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Surrogate Entrepreneurship and Artificial Intelligence Driven Accounting: Shaping a Sustainable Future through Digital Start-ups

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Abstract

This study examines the impact of innovative technology, artificial intelligence (AI) driven accounting, and surrogate entrepreneurship on fostering a sustainable future, with a focus on digital start-ups. Surrogate entrepreneurship refers to managing ventures on behalf of other entities rather than for personal ownership. Digital start-ups can harness advanced technologies like blockchain and AI to improve transparency, accuracy, and efficiency in accounting practices. Data were gathered through a structured questionnaire using a five-point Likert scale from 354 respondents, including entrepreneurs, accountants, business managers, and auditors in Southern Rajasthan. Partial least squares structural equation modeling (PLS-SEM) was utilized to analyze complex relationships between latent and observable variables. The results indicate that innovative technology, AI-driven accounting, and surrogate entrepreneurship significantly influence sustainable futures, accounting for 64.4% of the variance in digital start-ups' contributions to sustainability. These findings provide valuable managerial insights into sustainable finance strategies and underscore the critical moderating roles of digital start-ups and surrogate entrepreneurship in driving sustainable development.

Keywords: artificial intelligence; entrepreneurship; sustainability; accounting

1. Introduction

The rapid evolution of digital technologies is reshaping traditional business models and corporate practices, ushering in innovative paradigms such as surrogate entrepreneurship and AI-driven accounting. Surrogate entrepreneurship involves managing ventures on behalf of others, offering flexibility and unique opportunities for innovation and strategic oversight (Lundqvist & Williams-Middleton, 2024). Similarly, AI-driven accounting leverages automation and artificial intelligence to optimize financial processes, enhance decision-making, and promote accuracy and transparency. Together, these approaches empower businesses, particularly digital start-ups, to overcome inefficiencies in conventional accounting systems and embrace sustainable practices (Nikiforou et al., 2022). Digital start-ups play a pivotal role in this ecosystem by integrating advanced technologies such as blockchain and AI to foster transparency, ethical auditing, and green investments (Nikiforou, 2023). These innovations prioritize long-term economic health and environmental accountability, aligning business operations with sustainability goals. By combining surrogate entrepreneurship with AI-driven accounting, digital start-ups are uniquely positioned to drive operational efficiency, financial transparency, and environmental responsibility, paving the way for a sustainable future. This raises critical questions about the factors influencing sustainable development, the role of surrogate entrepreneurship in achieving sustainability, and the extent to which AI-driven innovation empowers start-ups to align with global sustainability objectives (Mutashar & Flayyih, 2024).

In today's competitive and rapidly evolving business environment, sustainability has emerged as a global strategic priority (Karali et al., 2024). Organizations are increasingly turning to AI-driven technologies to optimize resource utilization, minimize waste, and enhance operational transparency. However, integrating such innovations into traditional practices presents significant challenges for resource-constrained entities like small- and medium-sized enterprises (SMEs) and digital start-ups. Surrogate entrepreneurship addresses these challenges by bridging gaps in expertise, resources, and strategic oversight, enabling innovation and sustainability (Song et al., 2022). A digital start-up aiming to implement AI-driven accounting for resource optimization may lack the necessary technical expertise or financial resources. A surrogate entrepreneur can step in to provide leadership, technological know-how, and financial support, ensuring successful integration and alignment with sustainability principles. This collaborative model not only helps start-ups achieve their objectives but also embeds sustainability into their core operations.

The intersection of AI-driven innovation and sustainability is significantly bolstered by surrogate entrepreneurship, which enables resource-constrained start-ups to adopt advanced technologies (Lundqvist, 2014). This synergy underscores the transformative potential of combining surrogate entrepreneurship with AI-driven accounting to advance sustainable development. As Silvestre and Ţîrcă (2019) highlight, innovation serves as a critical driver for sustainability, allowing organizations to align their operations with environmental and societal goals. This integrated framework reveals that AI-driven innovation provides the technological backbone for sustainable practices, while surrogate entrepreneurship ensures that even resource-constrained start-ups can actively contribute to a sustainable future. The purpose of this study is to examine the synergistic impact of surrogate entrepreneurship and AI-driven accounting on sustainable development, particularly in the context of digital start-ups. The research aims to explore how these innovative paradigms address the resource constraints faced by start-ups, foster operational efficiency, and align business operations with sustainability goals. By investigating these dynamics, the study seeks to provide actionable insights for policymakers, entrepreneurs, and stakeholders to leverage these approaches for achieving a sustainable and technologically advanced future.

