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The Impact of Sustainable Innovation, Entrepreneurship Training and Digital Engagement on the Business Performance: A Quantitative Analysis

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Abstract

***Purpose**: This study investigates the influence of sustainable innovation, entrepreneurship training, and digital engagement on business performance using empirical data.*

***Methodology**: A quantitative methodology was employed using data collected from 30 companies selected through purposive sampling. Descriptive and inferential statistics, including multiple regression, ANOVA, and t-tests, were conducted using SPSS 23 and Excel.*

***Findings**: Results revealed that entrepreneurship training ($t=2.142$, $p=0.041$) and digital engagement ($t=2.421$, $p=0.022$) significantly influence profit growth. The regression model explains 32.2% ($R^2=0.322$) of the variance in business performance. Additionally, ANOVA results show that IT integration and sustainable innovation scores significantly vary across compliance levels ($F=2.857$, $p=0.044$). Government support was found to significantly impact profit growth ($t=-6.569$, $p<0.001$).*

***Research Implications:** The study emphasizes integrating entrepreneurship development and digital strategies into sustainability-oriented business models for better performance.*

Practical Implications: The findings highlight the need for optimizing government support programs and promoting digital platforms and training to enhance business sustainability.

***Originality/Value**: The originality lies in the integrated analysis of innovation, training, and digital engagement offering a holistic perspective on their synergistic effects on business outcomes.*

Keywords: Sustainable Innovation, Entrepreneurship Training, Digital Engagement, Business Performance, Regression, Government Support, Profit Growth

Introduction

The need for satisfying the customer demands constantly and for the better interest acquisition, the conventional business model innovated. As the economy of a country keeps developing, enterprises and businesses are rapidly trying to amplify their resource which has lead to drastic ecological and environmental damage and pollution as well. This is considered to be one of the shortcomings of conventional model for business, as there are few incongruities associated with the social, environmental and economical developments (Press et al.). Innovations in any business model should be sustainable irrespective of its economic progress. It should also take into the consideration of the shareholder and the impact on environment and society and offer better emphasis on capturing the value creation (Karki and Porras). The activities of business have significantly processed well with the invention of digital technologies. However, most of the high-speed digital technologies has brought significant changes and also shorten the business life cycle and this affects the value creation of business and sustainability (Stubbs and Cocklin; Bocken et al.). It can be simply stated that entrepreneurs usually combine the activities of business with the concept of sustainability and in

return shareholders offer a linkage for better organizational adaptability (Gregori and Holzmann; Ghezzi and Cavallo) and also offers better value creation.

This significantly brings in many more stakeholders and this along with the utilization and integration of platforms of value networks and its existing resources across various regions will effortlessly transform innovations of corporates (Massaro et al.). The utilization and integration of value network platforms across cross borders can result in extension of values and similarly, resources that are already established can also be expanded as per the requirement. It was found out that there is significant lack of in-depth logical construction and exploration of its sustainable implementation in a business (Massa et al.).

Thus, there is need for shifting into a new paradigm for thriving in a dynamic environment and to have a better sustainability in its innovations (Behera; Stasiškienė et al.; Geissdoerfer et al.).

The internal logics of any businesses should be understood properly and this is one of the way to explore any problem in managing the business source (Gil-Gomez et al.). In relation to this study plans to explore the entrepreneurial contribution in embedding social benefits with the digital technology and inculcating the sustainability through the formulation of proper strategy through associated training programs.

This studies thereby tries to offer ideas for business in pursuing towards the development sustainably and understanding the most significant implications for the entrepreneurs using digital platforms in promoting sustainability.

The constant development and evolution of process and products by means of varied digital inventions mentions the necessity for adaptive and agile management of business strategies and this in turn can ensure the social and technological changes rapidly (Gil-Gomez et al.). On this context, community trust, relationship networks and encompassing it with the social capitals is very important for businesses and its sustainability.

This is for the reason that strong social capital enables resource accessibility, knowledge sharing, and operative relationship that are important for nurturing resilience and innovation. Study specifies that social capital suggestively influences business performance by aiding the resource optimization as well as reassuring a culture of innovation within establishments (Gil-Gomez et al.). In addition to this, role of social capital and its extending the roles beyond financial benefits through the means of socio-cultural, legal and political influence must be ensured which in return can help in overall community stability and wellbeing (Osterwalder et al.). The development of relational relationships and varied social links, that are central components of social capital, deliver valued information and prospects which improves business productivity and competence (Casadesus-Masanell and Zhu).

