	T	% of V	Cum %	T	% of V	Cum %
1	11.167	44.669	44.669	11.167	44.669	44.669

The Structural Model Analysis

The findings of this study, is described in general in Table 7 and Fig. 2. The path coefficients, STDEV values, and P values found for each construct in this investigation demonstrate this. The estimated correlation coefficient between sustained performance and sustained intellectual capital (SIC) is 0.128. This positive correlation shows that an expected rise in sustained performance is linked to a sustained increase in intellectual capital. At a typical significance level of 0.05, the T-statistic of 3.759 is significantly higher than 1.96, yielding a very low P-value of 0.000. As a result, the null hypothesis is disproved and the association between SIC and performance is taken to be verified. The predicted coefficient for the link between sustainable entrepreneurship (SE) and performance is 0.294. A higher degree of sustainable entrepreneurship is thought to be linked to an anticipated rise in performance, according to this positive correlation. The associated P-value is 0.000, and the associated T-statistic is 10.48. The null hypothesis is disproved and the association between SE and performance is proven because the P-value is less than 0.05. The calculated correlation coefficient between environmental supply chain management (SMP) practises and sustainable intellectual capital (SIC) is 0.356. A rise in environmental supply chain management practices is anticipated to be correlated with higher levels of sustainable intellectual capital, according to a positive correlation. A P-value of 0.000 is obtained because the T-statistic of 8.854 is considerably higher than 1.96. As a result, the null hypothesis is disproved, proving that SIC and SMP do indeed have a

relationship. The estimated correlation coefficient between environmental supply chain management practices and sustainable entrepreneurship is 0.463. This positive correlation shows that there is a direct relationship between environmental supply chain management practices and levels of sustainable entrepreneurship. The corresponding T-statistic is 11.855, and the accompanying P-value is 0.000. The absence of a supported association between SE and SMP is suggested by the low P-value, which also supports the rejection of the null hypothesis. performance and environmental supply chain management (SMP) are predicted to have a 0.54 correlation coefficient. A higher degree of environmental supply chain management practices is linked to a forecasted rise in performance, according to this positive coefficient. With a P-value of 0.000, the T-statistic of 21.429 is substantially higher than 1.96. The link between SMP and performance is thus proven, and the null hypothesis is rejected.

Fig 2: Graphical Result.