2. Literature Review and Hypotheses Development

The current study holds significance for expanding the understanding of the concept and scope of further exploration. The research gap stems from the fact that earlier studies have predominantly focused on traditional accounting and entrepreneurial determinants, with limited exploration of innovative approaches such as AI-driven accounting or entrepreneurial strategies aimed at fostering a sustainable future. While there is substantial literature on sustainability, entrepreneurship, and accounting, the intersection of surrogate entrepreneurship and digital start-ups remains largely unexplored. Specifically, no comprehensive study has examined the dynamic relationship between surrogate entrepreneurship—where entrepreneurs manage ventures on behalf of others—and digital start-ups in advancing sustainable business practices. This gap presents an opportunity to explore how digital start-ups and surrogate entrepreneurship can drive advancements in accounting and contribute to the long-term sustainability of organizations. Addressing this overlooked area could provide valuable insights into innovative business practices and transformative business models.

2.1. Innovative Technology and Sustainable Future

This section examines existing literature on innovations that facilitate the transition of individuals, organizations, supply chains, and communities toward achieving sustainable futures (Silvestre & Ţîrcă, 2019). It explores the moderating role of leadership style and the impact of corporate flexibility and control culture on sustainable performance through enhanced innovation capabilities (Wang & Huang, 2022). Furthermore, it investigates the relationship between enterprise sustainable development, green technology innovation, and media attention (Jie & Jiahui, 2023). Based on the insights derived from this review, the following research hypotheses are proposed:

H01: Innovative technology has a positive impact on sustainable future
H08: Digital Start-ups mediate the relationship between innovative technology and sustainable future

H11: Digital start-ups moderate the relationship between innovative technology and sustainable future

2.2. AI-Driven Accounting and Sustainable Future

Green accounting and green incentives play a pivotal role in shaping both the present and future of sustainable development (Dhar, 2022). Understanding the impact of accounting on sustainable development is equally critical (Tilt, 2016). Prior research has highlighted the importance of AI-driven accounting as a key enabler of sustainability. Scholars emphasize that green accounting is an indispensable tool for assessing the interplay between environmental and economic factors (Dorogoi, 2023), while advocating for broader awareness of sustainability reporting and accounting principles (Salcedo & Salcedo, CPA, 2021). A review of existing studies consistently confirms the positive influence of AI-driven accounting on fostering a sustainable future across various research perspectives. Building on these insights, the following research hypotheses are proposed:

H02: AI-Driven accounting has a positive impact on sustainable future
H09: Digital start-ups mediate the relationship between AI-Driven accounting and sustainable future
H12: Digital start-ups moderate the relationship between AI-Driven accounting and sustainable future

2.3. Surrogate Entrepreneurship and Sustainable Future

Entrepreneurship is widely recognized as a key driver of economic growth (Dhewanto et al., 2022). Research highlights that the relationship between social responsibility and family business performance is positively influenced by an entrepreneurial attitude (Hernández-Perlines & Ibarra Cisneros, 2017). This suggests that family firms emphasizing entrepreneurship are better positioned to leverage their social responsibility initiatives to enhance overall performance. Furthermore, a review of prior studies consistently confirms the positive impact of surrogate entrepreneurship on promoting a sustainable future across diverse research perspectives. Based on these findings, the following research hypotheses are proposed:

H03: Surrogate entrepreneurship has a positive impact on sustainable future
H10: Digital start-ups mediate the relationship between surrogate entrepreneurship and sustainable future
H13: Digital start-ups moderate the relationship between surrogate entrepreneurship and sustainable Future

2.4. Digital Start-ups and Sustainable Future

Digital start-ups are experiencing rapid growth worldwide (Ardi et al., 2022). Beyond driving the development of innovative products and services, these digital ventures significantly contribute to strengthening existing economies (Lammers et al., 2022). Start-ups are often founded by visionary leaders with creativity, originality, and exceptional expertise (Tajpour et al., 2023), making them a critical necessity in today's dynamic market landscape. Previous research highlights the importance of fostering a new generation of digital entrepreneurs by equipping them with adequate knowledge, skills, financial support, and an entrepreneurial culture (Passaro et al., 2020). Based on this literature review, the following research hypotheses have been developed:

H04: Digital start-ups have a positive impact on sustainable future
H05: Innovative technology has a positive impact on digital start-ups
H06: AI-driven accounting has a positive impact on digital start-ups
H07: Surrogate entrepreneurship has a positive impact on digital start-ups

Figure 1 presents the conceptual framework of the study. Limited research has explored the concept of surrogate entrepreneurship, highlighting a significant gap in the literature. This study aims to investigate the relationships among digital start-ups, AI, surrogate entrepreneurship, and their collective impact on a sustainable future.

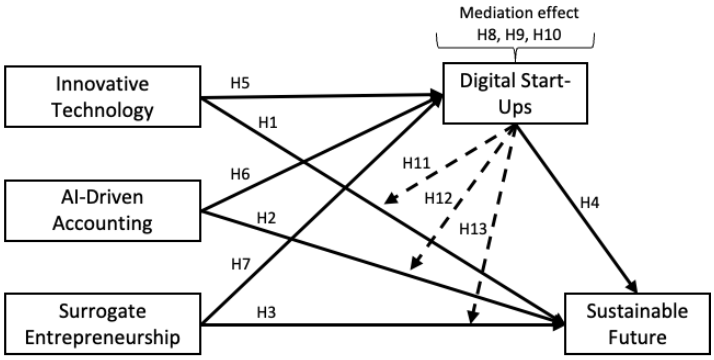

Figure 1. Conceptual Framework.