Also, social capital's significance and its influence on multifaceted communal procedures, with indication signifying that certain kinds of social capital can decrease the risk of few difficulties, thus backing up the individual well-being within the business (Zott and Amit). In spite of the standard significance of these factors, there remains a want for empirical study for exploring their collective effect on sustainability caused by the entrepreneurs and business. This study aims to fill this gap by examining the impact of entrepreneurship training, digital innovation, and social capital on business sustainability.

Literature Review

It can be stated that the entrepreneurship training is very much needed for the success of any business especially the ones that innovate and adapt the digital platforms. These trainings make use of skilled individuals and those that include managing of financials, planning of business, strategies for marketing and finally managing the innovations accordingly that are very vital for piloting a swiftly shifting market setting. Researchers like (Azza et al.) highlight that entrepreneurship training improves the business mindset by evolving critical thinking, problem-solving abilities, and opportunity acknowledgement. It is particularly pertinent in the businesses where incessant novelty is essential for maintaining competitiveness. Moreover, studies illustrate that entrepreneurial training programs suggestively progress business performance by

amplifying growth of the revenue, acquisition of customers, and lastly operational competence (Martínez-Falcó et al.). The experiential learning role is more underlined, as it permits entrepreneurs in applying theoretical ideas in real-world sceneries, thus evolving practical skills vital for entrepreneurial achievement (Foss and Saebi). Furthermore, Entrepreneurial Development Programmes (EDPs) accessible have been made known to be completely impacting trainees' entrepreneurial outlook and incentive, though there is a need for custom-made strategies in ensuring ensure all trainees benefit optimally (Shetty et al.).

Digital innovation has turned out to be an essential factor in driving business accomplishment these days, particularly in sectors which prosper on inventiveness and technical progressions. It includes the application of novel digital skills for improving processes of business, progress in launching new services or products, and improving the experiences of the consumers. For example, if service sector is taken into consideration, AI technologies in mobile apps for data have transformed client relations, with positive applications emphasized through numerous case studies. Furthermore, digital innovation is redesigning management of business process by developing incessant evolution and upgrading of processes and products (Shetty et al.). Augmented and virtual reality known as AR and VR which are the innovative strategies of digital marketing help in amplifying the contents that are usually user generated and this is very much needed for the businesses to be competitive and efficiently influence their audience altogether (Wang et al.).

So, all three factors namely sustainable innovation, Entrepreneurship training and digital engagement are certainly essential in increasing the sustainability of the business. Here, the concept of Entrepreneurship training is for offering essential knowledge and skills for people with a proactive mindset making them capable of identifying and exploiting prospects successfully. This training nurtures entrepreneurial proficiencies that are rather important for the navigation of market conditions complexities and risk management and also for taking business to next level. For example, the concept of sustainable entrepreneurship management highlights the significance of sustainability goals integration within the strategies of a business and this in return ensure the success of a business in long term. Digital engagement has known to play important role in this context by simplifying sustainable practices within innovativeness. The planned usage of digital technologies, like in-sales procedures, pointedly intensifies the probability of mixing environmental and social considerations into business policymaking, as demonstrated by entrepreneurs in many countries (Plečko and Bradač Hojnik). Furthermore, digital engagement and marketing arises as a crucial tool for business permanency and accomplishing wider and comprehensive markets, in that way aiding for the sustainable financial development (Warsiman et al.). Digital engagement in business performance comprises of relationship networks and also community engagement, additionally promoting sustainability through means of corporate social responsibility (CSR) and novelty.

Furthermore, environmental practices and business reputation are thoroughly related, with business size and innovation measurements which play as an interceding and regulating variables, correspondingly, underlining the significance of sustainable initiatives in increasing corporate reputation and size (Shakil et al.). Digital engagement and innovation have certainly turned out to be a critical constituent for businesses primarily altering the making, delivery, and consumption of services and products. The addition of digital technologies into business processes along with entrepreneurial training enables an amplified operational competence and the capability for reaching a wider audience. For example, the media industry has elevated digital innovation for making content creation and distribution more suitable, exploiting AI for boosting competitiveness and looking out for new profit models in addressing challenges of the market. Likewise, the accomplishment arts sector has seen note worthy fluctuations, with digital technologies allowing new forms of creative countenance and audiovisual aid and knowledges that augment conventional art performances. The digital economy which is driven by high-tech IT, plays a crucial role in engineering advancements and social advance, as perceived in strategic prominence on digital

engagement for fostering economic growth and green technology (Shi et al.). Besides, businesses can profit from pioneering digital marketing strategies, like VR and AR for creating immersive customer experiences and leverage user generated content in building and expansion and also by means of developing trust (Yoo et al.).

