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Sustainable Entrepreneurship in the Digital Age: Navigating Green Technology, Corporate Social Responsibility, and Financial Sustainability

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ABSTRACT

Purpose: The purpose of this study is to establish the correlation between green technology, CSR, and financial sustainability in relation to sustainable entrepreneurship in the digital economy. The emphasis is made on the intermediary position of digital technology in promoting sustainable practices in the given business context.

Design/Methodology/Approach: The study uses a quantitative method where the target population of 203 respondents is sampled from different industries. Self-administered questionnaires with structured and closed questions were used to collect the data and structural equation modelling analysis was applied. The findings reveal that green technology, CSR, and financial sustainability are correlated because digital technology acts as a moderator that enhances the effects of sustainability.

Findings: Corporate social responsibility and financial sustainability are also critical in the formulation of sustainable business success. The mediating function of digital technology is illustrated in this case to demonstrate how organizations can enhance sustainability through better communication and operational effectiveness while using fewer resources.

Implications/Originality/Value: This study contributes to the existing literature by revealing new perspectives on how firms can use digital technology to support environmentally friendly technologies and CSR to improve financial performance. The conclusion of the study indicates that firms which engage in sustainable business strategies facilitated by digital solutions are likely to be more viable in the long run. This research forms part of the ongoing literature on sustainable entrepreneurship.

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Introduction

Nowadays, sustainable entrepreneurship has been recognized as a promising business model that can provide economic prosperity alongside social and environmental well-being. The role of technology in all areas of life has not only increased business productivity but also provided an opportunity to develop innovative green technologies which can have a big impact on reducing the carbon footprint (Mittelstädt et al., 2023). The researchers however are using these progresses to generate business models that are very much about profit as they are about the planet (Broccardo et al., 2023). The digital age has dually benefited the business growth, even though many times at the rate of environmental degradation and social injustice (Mondal et al., 2022). The traditional business model which is mostly focused on profit maximization rather than sustainability leaves at the end of the day over exploitation of resources, pollution and social inequalities (Di Vaio et al., 2022). The aim is to develop entrepreneurial ventures that are financially successful while ensuring that they also maintain the environment and social responsibility (Ma et al., 2023).

The green technology (clean tech) is a nerve of this new trend in entrepreneurship and it refers to a broad array of invention that seek to reduce the damage done on the environment while at the same time create more energy efficiency (Sadiq et al., 2022). For instance, producers of energy are using renewable energy sources like solar, wind, and geothermal to provide the environmentally friendly alternative to conventional energy (Sannino et al., 2020). These developments aid in minimizing the use of fossil fuels thus contribute in the battle to stop climate change (Abdullah et al., 2023). Besides the energy, entrepreneurs of sustainability also utilize energy-saving goods and smart technologies that reduce waste and make the system more efficient, such as smart homes having an automatic energy system (Munir et al., 2023).

The third element of sustainable entrepreneurship is CSR or corporate social responsibility and in a world where information is transmitted at the speed of light through digital windows, companies are expected to incorporate their social and environmental impacts (Mahmood et al., 2023). The enterprisers that have CSR at heart realize that the business operations bear not only on the profitability of the business but also on the health of the employees, customers, and the community at large (Mahmood et al., 2024). These entrepreneurs usually adhere to ethical labor practices, funnel back benefits to the local communities, and ensure that materials are sourced ethically (Khakwani et al., 2024). The third factor that stands behind this type of entrepreneurship is financial stability. As such, firms should not only look into incorporating green technology and CSR but must also be economically viable enough to survive and grow their influence (Bhatnagar et al., 2022). The successful sustainable businessmen have been able to find creative ways in which to balance these objectives; resultant business models generate revenue and at the same time fulfill their sustainability goals (Hou, 2019). They create and implement new revenue channels which they may include for example environmentally friendly products and services or using digital platforms to reach more people and thus their businesses remain to grow but still they stay committed to sustainability (Haldar, 2019).

Moreover, it can be said that the digital age is an effective field which integrates green technology, corporate social responsibility, and financial sustainability (Cardinali & De Giovanni, 2022). While entrepreneurs in this field are at the forefront of the wave of demonstration that business success and environmental guardianship are not contrary to each other but instead can build on each other (Shiri & Jafari-Sadeghi, 2023). This transforming setting could end up taking over the industries, changing the meaning of success, and eventually making the world a better place for all groups (Demianchuk et al., 2021).