3. Methodology

This study employs a quantitative research design to assess the relationships among key variables: "Sustainable Future (SF)," "Innovative Technology (IT)," "AI-Driven Accounting (ADA)," "Digital Start-ups (DSU)," and the moderating variable, "Surrogate Entrepreneurship (SEN)." A structural equation modeling (SEM) approach was used to explore these relationships within the proposed conceptual framework. Primary data were collected from employees in the coal sector using survey questionnaires, specifically targeting accountants, business managers, auditors, and entrepreneurs from Southern Rajasthan. Out of 500 distributed questionnaires, 354 were completed, resulting in a response rate of 70.4%, which is deemed sufficient for analysis. The data collection instrument utilized a five-point Likert scale ranging from "strongly agree" (1) to "strongly disagree" (5) to measure respondents' perceptions. The study employed second-generation partial least squares structural equation modeling (PLS-SEM) using SmartPLS 4.0 software for data analysis. PLS-SEM is particularly suitable for examining complex relationships between latent and observable variables. The analysis aimed to validate the conceptual model and test the proposed hypotheses effectively. The exploratory nature of the research focuses on identifying accountability, experience, and independence as factors influencing audit quality (Suyono, 2012). Table 1 presents the study's dependent and independent variables, which include the five primary constructs and their interactions. The robust analytical approach provides valuable insights into how these variables interact to support sustainable development and innovation.

Table 1. Variables along with item relevance.

Variables	Items
AI-driven Accounting	ADA1: Application of Machine learning based accounting take place of traditional accounting
	ADA2: Real-time financial reporting contributes to the success of a business and its future growth
	ADA3: Fraud detection capabilities improve transparency and increase success rates
	ADA4: Artificial Intelligence aids in developing better strategies and decision-making processes
Digital Start-ups	DSU1: Entrepreneurial agility steers digital startups in the right direction
	DSU2: Robust business models are essential for the success of digital startups
	DSU3: Proper funding and scalability are critical for successful startups
Innovative Technology	IT1: Technological advancement is crucial for shaping the future
	IT2: Descriptive innovation with advanced technology enhances better decision-making capabilities
Surrogate	SEN1: Indirect leadership is the hallmark of effective surrogate entrepreneurship
Entrepreneurship	SEN2: Delegation of entrepreneurial activities represents an aspect of surrogate entrepreneurship
	SEN3: Innovation through external parties exemplifies the strength of surrogate entrepreneurship
	SEN4: Surrogate entrepreneurship reflects a strategic partnership for growth and innovation
Sustainable Future	SF1: Environmental impact plays a crucial role in shaping a sustainable future
	SF2: Long-term business liability influences a sustainable future positively
	SF3: Corporate social responsibility contributes significantly to shaping a sustainable future
	SF4: Green energy adoption is essential for creating a sustainable future
	SF5: Innovation and technology advancements drive the development of a sustainable future.

4. Results

The relationship between innovation and sustainable performance has been explored through studies investigating the interplay of innovation, entrepreneurship, and sustainability (Suyono, 2012). Research focusing on innovative capacities and sustainable start-up performance (Paramba et al., 2023) provides

valuable theoretical insights to guide SMEs toward innovation practices that support sustainable development (Zhang et al., 2022). Partial least squares structural equation modeling (PLS-SEM) has emerged as a widely used technique for analyzing complex relationships between latent and observable variables (Sarstedt et al., 2020). This study utilized a structured questionnaire with a five-point Likert scale to collect data from SMEs' management. The sample size adhered to the guideline of being five to ten times larger than the total number of questionnaire items (Ishtiaq, 2019). PLS-SEM, being a variance-based technique, is favored for its ability to explore causal relationships between variables rather than focusing on covariance. SmartPLS software was employed for path analysis, enabling an in-depth examination of the research hypotheses (Paino et al., 2014). Data analysis was conducted using SmartPLS 4, ensuring a robust assessment of the structural model (Guo & Zhang, 2021). The observed variables' external loading coefficients were monitored to ensure quality, with coefficients exceeding the lower bound threshold of 0.5 being considered acceptable. This study formulated hypotheses to assess the relationships between sustainable development and the integration of AI in start-ups. The findings contribute to understanding how innovative approaches can foster sustainable performance, providing actionable insights for SMEs aiming to implement sustainable business practices.