The growth of sustainability in business has exposed that implementing ISO standards and sustainability reports can pointedly influence financial performance, offering a framework for up-to-date decision-making and indicating a optimistic association amongst sustainability and monetary accomplishment.

Most of the researches hither to has studied the associations between sustainable innovation, Entrepreneurship training and digital engagement on the business performance individually but not together. It was found that the current literature is very little or plays little attention to this and so there is necessity to look into the exploration of entrepreneurial contribution in achieving social benefits and offer few insights on this context. There is also a necessity to understand and logic of the managerial and entrepreneurial role in the business activities. This study tries to fill the gap and find the impact of these three factors on the performance of a business.

Methodology

A quantitative research methodology was adopted for this study to know how sustainability practices affect business performance across 30 companies. a purposive sampling technique was adopted to select those that have vibrant and active engagements towards sustainability, as seen by their sustainability report or disclosures. The sample should also be representative by allowing other industries into the fold of the research. Primary and secondary data collection techniques were applied. Primary data were collected by administering structured questionnaires to representatives of selected companies using variables such as sustainability innovation scores, government support, corporate governance practices, and sustainability reporting score. Secondary data are financial performance indicators such as profit growth percentages, changes in market shares, or cost accounting savings from sustainable practices, gathered from annual reports, sustainability reports, and public databases.

The variables in the study being sustainability innovation, government support, sustainability reporting, and corporate governance score, as independent variables, and profit growth percentages as a dependent variable. Thus, the data were analyzed by descriptive and inferential statistical techniques. Descriptive statistics would summarize the central tendencies and variability of the data. Correlation analysis would be used to study the relationships of independent versus dependent variables while multiple regression would be used to predict profit growth in relation to sustainability factors. Finally, trend analysis would be enabled to interpret patterns and relationships using scatter plots and line graphs. The data analysis was done using SPSS 23 and Microsoft Excel for visualization of data.

Data Analysis

It has been about ethical consideration in the study where all data from companies are anonymized to maintain confidentiality that is also informed consent from the different participating organizations in the possession of its data collected, which is strictly used for academic and research purposes. The Normality for the data obtained was tested using Shapiro Wilk test of normality.

Descriptive Statistics

The table 1 brings the summary of the descriptive statistics for the main variables under study, including their mean, standard error, and standard deviation. All these were shown to give insights into central tendency, variability, and precision of each variable's data distribution.

Table 1 Descriptive Statistics

	Mean	Std. Error	S.D.
Sustainable Innovation Score	72.23	2.09	11.46
Entrepreneurship Training Hours	35.83	1.97	10.81
Social Media Engagement Score	64.97	1.51	8.29
Recycling Rate (%)	60.39	2.49	13.63

Government Support Received (in lakhs)	5.94	0.40	2.21
Profit Growth (%)	13.81	1.04	5.69
Sustainability Reporting Score	3.23	0.26	1.41
IT Tool Integration Level	2.77	0.24	1.33

The Sustainable Innovation Score yields an average of 72.23, a standard error of 2.09 and a standard deviation of 11.46, indicative of moderate variability about the mean and suggesting a relatively consistent level of sustainable innovation among organizations. Comparable to this, the Entrepreneurship Training Hours also give an average of 35.83 hours, standard error of 1.97 and standard deviation of 10.81, thereby showing similar variability in the number of training hours received by the companies.

Mean value for Social Media Engagement Score is 64.97 and a standard error of 1.51 and high standard deviation of 8.29. It indicates a variation that is relatively low in terms of engagement across the companies. Recycling Rate (%) on the other hand shows a mean of 60.39 and has a high standard deviation of 13.63 signifying more variability in the recycling rates of the entities under study. Government Support Received shows an average of 5.94 lakhs with a standard error of 0.40 and a standard deviation of 2.21 which means that there is not much difference in the amounts received for this financial support. The Profit Growth (%) signifies an average of 13.81%, with standard error 1.04 along with the standard deviation of 5.69 which indicates moderate variance that exists among different entities regarding the growth percentage.

Sustainability Reporting Score is having average of 3.23 with a standard error of 0.26 and standard deviation of 1.41 which means reporting practices are rather uniform regarding sustainability. Finally, IT Tool Integration level would have an average of 2.77, with a standard error of 0.24 and standard deviation of 1.33, which reflects considerable consistency in terms of integration level of IT tools.