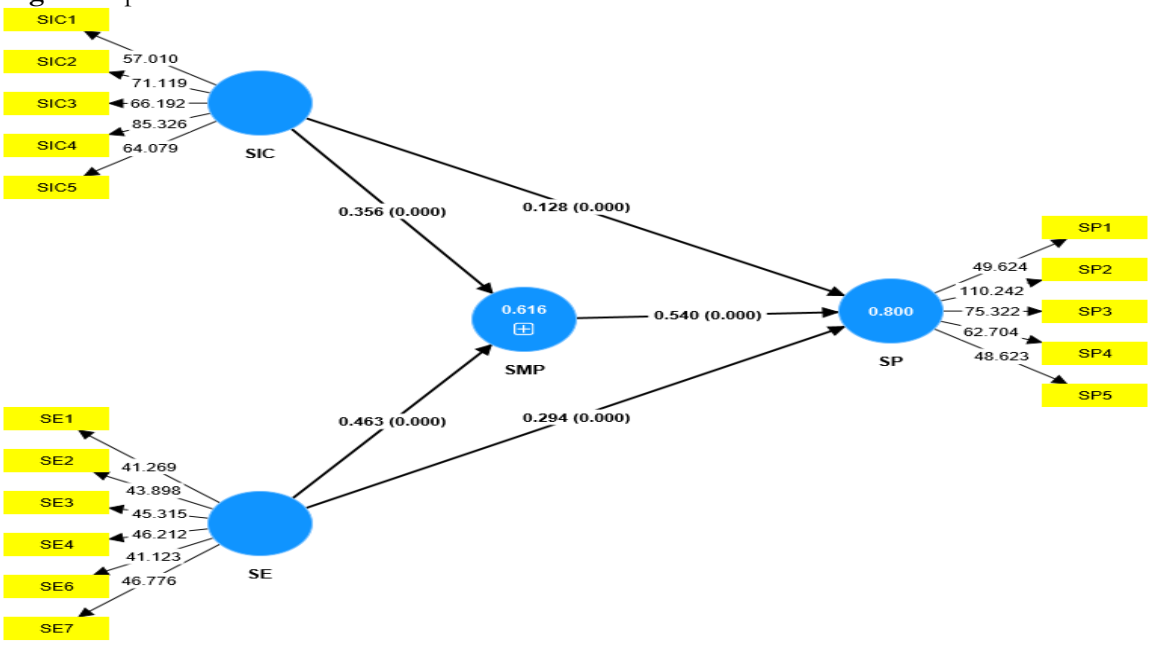


Table 7: Path Analysis Result.

Path analysis	Estimates	STDEV	T statistics	P values	Decision
SIC -> P	0.128	0.034	3.759	0.000	Supported
SE -> P	0.294	0.028	10.48	0.000	Supported
SIC -> SMP	0.356	0.04	8.854	0.000	Supported
SE -> SMP	0.463	0.039	11.855	0.000	Supported
SMP -> P	0.54	0.025	21.429	0.000	Supported

Mediation Analysis

The current study examines the mediating link in accordance with the recommendations made by Preacher and Hayes (2004, 2008). Through the knock-on effect, the bootstrapping method identified the mediating connection. According to Preacher and Hayes (2008), the indirect impact's 95% boot confidence interval (CI: LL-UL) does not contain a "0" between the variables. Results of evaluating the mediating hypothesis are shown in Table 8.

Table 8: Indirect Method.

Path analysis	Estimates	STDEV	T statistics	P values
SIC->SMP-> P	0.192	0.022	8.617	0.000

Table 8 displays the bootstrap results for the indirect effect, which is significant at p<0.01 (SIC->SMP-> P). The researcher used the indirect effect of 0.192, 95% Boot CI: (LL= 0.152, UL= 0.237) to further confirm the existence of mediation. According to the research conducted in Jordan, SMP serves as a mediator between SIC and performance in this situation.

Discussion

The result of the path analysis shows a significant relationship between sustained intellectual capital (SIC) and performance. The estimated coefficient of 0.128 indicates a positive relationship, which means that an increase in sustained intellectual capital leads to a corresponding increase in performance. This result underscores the critical role of intellectual capital in driving sustainable business performance. The T-statistic, which measures the magnitude of the estimated coefficient relative to its standard error, is calculated as 3.759. This result is compared to the critical value of 1.96, which is commonly used at a significance level of 0.05, to determine its statistical significance. The statistical significance of the association between SIC and performance is demonstrated by the fact that the T-statistic in this instance greatly surpasses the value of 1.96. This indicates that it is improbable that the observed association between these variables is the result of pure chance. Further proof of the statistical significance may be seen in the 0.000 very low P-value. The P-value is the likelihood that the observed result would materialize if the null hypothesis were correct. The P-value of less than 0.05 (or 5%) is generally considered statistically significant and indicates strong evidence against the null hypothesis. In this case, the P value is significantly less than 0.05, supporting the conclusion that the relationship between SIC and performance is not the result of random variation. Consequently, the null hypothesis stating that there is no relationship between SIC and performance is rejected. The rejection of The consequences of the null hypothesis is substantial. It suggests that there is a measurable relationship between prolonged performance and the existence of sustained intellectual capital. Put another way, businesses that develop their intellectual capital and invest in it while also being socially and ecologically conscious are more likely to see improvements in overall performance. Sustainable intellectual capital is the term used to describe the knowledge, skills, and intangible resources that assist an organization in effectively implementing sustainable practices. These might include innovative approaches to resource management, producing eco-friendly products, or implementing eco-friendly behaviors. The positive coefficient indicates that these approaches are both consistent with sustainability goals and result in measurable improvements in performance results. This result is consistent with the increasing recognition of the value of intellectual capital in a rapidly evolving business environment. As firms come under more pressure to operate sustainably, the ability to leverage intellectual resources to support green projects becomes a competitive advantage. The positive coefficient indicates that the advantages of long-term intellectual capital surpass those that could be anticipated from chance variations. It also shows that sustaining intellectual capital leads to greater performance.