The reliability of the SMART-PLS scale was assessed using three key indicators: Composite Reliability (CR), and Cronbach's Alpha. As noted by Thọ (2011), a scale is deemed reliable if its Cronbach's Alpha coefficient falls within the range of 0.6 to 0.9. The evaluation results, presented in Tables 2 and 3, reveal impressive Cronbach's Alpha values between 0.788 and 0.866 across all scales. Similarly, the CR values range from 0.792 to 0.831, while RhoA values span from 0.872 to 0.909, indicating excellent reliability across the scales. Convergent validity was verified through the Average Variance Extracted (AVE), with Grewal et al. (2020) suggesting that an AVE value of 0.5 or higher ensures significant convergent validity. As shown in Table 3, the AVE values range from 0.577 to 0.825, confirming that the scales meet the criteria for convergent validity.

Table 2. Outer loading and testing methods.

Items	ADA	DSU	IT	SEN	SF
ADA1	0.804				
ADA2	0.834				
ADA3	0.82				
ADA4	0.798				
DSU1		0.85			
DSU2		0.871			
DSU3		0.868			
IT1			0.917		
IT2			0.9		
SEN1				0.864	
SEN2				0.852	
SEN3				0.838	
SEN4				0.823	
SF1					0.707
SF2					0.788
SF3					0.834
SF4					0.723
SF5					0.74

Table 3. Construct reliability and validity.

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
ADA	0.83	0.831	0.887	0.662
DSU	0.828	0.829	0.897	0.745
IT	0.788	0.792	0.904	0.825
SEN	0.866	0.867	0.909	0.713
SF	0.816	0.825	0.872	0.577

Multicollinearity was evaluated using the Variance Inflation Factor (VIF) statistic, following the guidelines of Hair et al. (2016), who indicate that VIF values below 5 signify no serious multicollinearity issues. The VIF values for all indicators were below the recommended threshold. Discriminant validity was assessed using both the HTMT index and the AVE square root index. Table 4 presents the HTMT coefficient, ranging from

0.342 to 0.92, confirming that the study model ensures discriminant validity. The coefficient of determination (R^2) was employed to evaluate the explanatory power of the model, as shown in Table 5.

The findings indicate that, without a moderating effect, the R^2 value for audit quality is 0.644, suggesting that "Sustainable Future (SF)," "Innovative Technology (IT)," and "AI-Driven Accounting (ADA)" collectively explain 64.4% of the variance in Digital Start-ups (DSU). Furthermore, the explained variation for audit quality increased from 40.5% to 64.9% with the inclusion of "Surrogate Entrepreneurship (SEN)" as a moderating variable. The variation further increased to 68.4% with the mediating influence and slightly decreased to 68.2% under the moderation effect. These results underscore the robustness and explanatory capacity of the study model.

The next step in structural modeling involves evaluating the proposed relationships to support the hypotheses. Path coefficients will be used to illustrate the connections between the key concepts in the conceptual framework. Respondents provided their responses using a five-point Likert scale to the questions related to the proposed constructs. Figure 2 presents the path diagram without the inclusion of moderating and mediating effects (Model 1).

Table 4. Discriminant validity.

	ADA	DSU	IT	SEN	SF	DSU x IT	DSU x ADA	DSU x SEN
ADA								
DSU	0.858							
IT	0.82	0.683						
SEN	0.751	0.907	0.736					
SF	0.893	0.773	0.899	0.746				
DSU x IT	0.509	0.362	0.483	0.373	0.435			
DSU x ADA	0.568	0.408	0.478	0.401	0.43	0.867		
DSU x SEN	0.42	0.496	0.37	0.537	0.342	0.7	0.732	

Table 5. Goodness of fit.

Variables	Without moderating and mediating (Model 1)	With Mediating effect (Model 2)	With Moderating effect (Model 3)
DSU	0.644	0.684	0.682
SF	Nil	0.405	0.649

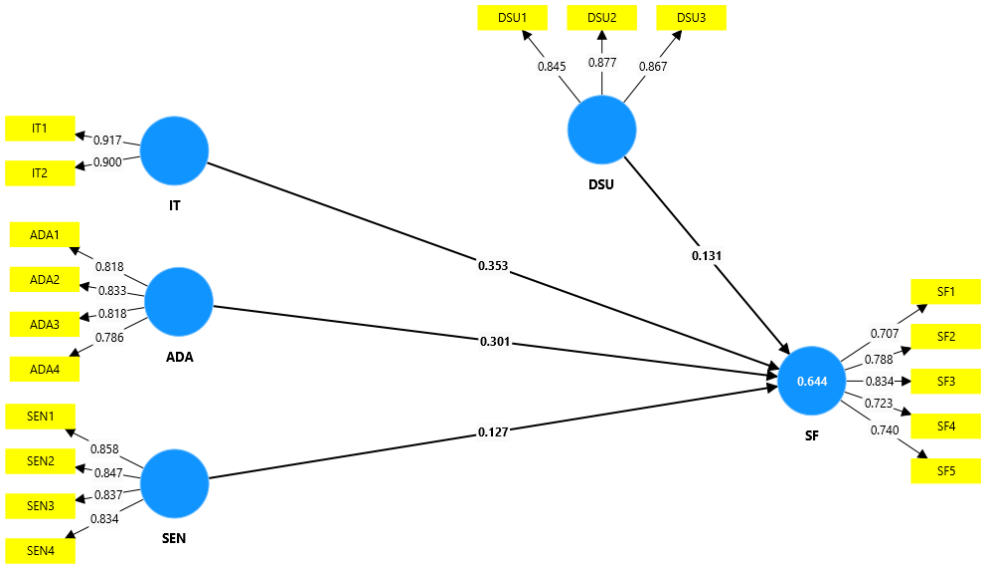

Figure 2. Path diagram for model 1.