ANOVA: Recycling Rate and Sustainable Innovation Score Impact on Sustainability Reporting

Null Hypothesis (H_0): There is no significant impact of recycling rate and sustainable innovation score on sustainability reporting.

Alternative Hypothesis (H_1): There is a significant impact of recycling rate and sustainable innovation score on sustainability reporting.

Table 2 ANOVA-Recycling Rate and Sustainable Innovation Score Impact on Sustainability Reporting

		N	Mean	SD	Std. Error		Sum of Squares	df	Mean Square	F	Sig.
Recycling Rate (%)	Minimal Compliance	5	56.056	11.990	5.362	Between Groups	1691.152	4	422.788	2.857	0.044
	Basic Compliance	5	68.904	12.396	5.543						
	Moderate Compliance	4	54.818	15.177	7.588	Within Groups	3699.392	25	147.976		
	High Compliance	10	66.925	13.062	4.131						
	Excellent Compliance	6	49.717	7.526	3.073	Total	5390.544	29			
	Total	30	60.387	13.634	2.489						
Sustainable Innovation Score	Minimal Compliance	5	78.400	7.162	3.203	Between Groups	1224.533	4	306.133	2.959	0.039
	Basic Compliance	5	78.400	11.675	5.221						
	Moderate Compliance	4	71.000	15.979	7.990	Within Groups	2586.833	25	103.473		
	High Compliance	10	63.800	8.715	2.756						
	Excellent Compliance	6	76.833	8.796	3.591	Total	3811.367	29			
	Total	30	72.233	11.464	2.093						

Table 2 shows the descriptive statistics for recycling rates (%) and sustainable innovation scores on five levels of compliance Minimal, Basic, Moderate, High, and Excellent. The mean was found to be 60.387% with a standard deviation of 13.634% and standard error of 2.489%. Out of the following

compliance types, Basic Compliance had the highest mean for recycling rate (68.904%, SD=12.396%), while High Compliance came closely at a mean of 66.925% (SD=13.062%). Low in mean recycling was that of Excellent Compliance (49.717%, SD=7.526%). Basic Compliance (56.056%, SD=11.990%) and Moderate Compliance (54.818%, SD=15.177%) also performed lesser than the overall mean. Moderate Compliance has high variability (SE=7.588%), suggesting different differences within the same group, while Excellent Compliance has very low variability (SE=3.07%).

On the other hand, the sustainability innovation scores tell a different story. In general, the average score is 72.233 with a standard deviation of 11.464 and it has a standard error of 2.093. The highest mean innovation scores were found for Minimal and Basic Compliance, both with 78.400 scores and SDs of 7.162 and 11.675, respectively, arguing for very high innovation performance and low variation. Excellent Compliance also does quite well in innovation this level (76.833, SD=8.796), while Moderate Compliance (71.000, SD=15.979) and High Compliance (63.800, SD=8.715) get lower scores. High Compliance appears to have the lowest mean innovation score, which possibly indicates trade-offs where one must achieve higher recycling rates for innovation to foster.

It has emerged that the nexus between recycling practices and innovation performance is transformed with cross-group comparisons. While Basic Compliance scores strong in both metrics, Excellent Compliance tells a different story, with high innovation scores but abysmal recycling rates. This misalignment may reflect different organizational priorities or challenges in allocating resources. The findings suggest, that heavy compliance in one arena may cost performance in another.

The analysis of variance investigates the differences of Recycling Rate (%) and Sustainable Innovation Score across five compliance levels. The analysis of variance is significant at a five percent level of confidence with F-statistic of 2.857 and p-value of 0.044 for the Recycling Rate (%), between groups sum of squares of 1691.15 and within groups sum of squares of 3699.39. The mean square between groups is 422.79, and that of within groups is 147.98. Thus, compliance levels are significantly associated with the recycling rates and suggested that the variability in mean group is not by chance.

ANOVA also shows similarity for Sustainable Innovation Score with a significant difference across levels of compliance (F=2.959, p=0.039). Between groups, it analyzed 1224.53, within groups, it analyzed 2586.83, resulting in mean squares of 306.13 and 103.47 for within and between groups, respectively. The significant p-values for these variables (less than 0.05) indicate the importance of levels of compliance in relation to the organizational outcomes associated with sustainability. Furthermore, it stands true for both the measures considered that their F-values are relatively higher, suggesting that the variance between group means is quite notable when compared with the variance within groups. It helps in concluding that compliance strategies are important in influencing recycling practices and innovation outcomes.

t-Test: Government Support and Profit Growth

Null Hypothesis (H_0): There is no significant relationship between government support received and profit growth.