The research question of this study is: What is the best way for sustainable entrepreneurship in the digital age to succeed in achieving the balancing act between financial success, environmental sustainability and corporate social responsibility? This research seeks to explore how sustainable entrepreneurs in the digital era tend to be the ones who exercise both profitability and responsible business strategies to achieve harmony. This study will be comprised of three major segments, namely, the examination of green technologies, corporate social responsibility initiatives and financial sustainability models for the purpose of finding out the frameworks that are successful in sustainable entrepreneurship. The goal is to get the participants to be in a position to absorb and implement the knowledge acquired back into their businesses hence leading to increased citizen-level change towards sustainable and social business development. Sustainable entrepreneurship in the digital age requires a comprehensive understanding of three interconnected variables: this research will focus on renewable technologies, CSR, and business financial sustainability. Sustainable technology can therefore be explained as the technology that is created to reduce the impacts of people on their environment as they pursue development. This comprises the utilization of solar, wind, and geothermal energy which also encompasses the use of energy conserving technology and procedures that reduce on the use of energy and resources. Innovators of green economy have come out as the champions in combating climate change, reduction of carbon and development of sustainable economy. Corporate responsibility is the other key aspect. In the present era, when consumers and stakeholders desire to know more and more about the ethical practices of companies and communities, CSR stands for the companies' commitment to ethical practices, social equity, and community involvement. Sustainable entrepreneurs view CSR (Corporate Social Responsibility) as the key component of their businesses and therefore, they ensure fair labor practices, ethical sourcing and community development. This strategy is not only the reason behind the growth of the company but also it builds trust and loyalty among customers as well as employees.

The contribution of this research is the fact that it can reshape the way the current business model operates through its emphasis on the repercussions of sustainable business in today‘s digital world. World challenges such as climate change, resource depletion and social inequality increase in magnitude. Companies have an amazing role in pushing the change. These findings can help entrepreneurs identify models that not only create profits but also help to lessen environmental effects and bring about greater social responsibility. The research, in its essence, will be a blueprint for the industry to integrate sustainability and social responsibility with financial sustainability. It will shape the industry practices, spur responsible innovation, and thus contribute to a more sustainable and equitable global economy.

Literature Review

Green Technology and Sustainable Entrepreneurship

According to (Huang et al., 2022) green technology which is the main pillar of sustainable entrepreneurship, provides with a way to minimize the negative impact on the environment and yet at the same time support the country's economy. Essentially, green technologies cover all the innovative techniques and methods for the conservation of the environment, reduction of waste and the minimization of emissions to the atmosphere (Ye et al., 2020). The entrepreneurs who follow this approach turn out to be some of the key players that initiate the transition to greener economy (Popescu & Popescu, 2019). One particular area that has seen tremendous progress thanks to green technology is renewable energy sources (Herden et al., 2021). The emissions from the combustion of fossil fuels, like coal and oil, are high thus posing a great threat to the environment (Etter et al., 2019). Different from non-renewable energy resources such as solar, wind and geothermal power, they offer alternatives for sustainable energy and greatly decrease the overall footprint of the carbon (Ullah et al., 2022). Renewable energy entrepreneurs are not only looking for ways to use resources efficiently, but also for methods that would make renewable energy accessible and affordable (Ahmad et al., 2022). Solar panels like, for instance, are no longer the expensive and low-

performance machines they used to be thus making it possible for both companies and homeowners to generate their own clean energy (Kraus et al., 2018).

Corporate Social Responsibility and Sustainable Entrepreneurship

According to (Sadiq et al., 2022) the term corporate social responsibility (CSR) is the core part of sustainable entrepreneurship, expressing a dedication to ethical business and social equity. Entrepreneurs who, first and foremost, care about CSR are about the benefits of this to the local communities, clients, staff and the environment (Hou, 2019). This can be achieved through fair labor standards, ethical sourcing, community outreach, and good governance systems (Haldar, 2019). Environmental entrepreneurs who believe in CSR and act accordingly have more loyal customers and expanded trust, which can bring them ahead in the market competition (Cardinali & De Giovanni, 2022). Entrepreneurs can ensure the sustainability of their businesses by combining social responsibility with their business strategies (Shiri & Jafari-Sadeghi, 2023). Through this approach, they can create a long-term relationship with the stakeholders and prove that success of business and social responsibility can go hand-in-hand (Demianchuk et al., 2021).

Financial Stability and Sustainable Entrepreneurship

According to (Ullah et al., 2022) financial stability being a basic element of sustainable entrepreneurship allows the business to function while also achieving sustainable goals. Sustainable entrepreneurs in a nutshell are the ones who intend to build business models that are able to earn sustainable revenue and profitability without compromising their basic values in terms of environment and social (Ahmad et al., 2022). Stability in finances is a prerequisite for these businesses to reinvest in further innovation, expand their operations and eventually shape the broad spectrum of industry innovations (Huang et al., 2022). The sustainable businesspeople, in most cases, develop multiple sources of their income and also utilize the cost-cutting strategies that are in line with their sustainability goals (Bhatnagar et al., 2022). Successful companies that have found a way to balance financial performance and sustainability will be the pioneers in their industry and will lead in the global shift towards sustainability (Mittelstädt et al., 2023).