The theories were tested using the Smart-PLS 4 software. Thirteen hypotheses were formulated for the study, with seven focused on measuring direct relationships and their impact on variables, while the remaining six examined the mediating and moderating relationships. As shown in Table 6, the first hypothesis (H01) tests

the potential impact of innovative technology (IT) on sustainable future (SF). The results indicate a positive and significant effect of IT on SF ($\beta = 0.322$, $t = 5.002$, $p < 0.000$), confirming the beneficial role of IT in advancing SF. The second hypothesis explores the relationship between sustainable future (SF) and AI-driven accounting (ADA), with results showing a positive and significant impact of SF on ADA ($\beta = 0.35$, $t = 5.59$, $p < 0.000$), leading to the acceptance of H2. Hypothesis 3 examines the impact of surrogate entrepreneurship (SEN) on sustainable future (SF). The study finds a significant and positive effect ($\beta = 0.238$, $t = 4.922$, $p < 0.000$), thus validating H3. The fourth hypothesis investigates the influence of digital start-ups (DSU) on SF. The results show a positive relationship ($\beta = 0.151$, $t = 2.747$, $p < 0.006$), supporting the acceptance of H4, which indicates that DSU positively impacts SF. The analysis further reveals a negative relationship between IT and DSU ($\beta = -0.114$, $t = 2.642$, $p < 0.008$), suggesting that innovative technology has a negative impact on DSU. Additionally, the findings confirm that AI-driven accounting (ADA) has a significant positive effect on DSU ($\beta = 0.439$, $t = 8.154$, $p < 0.000$), supporting the approval of hypothesis 6. Finally, the study illustrates that DSU benefits significantly from SEN ($\beta = 0.56$, $t = 10.814$, $p < 0.000$), leading to the acceptance of hypothesis 7.

Table 6. Direction relationship result.

Paths	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values	Result
IT -> SF	0.322	0.32	0.064	5.002	0.00	Supported
ADA -> SF	0.35	0.351	0.063	5.59	0.00	Supported
SEN -> SF	0.238	0.239	0.048	4.922	0.00	Supported
DSU -> SF	0.151	0.152	0.055	2.747	0.006	Supported
IT -> DSU	-0.114	-0.114	0.043	2.642	0.008	Supported
ADA -> DSU	0.439	0.441	0.054	8.154	0.00	Supported
SEN -> DSU	0.56	0.559	0.052	10.814	0.00	Supported

Table 7. Indirect (mediate) relationship result.

Paths	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
DSU x IT -> SF	-0.109	-0.109	0.061	1.795	0.073
DSU x ADA -> SF	0.035	0.035	0.054	0.657	0.511
DSU x SEN -> SF	0.082	0.083	0.042	1.976	0.048

Hypotheses H08, H09, and H10 were formulated to examine the mediation effects. To investigate how Digital Start-ups (DSU) influence the relationship between "Sustainable Future (SF)" and "Innovative Technology (IT)", a mediation analysis was conducted. The results, as shown in Table 7, indicate that the indirect effect of IT on SF through DSU was not significant (H8: $\beta = -0.109$, $t = 1.795$, $p = 0.073$). Similarly, the indirect influence of AI-Driven Accounting (ADA) on SF through DSU was also found to be insignificant ($\beta = 0.035$, $t = 0.657$, $p = 0.511$). Furthermore, the analysis revealed that surrogate entrepreneurship (SEN) did not have a substantial indirect effect on SF through DSU ($\beta = 0.082$, $t = 0.042$, $p = 0.048$). These findings suggest that SEN, rather than IT and ADA, plays a significant role in influencing SF in the relationship with DSU. Therefore, while H10 is supported, H8 and H9 are not supported. Figure 3 illustrates the path diagram with mediating effects (Model 2).

When two constructs exhibit a non-constant relationship that varies depending on the values of a third variable, known as the moderator variable, the relationship is considered to be moderated. The hypothesis in this study aims to explore how digital Start-ups influence other factors. Several theoretical frameworks have been proposed to assess the moderating impact of variables, which help determine how the presence or absence of a moderator alters the strength or direction of the relationships between the primary constructs. These theories are essential for understanding the dynamic interaction between variables and the role that moderating factors, such as DSU, play in shaping outcomes.