Alternative Hypothesis (H_1): There is a significant relationship between government support received and profit growth.

Table 3 t-test-Government Support and Profit Growth

	Mean	S. D.	Std. Error Mean	t	df	p-value
Government Support Received (in lakhs)	5.938	2.213	0.404	-6.569	29	0.000
Profit Growth (%)	13.813	5.687	1.038			

The table 3 describes the measures relating to the variables- Government Support Received (in lakhs), which indicates profit growth (in %) in their mean, standard deviation, and one sample t-test comparison. The mean of government support is 5.938 lakhs, while the standard deviation is 2.213, standard error of the mean is 0.404. One-sample t-test was conducted to find out whether the mean

government supports differ significantly from hypothesized value or not. The t-founder is -6.569 with 29 degrees of freedom and p-value being 0.000. This indicates highly significant results ($p < 0.001$) which signify that, on average, government support received by the participants significantly differs from the hypothesized one. Speaking of profit growth rates, an average of 13.813 per cent has been cited whose standard deviation is 5.687, with standard error of 1.038. The significance of the government support identifies that it has possible variance from the expected levels, which would indicate the gaps in financial assistance or variance in the efficiencies of support programs. These findings indicate the importance of government support in shaping business outcomes.

Regression Model: Social Media Engagement and Entrepreneurship Training Hours Effect on Profit Growth

Null Hypothesis (H_0): Social media engagement score and entrepreneurship training hours do not significantly influence profit growth.

Alternative Hypothesis (H_1): Social media engagement score and entrepreneurship training hours significantly influence profit growth.

Table 4 Regression Model-Social Media Engagement and Entrepreneurship Training Hours Effect on Profit Growth

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	0.567[a]	0.322	0.271	4.85422

a. Predictors: (Constant), Social Media Engagement Score, Entrepreneurship Training Hours

ANOVA[a]

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	301.684	2	150.842	6.402	0.005[b]
Residual	636.212	27	23.563		
Total	937.896	29			

a. Dependent Variable: Profit Growth (%)

b. Predictors: (Constant), Social Media Engagement Score, Entrepreneurship Training Hours

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-10.113	7.326		-1.380	0.179
Entrepreneurship Training Hours	0.182	0.085	0.345	2.142	0.041
Social Media Engagement Score	0.268	0.111	0.390	2.421	0.022

a. Dependent Variable: Profit Growth (%)

The study examines a regression model for two independent variables the social media engagement score and entrepreneurship training hours in their effect on the dependent variable profit growth (%). The model summary shows that the model explains 32.2% of the variance in profit growth (%) as its R Square value is 0.322. A moderate fit (considering predictors and sample size) is supported by the adjusted R Square value of 0.271. The estimation standard error is 4.854, which indicates the distance of average observed value from the predicted value and indeed, the ANOVA results further support the significant model ($F=6.402$, $p=0.005$). As the p-value is less than 0.01, it indicates the multi-effect of the combined predictors-Social Media Engagement Score and Hours of Training in Entrepreneurship-on the outcome: Profit Growth (%). Out of the total 937.896 total sum of squares, 301.684 is explained by the regression model and the remaining 636.212 and attributed to residuals.

The coefficients table gives a better understanding of each predictor's unique contributions. The unstandardized coefficient (B) for Entrepreneurship Training Hours is 0.182 while the standard error is 0.085. The standardized coefficient (Beta), on the other hand, is 0.345. The t-value of 2.142 ($p=0.041$) underlines the concept of a statistically significant positive relationship between Entrepreneurship Training Hours and Profit Growth (%). It follows, therefore, that for each extra hour of entrepreneurship training, profit growth is expected to increase by 0.182 units while other factors remain constant.

The unstandardized co-efficient for Social Media Engagement Score is at 0.268 with a standard error of 0.111. Its Beta standardized co-efficient was 0.390. The t-value of 2.421 (p=0.022) signifies a statistically positive correlation with Profit Growth (%). It follows that, because of more social media engagement, profit growth would seem to increase, more so influenced by the number of training hours for entrepreneurs, as indicated by the bigger value of Beta. In totality, entrepreneurship training and social media involvement appear to be the most critical interventions that can drive profit growth; social media involvement proves slightly stronger. Thus, the findings demonstrate the significance of combining digital engagement strategies and skills development programs to improve business performance.