Mediating Role of the Digital Age

According to (Alberico et al., 2022) in the digital era, the digital age serves as a critical medium for the interrelationship between sustainability and entrepreneurship. Digital technology provides a platform for green entrepreneurs to communicate their products or services to a larger the audience, and for them to optimize their processes, and use less resources (Ye et al., 2020). The online marketing of products and services is the most efficient way for businesses to reach customers in other countries with reduced need for physical infrastructure and hence, the carbon footprint (the carbon footprint being the amount of carbon dioxide released into the atmosphere through the burning of fossil fuels) (Abdullah et al., 2023). Furthermore, data analytics and machine intelligence can be applied to enhance energy efficiency and search for usability areas for sustainability (Munir et al., 2023). The digital age in turn helps in the creation of the transparent and accountable environment where businesses are able to show their CSR initiatives and sustainability efforts (Mahmood et al., 2024). Brand visibility in digital era can be a boost to consumer confidence and engagement, thereby strengthening the role of sustainable entrepreneurship in the digital era (Etter et al., 2019).

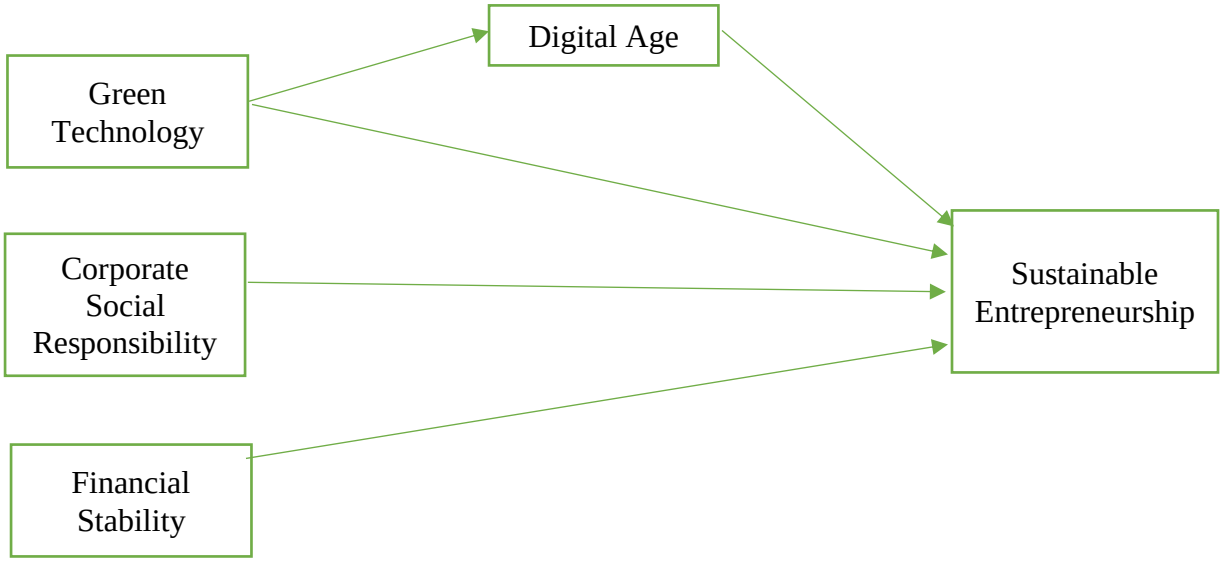

Fig.01 Theoretical Model

Hypothesis Development

Based on above we have developed the following hypothesis.

H1: There is a significant positive relationship between Green Technology and Sustainable Entrepreneurship.

H2: There is a significant positive relationship between Corporate Social Responsibility and Sustainable Entrepreneurship.

H3: There is a significant positive relationship between Financial Stability and Sustainable Entrepreneurship with mediating role of Digital Age.

H4: There is a significant positive relationship between Green Technology and Sustainable Entrepreneurship with mediating role of Digital Age.

Material and Methods

Research Design

This paper employs a quantitative research design to examine the interconnectivity between the green technology, CSR, financial sustainability, and sustainable entrepreneurship in the digital age. The research design entails the use of a list of questions that are posed systematically and they allow for statistical analysis while offering a chance for the formulation of coherent conclusions. The quantitative approach is capable of giving out a strong back drop that can be used in analyzing the complicated factors that are related (Mahmood et al., 2023).