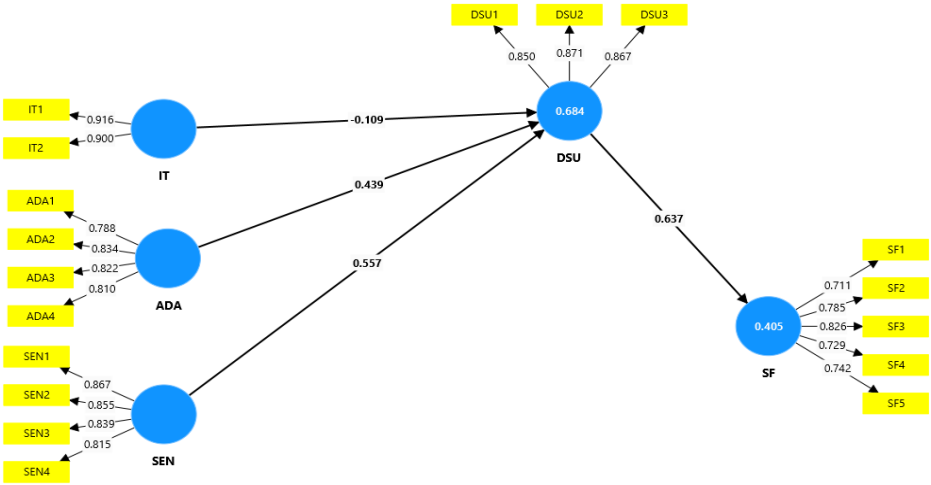

Figure 3. Path diagram with mediation effect (Model 2).

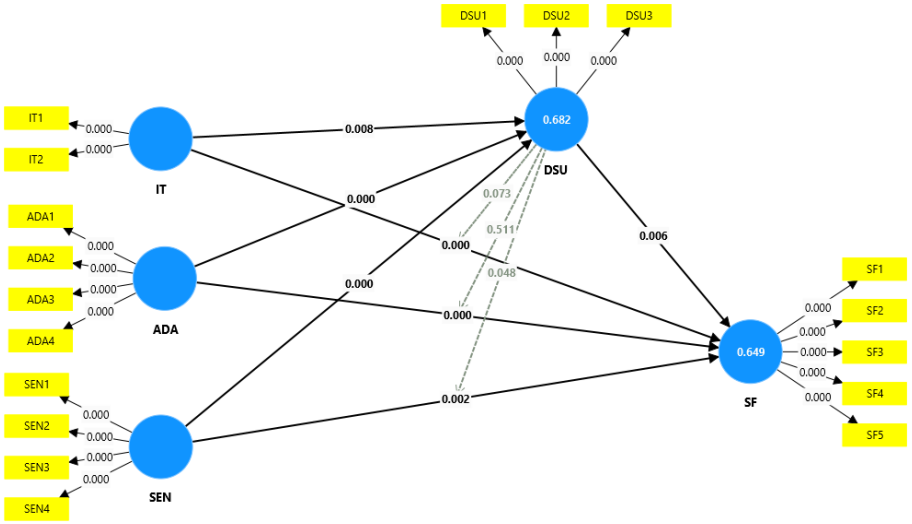

Figure 4. Path diagram with moderating effect (Model 3).

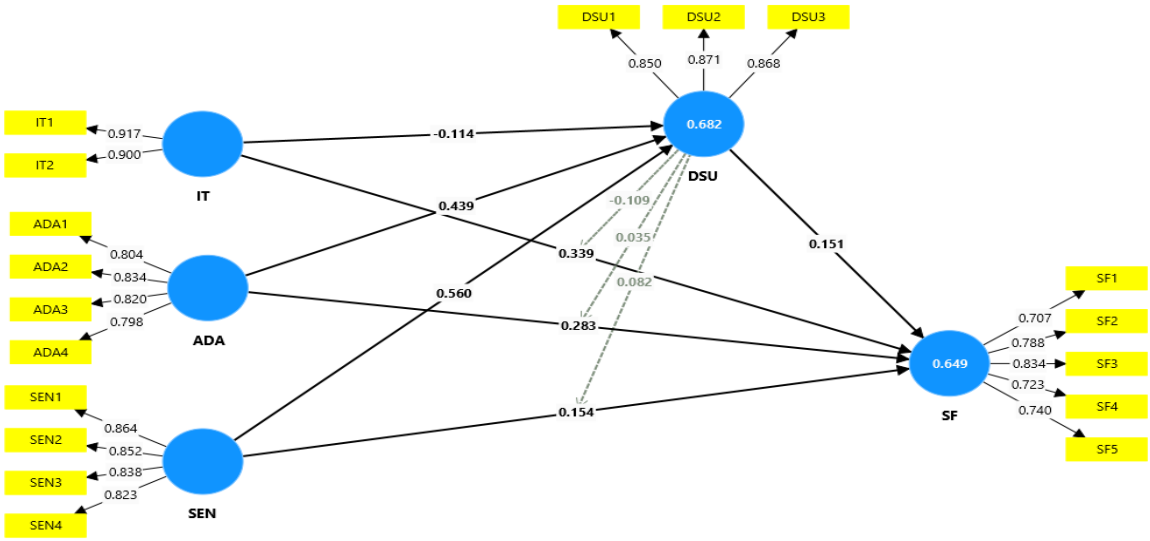

Figure 5. Path diagram presenting relationship with moderating effect (Model 3).