The path analysis's findings demonstrate the strong and favorable correlation between performance and sustainable entrepreneurship (SE). There is a clear association between a greater level of sustainable entrepreneurship and an expected increase in performance (correlation coefficient = 0.294). This research emphasizes how important it is for entrepreneurial endeavors to put sustainability first to improve business success. A crucial statistical metric called the T-statistic is estimated to be 10.48. At a significance level of 0.05, the critical threshold of 1.96 is typically utilized, and this result is much over it. The statistical importance of the link between SE and performance is highlighted by the high T-statistic, which shows that random variation is unlikely to be the cause of the observed association. The P value of 0.000 further confirms the statistical significance. The chance that the result would be observed if the null hypothesis were true is

indicated by this P-value. The null hypothesis is strongly refuted by a P-value below the usual threshold of 0.05, which is generally regarded as statistically significant. Because the P value in this situation is much lower than 0.05, the null hypothesis should be rejected.

Therefore, the claim that sustainable entrepreneurship and performance are substantially and strongly associated is supported by these statistical facts. The null hypothesis, that there is no correlation between SE and performance, is shown. This discovery has significant theoretical and practical implications. Sustainable entrepreneurship is the proactive pursuit of sustainable business methods that prioritize profit-making over social and environmental well-being. This might entail the inventive development of environmentally friendly products, moral supply chain strategies, or the use of renewable energy sources. The positive coefficient demonstrates how some corporate strategies both help achieve sustainability goals and produce quantifiable gains in overall performance. T-statistic and P-value support the hypothesis that sustainable entrepreneurship has a significant impact on performance. This confirms the growing body of knowledge that companies that include sustainability in their core competencies have a competitive advantage. Enterprises that incorporate state-of-the-art sustainability-focused tactics into their operations are more likely to see improvements in social and environmental outcomes as well as financial success.

The results of the path analysis show a substantial and positive correlation between Environmental Supply Chain Management Practices (SMP) and Sustainable Intellectual Capital (SIC). As sustainable intellectual capital increases, a development in environmental supply chain management practices is expected, according to the computed coefficient, which is 0.356. The significance of intellectual capital in developing environmental supply chain operations processes is emphasized by this study. The statistical significance of this link is highlighted by the T-statistic of 8.854. This value considerably above the conventional limit of 1.96, indicating that the found link between SIC and SMP is statistically significant and unlikely to have resulted from random fluctuations. Furthermore, the importance of the link is supported by the incredibly low P-value of 0.000.

The likelihood of seeing the observed result in the case that the null hypothesis is true is known as the P-value. There is compelling evidence that the null hypothesis is incorrect when the P-value is less than the conventional cutoff threshold of 0.05. It is further supported that there is a relationship between environmentally friendly supply chain management techniques and sustainable intellectual capital because the P-value in this instance is notably smaller than 0.05. The statistical and empirical relevance of the link between SIC and SMP is highlighted by the combined use of both two measures. There is a substantial correlation between the two variables, as evidenced by the rejection of the null hypothesis. This finding has important implications for both theoretical understanding and practical application.

Sustainable intellectual capital includes all of the information, abilities, and intangible resources that a business employs to support its environmentally friendly operations. This includes innovative ways to reduce the impact on the environment, produce eco-friendly goods, expedite the production process, and promote conscientious resource utilization. The positive correlation indicates that companies with greater levels of Sustainable Intellectual Capital are more likely to implement advanced environmental supply chain management practices. Some examples of how this alignment may manifest itself include better supplier selection, the use of circular economy principles inside the supply chain, and the integration of sustainable sourcing strategies. In addition to reducing risks, boosting operational effectiveness, and establishing a reputation for moral business conduct, this enhances sustainability performance. The remarkably low P-value and the strong T-statistic show that sustainable intellectual capital has a significant impact on environmental supply chain management practices. The assertion that businesses which invest in growing their intellectual capital for sustainability have a higher chance of seeing appreciable gains in their supply chain sustainability activities is supported by this meticulous statistical research.