Data Collection

The study obtains data source from a questionnaire-based survey of 203 respondents. Such a sample size is selected for its applicability and effective reach out to people with useful information on green technology, corporate social responsibility, financial sustainability, and eco-entrepreneurship. Convenience sampling is applied with the purpose of collecting the opinions from a diversified set of sectors and industries. The survey is distributed online with a letter of cover describing the study's main objective, the crucial character of the participants' responses, and the guarantee of privacy and anonymity which should make the participants to provide more accurate answers. Consequently, they are reminded regularly to stimulate response rates, and they have an adequate time to finish the poll.

Data Analysis

The obtained data are submitted into the statistical analysis process which uses software tools such as SPSS and PLS-SEM during this process. The first stage of analysis involves descriptive statistics

to highlight the recurring demographic patterns and the main variables. Subsequently, correlation analysis is adopted to test bivariate relations among green technology, CSR, financial sustainability, and entrepreneurship. Several regression models are applied to analyse the direct relationships among these variables and to deal with the factors that might affect them. Moreover, there are mediation analyses done to determine the effects digital technology has on sustainable entrepreneurship through the mediation analysis. This includes the introduction of the interaction terms in the regression models for an analysis of the way digital tools and platforms mediate the relationship of green technology, CSR, financial sustainability, and sustainable entrepreneurship. The research holds ethical standards by collecting informed consent, handling data confidentiality and privacy, and permitting the participants to leave the research at any time. Privacy of participants will be maintained by anonymizing and aggregating all the data to ensure that no one can identify the specific information of a person.

However, the study recognizes that possible drawbacks that might influence the validity of the results might exist. They might come from self-report bias because of the questionnaires are used, from cross-sectional nature of the data collection, and from the convenience sampling's inherent limitations. Knowing these limitations helps to create a more precise interpretation of results and to understand the degree to which they are useful in the real world.

Analysis and Results

The table 01 summarizes the main demographic data among a group of respondents. Following is the interpretation of the data presented in table 01:

Table 01 Descriptive Analysis

Demographic Questions	Description	Frequency	Percentage
Gender	Male	192	94.58%
	Female	11	5.42%
Age	20-30	36	17.73%
	31-40	61	30.05%
	41-50	89	43.84%
	Above 50	17	8.37%
Professional Experience	1-5 Years	39	19.21%
	6-10 Years	50	24.63%
	11-15 Years	94	46.31%
	More than 15 Years	20	9.85%
Business Organization	Services	54	26.60%
	Trading	76	37.44%
	Manufacturing	73	35.96%

Responses of male participants are overwhelmingly more than the female participants, the male participants contributes for the 94.58% of the responses of the sample and females represent 5.42%. This substantial gap from a male-dominated area is quite evident in the study. The respondents' age range is distinct with a majority being between the ages of 41-50 which is 43.84% and 89 respondents fall within the 41-50 age group. The second group of people falls in the age group of 31-40 comprising 30.05% of the sample. The age-group of people in the range of 20-30 years contribute 17.73% and 36 respondents fall within this group, and the people above 50 years old are

the 8.37% of respondents comprising on 17 respondents. The age distribution shows that a bigger share of workers are in middle age and only a small fraction of younger and older people are present. The main part of the participants (46.31%) is the experts who have 11-15 years of professional experience, meaning there are a high level of experts in the sample. The following after that, there are people who have had 6-10 years of experience which is 24.63% of the sample. Only 9.85% (20) are aged over 15 years, which means that we are dealing with a smaller group of people who have a tremendous experience. Interestingly, the majority of those who took part in the survey work in the trading organizations comprise of 37.44% (76 respondents) of the participants. Services is the second largest sector which accounts for approximately 26.60% (54 respondents). Manufacturing sector which is second only to the services sector comprised of 35.96% (73 respondents). This indicates the relatively even spread over the industries as well as the fact that the trading-related business is slightly more emphatic out of the three. Cumulatively, the information presented in this table provides a glimpse into the demographic makeup of the study participants, where male respondents are the majority, the middle-age group is the largest, a considerable number of people have moderate professional experience, and a range of industry representation, with Trading being the most represented sector. The demographic components of this study might have an effect on the outcomes and need to be kept in mind when evaluating and interpreting the results.