The Confirmatory Factor Analysis (CFA) is depicted in Figures 4 and 5, showcasing the associations between the path coefficients and several variables. Figure 5 highlights the relationship between the audit process and accountability, emphasizing the moderate yet significant impact of digital start-ups (DSU) in this context.

To better understand how a moderator influences the relationship between dependent and independent variables, simple slope plots are employed. These plots use slope lines to visually represent the type and direction of the interaction effects. The results report includes such plots, demonstrating how the moderator variable affects the relationships. Figure 5 illustrates the moderation effects between DSU and IT, DSU and IT, and ATA and SEN, shedding light on the intricate interactions at play.

Refer to Table 8. The study aimed to assess the potential moderating influence of Digital Start-ups (DSU) on the relationship between AI-Driven Accounting (ADA) and Sustainable Future (SF), with the results showing a significant moderation effect ($\beta = 0.066$, $t = 2.69$, $p = 0.007$). This finding suggests that the association between ADA and SF is influenced by DSU, highlighting the substantial role of blockchain technology in accounting and its contribution to fostering a sustainable future. Furthermore, the study revealed that Digital Start-ups (DSU) also moderates the relationship between innovative technology (IT) and sustainable future (SF) ($\beta = -0.017$, $t = 1.965$, $p = 0.049$). This suggests that DSU has a negative impact on how IT and sustainability interact, possibly due to the excessive reliance on technology, which can hinder the creativity of younger generations. Despite widespread interest in AI training, there is a lack of real, high-quality start-ups to drive sustainable innovation. Additionally, the analysis demonstrated a moderate yet significant moderating effect of DSU on the relationship between surrogate entrepreneurship (SEN) and sustainable future (SF), further validating the hypotheses. Consequently, Hypotheses H11, H12, and H13 were supported, confirming that DSU moderates the relationships between IT and SF, ADA and SF, and SEN and SF. The Standardized Root Mean Square Residual (SRMR) measures the discrepancy between the correlation matrix predicted by the model and the observed correlation. It is used to evaluate the goodness-of-fit of the model. When two variables are independent, this relationship can be assessed using the chi-square test. Additionally, the Normed Fit Index (NFI) is a metric for incremental fit, which generates values between 0 and 1. A value closer to 1 indicates a better model fit. According to Lohmöller (1988), an NFI value of 0.716 is considered a reasonable fit, providing useful insights into the PLS path model's NFI computation, as shown in Table 9.

Table 8. Moderate relation result.

Paths	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values	Result
ADA -> DSU -> SF	0.066	0.067	0.025	2.69	0.007	Supported
IT -> DSU -> SF	-0.017	-0.017	0.009	1.965	0.049	Supported
SEN -> DSU -> SF	0.085	0.085	0.032	2.617	0.009	Supported

Table 9. Model fit.

	Saturated model	Estimated model
SRMR	0.072	0.072
d_ULS	1.197	1.197
d_G	1.298	1.298
Chi-square	1280.415	1280.415
NFI	0.716	0.716

5. Discussion

The findings of this study provide valuable insights into how Digital Start-ups (DSU) and innovative technologies can contribute to a more sustainable future (SF), supporting the long-term viability and competitiveness of businesses. As highlighted by Paolo et al. (2014), the results have practical implications for management and business, with the potential for sustained growth and development. This study aligns with the argument that fostering innovation and sustainability can significantly impact the success and resilience of digital ventures in the evolving marketplace.

A central finding of this research is that innovative technology positively influences the pursuit of a sustainable future. This result challenges previous assumptions about the role of social media as a mediating factor and suggests that the combination of creative environments, knowledge exchange, and effective communication is essential for the long-term sustainability of digital start-ups. These findings support the theory that IT,

through its capabilities to drive efficiency, reduce resource consumption, and facilitate new business models, is a key enabler of sustainability in digital start-ups.

The role of digital start-ups in fostering a sustainable future aligns with the conclusions drawn by previous research, such as that of Lammers et al. (2022), which emphasized the financial and sustainable objectives driving digital start-ups. These businesses are often at the forefront of adopting new technologies and business models that contribute to the economic and environmental sustainability of their operations. As observed by Dhewanto et al. (2022), digital start-ups are not only critical to economic growth but also play a pivotal role in shaping the future dominance of nations by integrating advanced technologies for sustainable development.