The path analysis's findings show a strong and favorable correlation between environmental supply chain management (SMP) techniques and sustainable entrepreneurship (SE). The estimated coefficient of 0.463 indicates that as the level of sustainable entrepreneurship increases, there is a corresponding expectation of improved environmental supply chain management practices. This finding highlights the critical role of entrepreneurial approaches in shaping sustainable practices within the supply chain. The significance of this relationship is further supported by the T-statistic of 11.855. The fact that this value exceeds the generally acknowledged crucial threshold of 1.96 shows how statistically robust the link between SE and SMP is and how unlikely random variation's causation is. Furthermore, the low P value of 0.000 supports the relevance of the association. The P value is the probability that the outcome would occur if the null hypothesis were true. Strong evidence against the null hypothesis is provided by a P-value that is lower than the accepted cutoff of 0.05. The P-value in this situation is much lower than 0.05, validating the assertion that environmental supply chain management practices and entrepreneurial sustainability are related. The importance of the connection between SE and SMP is highlighted by the concordance of statistical markers. The rejection of the null hypothesis confirms that increased sustainable entrepreneurship is indeed associated with improved environmental supply chain management practices. This result is significant for both academic research and practical application. Sustainable entrepreneurship involves the deliberate integration of sustainability principles into business activities. This includes innovating and developing products, processes, and strategies that minimize environmental impacts while promoting economic viability. In the context of supply chain management, sustainable entrepreneurship promotes practices that emphasize responsible sourcing, efficient resource use, waste reduction, and ethical supplier relationships.

According to the positive coefficient, businesses that prioritize sustainable entrepreneurship are more likely to implement cutting-edge environmental supply chain management techniques. This approach might show up as tighter supplier cooperation, the incorporation of eco-friendly production techniques, and the use of circular economy ideas. Not only is performance enhanced, but there are also cost savings, increased operational efficiency, and enhanced capacity to meet changing customer demands for sustainable products. The association between SE and SMP is empirically significant, as evidenced by the strong T-statistic and extremely low P-value. These statistical ratios validate the relationship's applicability in real-world scenarios and provide weight to the claim that businesses that engage in sustainable entrepreneurship have a higher probability of achieving observable improvements in their supply chain sustainability practices.

The path analysis's findings demonstrate a strong and noteworthy correlation between performance and environmental supply chain management (SMP) techniques. The predicted correlation of 0.54 highlights the expectation that performance will rise in tandem with the adoption of more environmental supply chain management strategies. This research emphasizes how crucial efficient supply chain management is to raising overall company performance. The strong T-statistic of 21.429 highlights the statistical robustness of this association. This figure indicates that the observed link between SMP and performance is statistically significant and unlikely to be the result of random variation, as it is well above the widely accepted critical threshold of 1.96. Additionally, the relationship's practical relevance is supported by the extraordinarily low P value of 0.000. The likelihood that the outcome would occur if the null hypothesis were true is indicated by the P value. A P-value below the standard cutoff of 0.05 represents strong evidence against the null hypothesis. The conclusion that there is a strong correlation between environmental supply chain management techniques and performance is shown by the P-value in this instance, which is notably less than 0.05. When taken as a whole, these statistical markers highlight how empirically substantial the link is between SMP and performance. It is clear from the rejection of the null hypothesis that more environmental supply chain management techniques do correlate with better performance. This finding has implications for both practical use and scientific understanding. Using

socially and ecologically conscious tactics throughout all supply chain operations is a key component of environmental supply chain management methods. Sustainable procurement, effective resource management, waste minimization, moral supplier relationships, and encouraging responsibility and openness are a few examples of this. Businesses that implement advanced environmental supply chain management techniques are likely to see performance improvements, as indicated by the positive coefficient.