The Measurement Model

Table 02 Factor Loading Outer Model

	Corporate Social Responsibility	Digital Age	Financial Sustainability	Green Technology	Sustainable Entrepreneurship
CSR1	**0.702**				
CSR2	**0.762**				
CSR3	**0.783**				
CSR4	**0.803**				
CSR5	**0.777**				
DA1		**0.840**			
DA2		**0.823**			
DA3		**0.805**			
DA4		**0.793**			
FS1			**0.796**		
FS2			**0.813**		
FS3			**0.824**		
FS4			**0.750**		
GT1				**0.809**	
GT2				**0.863**	
GT3				**0.788**	
SE1					**0.784**
SE2					**0.815**
SE3					**0.718**
SE4					**0.770**
SE5					**0.767**

The structural model is a tool that is applied to check reliability and validity of different constructs by studying factor loadings, which measure the relationship between the observed and latent variables. In this model, we have five key constructs: CSR, Digital Age, Financial Sustainability, Green Technology, and Sustainable Entrepreneurship. CSR has five factors which are; Loadings The loadings of the five factors of CSR are as follows; 0.702 to 0.803. These results suggest a significant relationship between the observed variables and the construct of CSR with the items

utilized, which indicates that the items are good measures of CSR practices (Herden et al., 2021). Each article is only allowed in the factor loadings if the threshold value is not less than the acceptable level that is most often 0. 7 CSR scale used in this study ranges from 7 to 10, which shows the construct validity of the scale in estimating the practices based on CSR.
In the case of Digital Age, the items which form the structure are four and the factor loadings are between 0.793 and 0.840. These high factor loadings which share a value in the Digital Age construct prove that the selected items work rather well in fulfilling the purpose of the measure to distinguish the role of digital technology in business practices as perceived by the respondents (Mahmood et al., 2024). The appropriateness of these loadings confirms the fact that all the items are indeed reliable measures of the digital aspects dealt with in this study. In the case of the construct, financial sustainability, there were four items as follows and all had varying factor loadings that ranged from 0.750 to 0.824. The ranges identified in this study indicate that all the variables under investigation fall under the Financial Sustainability construct as proposed by the authors (Di Vaio et al., 2022). The loadings corroborate the idea that the used items are suitable in quantifying the financial dimension of sustainability this enhances the external validity of the study as an entrepreneurship research focusing on sustainability (Popescu & Popescu, 2019). In "Green Technology" there are three items having factor loading ranging to 0.788 to 0.863. As for the four marketing mix elements it can be seen that all of them have the highest loading for GT2 which is 0.863 and GT1 loadings have very high correlation coefficient and lies very close to the observed data. The relationship with the notion of green technology is profound, and it is possible to assert that these items are the right way to measure the efficiency of environmental practices. It is one of the simulations which show that the model is working perfectly well to demonstrate the function of green technology in sustainability.

Finally, the construction of the scale for Sustainable Entrepreneurship includes the elements with the factor loadings between 0 and 1 ranges from 0.718 to 0.815. SE3, however, is lightest with the lowest loading at 0.718. Moreover, the other items in this construct show high correlations with sustainable entrepreneurship as a concept that is what the chosen items to represent the concept of sustainable entrepreneurship (Sannino et al., 2020). In general, the factor weights in this measurement model are stable and can be used to verify the reliability and validity of the five constructs. Every factor loading is above the acceptable level of reliability, which implies that the observed variables that form the constructs are strongly linked to their respective latent constructs. This reliability allows the study's analysis and the interpretation to be on a strong basis, as the measurement model accurately captures the relationships among the inextricably linked dimensions of Corporate Social Responsibility, Digital Age, Financial Sustainability, Green Technology, and Sustainable Entrepreneurship.

Table 03 R-Square and Adjusted R-Square

	R Square	**R Square Adjusted**
Digital Age	**0.287**	**0.284**
Sustainable Entrepreneurship	**0.652**	**0.648**

The R-Square and Adjusted R-Square values reveal the degree of correlation between the outcome variable and predictors in regression models. These statistics shows the proportion of explained variance in a dependent variable by the independent variables in a model (Ma et al., 2023). There is a 0.287 R-Square value for the Digital Age while the Adjusted R-Square is slightly lower at 0.284 due to the number of predictors and sample size, it still indicates that approximately one-fourth of the variation is due to these factors. This little reduction indicates that the model is quite stable because a minor percentage of the variance is expected (Kraus et al., 2018). The Sustainable Entrepreneurship shows a very large R-squared value of 0.652, indicating that 65.2% the model only explains of the variance among the dependent variables. The Adjusted R-Square is again high

with a 64.8% indicates a good model without major overfitting. The higher R-Square value captures the fact that the independent variables which were used to model Sustainable Entrepreneurship are strongly related to this construct (Sarango-Lalangui et al., 2018). Generally, the results show that, the model for Sustainable Entrepreneurship has better explanatory power than the Digital Age, which means that the predictors have more variance to explain for Sustainable Entrepreneurship. These dissimilarities may be the result of a number or kind of variables influencing them, and it would be brilliant to explore these areas further in order to enrich the explanatory power of Digital Age construct.