Moreover, the findings are consistent with earlier studies highlighting the economic benefits of implementing sustainable practices in digital businesses. Naidoo & Gasparatos (2018), Karimi & Walter (2021), and Waty et al. (2023) observed that the adoption of green innovations, such as renewable energy technologies and efficient resource management systems, directly enhances the sustainability of start-ups. In this context, digital start-ups demonstrate a positive impact on sustainability, supporting the idea that innovation in the digital sector can drive significant environmental and economic benefits.

The integration of blockchain technology in digital start-ups also emerged as a crucial factor in promoting sustainability. As emphasized by Polas et al. (2022), Madkhali & Sithole (2023), and Dong et al. (2023), blockchain facilitates the efficient and transparent management of resources, thereby supporting sustainable practices. Additionally, blockchain's ability to mediate the relationship between sustainability orientation and social perception further solidifies its role in enabling the transition toward a sustainable green economy. The alignment of blockchain technology with sustainability goals underscores the potential for digital start-ups to integrate innovative solutions that enhance social, economic, and environmental value.

Furthermore, this study contributes to the understanding of how digital start-ups can influence the broader socio-economic landscape. The findings show that digital start-ups not only contribute to a sustainable future but also serve as catalysts for change by adopting technologies that promote sustainability. This is in line with the work of Yacob et al. (2019), which highlighted how digital innovations such as artificial intelligence and blockchain are pivotal in fostering green growth and improving corporate sustainability.

6. Conclusion

This study provides a significant contribution to the literature by examining the intersection of AI-driven accounting and surrogate entrepreneurship in fostering sustainable growth through digital start-ups. Unlike previous studies that primarily focused on traditional factors influencing business success, this research emphasizes the importance of innovative technologies, ethical accounting practices, and entrepreneurial strategies in achieving long-term sustainability. The findings underscore the potential of AI to enhance the transparency, efficiency, and accuracy of accounting processes, while surrogate entrepreneurship offers an alternative pathway to venture success without the need for direct ownership. Taken together, these elements highlight the evolving corporate landscape, where sustainability is not merely an aspiration but a central operational principle. The results reveal that digital start-ups play a critical moderating role in the relationships between innovative technology and sustainable future, AI-driven accounting and sustainable future, and surrogate entrepreneurship and sustainable future. This moderation indicates that the impact of these factors on sustainability outcomes is strengthened when digital start-ups are involved, reinforcing their pivotal role in driving sustainable development. Ultimately, the study concludes that the key to achieving both corporate success and sustainability in start-ups lies in the dynamic integration of AI technology. This approach not only optimizes business processes but also embeds sustainability into the core framework of the business. As digital start-ups continue to redefine industries, leveraging AI and surrogate entrepreneurship will be essential for ensuring long-term success and contributing to a sustainable future. The findings advocate for the necessity of adopting cutting-edge technologies and innovative business models as integral components of sustainable business practices.

6.1 Research Implications

A key practical contribution of this study is the fresh perspective it offers on integrating technological innovation with sustainable business practices. Surrogate entrepreneurship plays a critical role by allowing companies to support digital start-ups without taking on direct ownership, thus reducing risks while fostering innovation. This approach enables individuals to launch businesses without the need for extensive external resources or experience. Meanwhile, AI-driven accounting enhances financial accuracy, automates processes, and provides real-time insights, which together streamline operations. When combined, these elements empower start-ups to focus on strategic growth, optimize cost-efficiency, and make informed decisions—all while maintaining compliance and transparency. This integration shifts the entrepreneurial landscape, promoting sustainability and fostering innovative practices. By improving financial accuracy, operational efficiency, and transparency, AI-driven accounting directly contributes to long-term sustainability goals. Managers seeking to meet environmental, social, and governance (ESG) standards and enhance reporting can greatly benefit from AI-powered accounting solutions. In parallel, supporting surrogate entrepreneurship fuels creativity and offers the adaptability necessary for thriving in a rapidly evolving market. Ultimately, success in today's business environment hinges on embedding sustainability into core business strategies and fostering ethical governance.

6.2 Research Limitations and Future Scope

While this study offers valuable insights, there are notable limitations that warrant further research. One key constraint is the industry-specific context and the limited geographical scope of the study, which focuses on AI-driven accounting and surrogate entrepreneurship within digital start-ups. The findings may not be universally applicable to other industries or regions that experience different levels of technological adoption, economic conditions, or legal frameworks. Additionally, while AI and surrogate entrepreneurship are central to this study, other emerging technologies, such as blockchain and quantum computing, could also play significant roles in driving innovation in accounting and sustainability. Future research should expand to explore the impact of these technologies across various industries and regions, considering how local economic, cultural, and legal factors influence their potential for fostering sustainability. Furthermore, investigating how larger, more established organizations can integrate these advanced accounting solutions to promote sustainable development would offer valuable insights into the broader application of these technologies in the corporate sector.

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