This alignment may lead to increased brand impression, less environmental impact, improved operational performance, and cost savings. Businesses that effectively manage their supply chain for sustainability will be in a strong position to take advantage of increasing client demands for ethical goods and services as well as rising market trends. The concept that environmental supply chain management approaches have a large effect on performance is empirically substantiated by the high T-statistic and exceptionally low P-value. The statistical rigor of this investigation supports the hypothesis that companies that promote sustainable practices throughout their supply chain are likely to noticeably improve their overall company performance.

Studies reveal that environmental supply chain management (SMP) solutions have a substantial mediating role between performance and sustainable intellectual capital (SIC). This mediation shows that environmental supply chain management strategies moderate the relationship between performance and sustainable intellectual capital. The corpus of knowledge, expertise, and intangible resources that businesses employ to create and execute sustainable practices is referred to as sustainable intellectual capital. This can involve creative methods, environmentally responsible designs, and morally righteous actions. Ensuring that supply chain operations incorporate ecologically and socially responsible methods ensures that decisions are made at every stage of the value chain.

This is made possible by the use of environmental supply chain management strategies. The mediating role of SMP suggests that companies with higher levels of sustainable intellectual capital are more likely to use cutting edge environmental supply chain management techniques. Therefore, these activities enhance the overall performance. Organizations adopting effective and ethical approaches towards supply chain management may be a driver of at least some part of the positive correlation between performance and sustainable intellectual capital. Sustainable intellectual capital must be identified and implemented through the environmental supply chain management strategies in order to derive significant performance advantages. Its results show that sustainability principles have to be strategically introduced in many areas of supply chain management and business operations, thus boosting the overall performance while further promoting sustainable development aims.

The study found that one significant approach to bridge the gap between performance and SE is by implementing environmental SMP strategies. This means that the connection between sustainable entrepreneurship and performance is influenced simplified by an availability good environmental supply chain management systems. Sustainable entrepreneurship has to be creative and aggressive if sustainability concepts are going to be a part of business operations. It encompasses green product creation, sustainable sourcing and ethical business operations. On the contrary, environmental supply chain management incorporates ethical business practices at every level of a stream including distribution strategies supplier relationships and production plans.

The mediating role of SMP indicates that companies with higher levels of sustainable entrepreneurship are more likely to use environmental supply chain management strategies. As a result, these techniques improve overall effectiveness. Fundamentally, the positive impact of sustainable entrepreneurship on performance is the path to effective supply chain management strategies. To achieve quantifiable performance improvements, the previously mentioned finding highlights the need to develop a sustainable entrepreneurial culture and apply environmental supply chain management strategies. The

study highlights the strategic importance of integrating sustainability principles throughout the various supply chain phases to enhance overall performance and promote broader sustainability goals.

Conclusion

The outcomes demonstrate how the study components work together to support the main objective of long-term corporate success. The findings validate the favourable correlations seen between these factors and bolster the idea that an all-encompassing strategy for business sustainability yields better performance results. The statistical significance and coefficients support the empirical findings and highlight the crucial role that each variable plays in sustainable development. Our knowledge of the intricate procedures behind sustainable business activities and their effects is expanded by this research. These findings have significant implications for use in managerial decision-making. Business establishments should see the greatness of developing sustainable intellectual capital because it is an underlying factor for both sustainable innovation and strategic decision-making. Sustainable entrepreneurship is necessary to build an innovative and moral culture that enhances supply chain operations and general performance. Additionally, the correlation between performance with environmental supply chain management strategies demonstrated highlights how integrating sustainability into operations for a supply chain can be expressed in terms of calculable benefits. These research results demonstrate that it is very important for practitioners to include sustainability in core business processes. Creating intellectual capital and focusing on sustainable entrepreneurship should therefore be the top priority. Employers should find ways of supporting programs that train and equip those under their pay with the skills required to lead Long-term initiatives.

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