Construct Reliability and Validity

Table 04 Construct Reliability and Validity

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Corporate Social Responsibility	**0.824**	**0.832**	**0.876**	**0.587**
Digital Age	**0.832**	**0.834**	**0.888**	**0.664**
Financial Sustainability	**0.807**	**0.807**	**0.874**	**0.634**
Green Technology	**0.757**	**0.759**	**0.861**	**0.674**
Sustainable Entrepreneurship	**0.830**	**0.833**	**0.880**	**0.595**

Table 04 presents the reliability and validity measures for the five constructs in the study: CSR, Digital Age, Financial Sustainability, Green Technology, and Sustainable Entrepreneurship. This way, the researchers get to know how consistent, internally reliable and valid reliable the constructs are. This particular statistic measures the degree of consistency between items in each construct. All constructs have Cronbach's Alpha values that are above the acceptable level, and their values are ranging from 0.757 to 0.830. They cross the threshold of the recommended amount which is 0.7 which reflects significant internal consistency (Lotfi et al., 2018). This implies that each construct consistently measures the intended feature so that the constructs reliability would be increased. Besides rho_A, the consistency index which has the same value ranges from 0.759 to 0.834. Cronbach's Alpha and these numbers indicate reliability of the constructs and reveal consistency of responses within each construct. This criterion examines the credibility of the constructs by looking at the factor loadings of items as well as their overall variance (Voinea et al., 2019). All factors are demonstrated by a high composite reliability, ranging from 0.874 to 0.888. These values are greater than the threshold of >0.7: This is to say, the constructs are reliable and accurate in portraying the underlying latent variables (Herden et al., 2021). AVE evaluates the convergent validity by determining the proportion of variance contributed by the items that describe the construct and the remaining variance that represents the measurement error. As well as the composite reliability, average variance explained values which are lower than the benchmark, are above 0.5, ranging from 0.587 to 0.674. This finding tells us that each scale in the study has prepared a set of items which cover a wide range of the scale and the items from different scales highly correlate with each other, thus showing convergent validity (Mahmood et al., 2023). The results of the reliability and validity of all constructs confirm the model to be valid in terms of the intended concepts and provide a strong structure of assessment for the relationships between the variables. This creates a positive impression about the precision and stability of measures used for the research, which bolsters the validity of the findings and helps the theory that the research is based on.

Discriminant Validity

Table 05 Fornell-Larcker Criterion

	Corporate Social Responsibility	Digital Age	Financial Sustainability	Green Technology	Sustainable Entrepreneurship
Corporate Social Responsibility	**0.766**				
Digital Age	**0.620**	**0.815**			
Financial Sustainability	**0.777**	**0.594**	**0.796**		
Green Technology	**0.719**	**0.535**	**0.630**	**0.821**	
Sustainable Entrepreneurship	**0.739**	**0.698**	**0.686**	**0.631**	**0.771**

The Fornell-Larcker criterion is the tool that is used to test discriminant validity which is the process that makes sure that the construct under the measurement model is not identical to other constructs. The core idea is that the effect of a construct on its indicators should be more than the same effect on other constructs. The reliability is accessed through comparing the root of the Average Variance Extracted (AVE) of each construct with the correlations among constructs (Khakwani et al., 2024). As you can see in Table 05, the square root of the AVE for each construct is displayed diagonally, whereas the off-diagonal values represent the correlations between constructs. An EFA revealed a three-factor solution with a higher correlation between the three factors and with the other constructs (Broccardo et al., 2023). The ratings between CSR and other constructs vary from 0.620 to 0.777 demonstrating that CSR measures more randomness in its indicators than in other constructs. This use of two dimensions to measure CSR is evidence that is associated with discriminant validity. Digital ages has a higher value than the correlations between Digital Age and other constructs, which ranges between 0.594 to 0.698. This suggests that it is a specific characteristic rather than a broad concept. Summing up, the results of the Fornell-Larcker criterion indicate that each construct has discriminant validity, since, its AVE square root is bigger than its correlation with the other constructs (Mondal et al., 2022). This suggests that the constructs are independent, while they capture and measure various concepts. This provides evidence of the reliability and validity of the measurement model.