ANOVA: IT Integration and Sustainability Score

Null Hypothesis (H_0): There is no significant difference in sustainability scores across different levels of IT tool integration.

Alternative Hypothesis (H_1): There is a significant difference in sustainability scores across different levels of IT tool integration.

Table 5 ANOVA – IT Integration and Sustainability Score

Sustainable Innovation Score					ANOVA					
	N	Mean	SD	Std. Error		Sum of Squares	df	Mean Square	F	Sig.
Low Integration	7	64.714	8.731	3.300	Between Groups	1691.152	4	422.788	2.857	0.044
Basic Integration	6	79.833	6.882	2.810						
Moderate Integration	7	66.143	7.862	2.972	Within Groups	3699.392	25	147.976		
High Integration	7	77.286	14.373	5.432						
Full Integration	3	77.000	11.358	6.557	Total	5390.544	29			
Total	30	72.233	11.464	2.093						

The table 5 summarizes the Sustainable Innovation Scores across five levels of integration, which are Low, Basic, Moderate, High and Full. A total of 30 observations were analyzed with the combined mean score for all groups being 72.233 (SD=11.464, Standard Error=2.093). This indicates a moderate sustainable innovation performance within the sample. The Low Integration group (N=7) has a mean score at 64.714, a Standard Deviation of 8.731 and a Standard Error of 3.300. Their mean score was the lowest of the five integration levels, which indicates this group has the least implementation of sustainable innovation practices. The low and very similar standard deviation further indicates the minimum variance of scores in this group.

With the highest group mean at 79.833, the Basic Integration has a Standard Deviation of 6.882 and a Standard Error of 2.810. The evident low variability among members groups in this category regarding basic sustainable innovation strategy integration. The Moderate Integration group (N=7) with a mean of 66.143 spouts a Standard Deviation of 7.862 and a Standard Error of 2.972. It shows less progressive adoption of sustainable innovation practices compared to the average, despite being slightly above the Low Integration group.

The High Integration group (N=7) reported a mean score of 77.286, with the highest Standard Deviation (14.373) and Standard Error (5.432) among all groups. This implies that though the group achieves a high mean score, there is considerable variability in the level of sustainable innovation practices among its members. Finally, the Full Integration group (N=3) has a mean score of 77.000, with a Standard Deviation of 11.358 and a Standard Error of 6.557. Despite the small sample size, the mean score is comparable to that of the High Integration group, which indicates strong adoption of sustainable innovation strategies.

In this case, a one-way Analysis of Variance is used to test the null hypothesis regarding differences in group means as regards the dependent variable across five levels of the independent variable. It has a total sum of squares of 3811.367, which represents the total variation of the data set. That total variation is then partitioned into “Between Groups” and

"Within Groups." The "Between Groups" variation has a sum of squares of 1248.819, reflecting the variability due to differences in the group means. Calculating the mean square for the Between Groups variation, using 4 degrees of freedom (df = 4), results in 312.205 as the average variance explained by differences between the groups.

The "Within Groups," defined with a total of squares adding up to 2562.548, refers to the variability among each defined group in as much as differences among individual observations cannot be accounted for by group membership. With 25 degrees of freedom (df=25), the mean square for Within Groups is computed as 102.502. This number indicates the average variance because of individual differences within groups. An F-statistic, that is, the Between Groups mean square to Within Groups mean square ratio, equals 3.046, associated with a 0.036 significance level (p-value). Because the p-value is less than the conventional threshold of 0.05, results indicate that there are indeed statistically significant differences among the group means.

Discussion and Conclusion

This study provides empirical evidence that sustainable innovation, entrepreneurship training, and digital engagement significantly contribute to business performance. Regression results indicate that both entrepreneurship training and social media engagement positively affect profit growth, with the model accounting for 32.2% of the variance (R^2=0.322). Government support also demonstrates a significant impact on profit performance (t=-6.569, p<0.001). Furthermore, compliance levels and IT integration are statistically associated with differences in sustainability reporting and innovation scores (p<0.05).

This research bridges a gap in the literature by analyzing the combined effect of sustainability-focused innovation, digital engagement, and training offering a comprehensive model for business sustainability.

The findings suggest that firms should strategically invest in entrepreneurship training and digital strategies, while policymakers should tailor government support to enhance financial and sustainability outcomes.

The sample size was limited to 30 firms, and data were cross-sectional. Broader sampling and longitudinal studies may provide more generalizable results.

Future studies can explore sector-wise differences, longitudinal impacts, and the role of additional moderating variables such as organizational culture or leadership style in the sustainability-performance nexus.

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