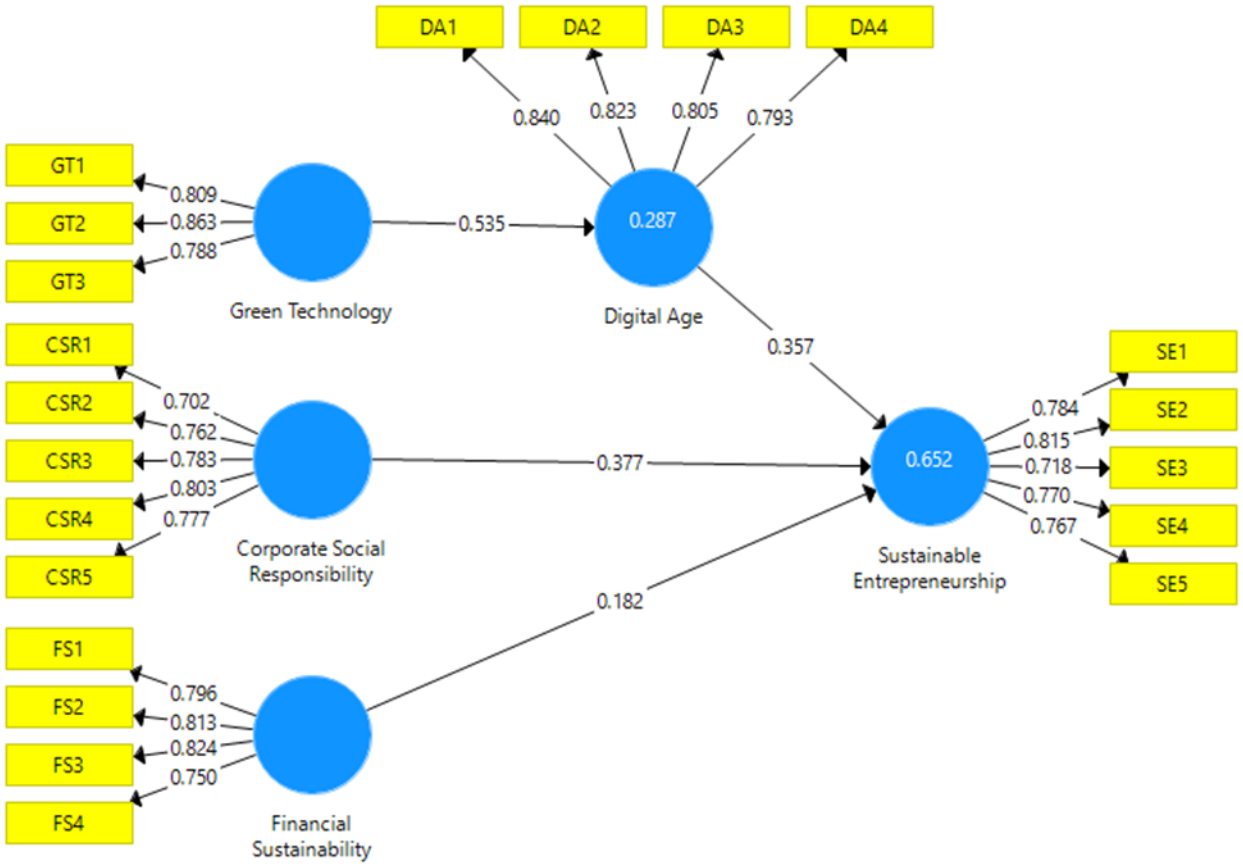

Fig.02 PLS SEM Research Framework

Testing of Hypothesis

Table 06 Hypothesis Testing Results

	P Values
Corporate Social Responsibility -> Sustainable Entrepreneurship	0.000
Digital Age -> Sustainable Entrepreneurship	0.000
Financial Sustainability -> Sustainable Entrepreneurship	0.008
Green Technology -> Digital Age	0.000

Table 06 presents the p-value for the different hypothesized relationships among the constructs of the study and it gives the statistical significance of those relationships. A value of p shows us the possibility that a found relationship is due to chance (Di Vaio et al., 2022). Usually, p-value less than 0.05 is considered significant. A probability of 0.05 or less is considered a statistical significance, it means that the relationship is most likely to be real and not random. Looking at table 05 the values of all the relationship are significant, as the p value is much lower than 0. 05 threshold as indicated by Popescu and Popescu (2019). This implies that when it comes to these factors, the observed correlations are more than likely to be real and not just chance happenings. The correlation analysis showed that there is a significant relationship between the Corporate Social Responsibility (CSR) and Sustainable Entrepreneurship with the probability value of = 0. 000. Therefore it can be concluded that CSR bears a significant positive impact on Sustainable Entrepreneurship. From this observation, it means that such companies that are CSR oriented are more sustainable regarding their entrepreneurial ventures. This implies that ethical perspective, community engagement and environmentalism are the right strategies to deal with sustainable problems (Sannino et al., 2020).

Also, p has a value of 0. Furthermore, Digital Age->Green Entrepreneurship tie and also has a p value of 0. 000 which show that the level of digital technology adoption for sustainability reasons is gradually rising among the entrepreneurs. One specific type of relationship focuses on the concept of sustainable development through the use of technologies and digitalization, proving that the application of digital platforms and strategies is beneficial to receive sustainable organizational outcomes (Ma et al., 2023). The financial viability is as closely related with the success of the entrepreneurship as the number 0. 008, furthermore, is also equal to 0. 05 or significant at 5%. It suggests that the financial stability and the presence of constant income streams are beneficial in encouraging sustainable entrepreneurs, and that is why it is vital to maintain financial health to assist sustainable business practices. Lastly, the Green Technology–>Digital Age relationship means a p-value of 0.000. The existence of this close relationship demonstrates the fact that digital transformation and the adoption of green technologies are tightly connected (Kraus et al., 2018). Technology is promoted in this film as an enabler of environmental friendly measures which implies that it is digital innovation that often comes together with the implementation of green technology. The overall output of the study gives an insight that the hypothesized relations between the constructs are statistically significant, which supports the incorporation of Corporate Social Responsibility, the Digital Age, Financing Sustainability, and Green Technology in the case of Sustainable Entrepreneurship.

Conclusion

The business environment has become more sophisticated, and the concept of sustainable entrepreneurship has emerged as a significant one, because the business is charging itself with the obligation of ensuring profitability in harmony with the environmental as well as the social responsibilities. The convergence of technology and sustainability has pushed new business models that borrow digital technology to create sustainable practices. The essence of this article is Corporate Social Responsibility (CSR), financial sustainability, green technology, and their roles in green entrepreneurship in the digital epoch. Summaries of the Findings, recommendations, Implications and future research therefore follows.

Summary of Findings

The research revealed remarkable correlations with the primary aspects that determine Sustainable Entrepreneurship. Corporate Social Responsibility (CSR) proved to be a powerful and positive driving force behind Sustainable Entrepreneurship, showing that companies which take ethical practices, community engagement, and environmental preservation seriously have a higher chance of sustainability. Digital Age factors also weighed heavily on Sustainable Entrepreneurship, and so we see that technology plays a key role in the growth of sustainability. Financing Stability has come out as a major factor in Sustainable Entrepreneurship. This means that a business's financial health has to support as a means of achieving its sustainability goals. Besides that, the Digital Age was closely associated with Green Technology showing the great role which the technology in the realization of green projects.

Recommendations

Being critical to business success, business should as a rule of thumb plan for CSR in their strategic planning in the long run. This encompasses encouraging ethical business conducts, establishing intimate relationships with the community and adopting environmentally friendly operations. Organizations should devise sustainable, welfare, and community based CSR programs for long term success. With regards to Digital Age factors, companies are invited to apply digital transformation approaches, via technology, to enhance sustainability. This could include the purchase of digital tools that support a reduction in the overall energy consumption, waste generation, and streamline the processes. In addition to that, businesses need to take advantage of the digital platforms in order to be more transparent and to communicate with the stakeholders about their sustainability projects. Thus, the Financial Sustainability of corporations can be

reinforced by creation of resilient business models which promote generating revenue with sustainability concept in mind. This can be done by focusing on different sources of income, operational efficiency, and green technology investments. Businesses ought to assess the possibility of partnerships and collaboration that are delivering financial stability and sustainability at the same time.

Implications

The research findings will have considerable consequences for the operations of enterprises, the authorities and even the stakeholders. To the enterprises, this shows that the key attributes of the sustainable entrepreneurship are the integration of the CSR, the adoption of the digital technology and the financial stability. Through these initiatives, the company not only strengthens its positive corporate image but also creates sustainable value for the business and its concerned parties. Policymakers can utilize these data in developing regulations and incentives aimed at encouraging companies to adopt sustainable practices. Such measures could include either tax relief for firms which invest in green technology or norms that require businesses to comply with CSR principles. Policy makers can then run education and awareness programs to ensure that the people understand the advantages of sustainable entrepreneurship. For all stakeholders, that is, the investor and the consumer, the consequences are apparent. The funds that invest in businesses which emphasize sustainability can bring in long-term advantages, which are from both financial and ecological perspective. In addition to that, consumers can utilize their buying power to promote businesses that are doing a good job in showing how much they value sustainability, and as a result, more changes in business practices will be seen.

Future Research Directions

However, this research has demonstrated relevant information. The next steps are more research in the specific area. Firstly, further studies could look into the part a technology like an artificial intelligence can play in front of sustainability, or block chain or the Internet of things (IoT). Building a strategic plan on how these technologies can be applied and utilized in order to promote sustainable entrepreneurship will prove to be a valuable assistance for firms. The second part is the longitudinal studies which can present far more detailed knowledge about the lasting impacts of CSR on digital transformation on sustainable entrepreneurship. Through the process of tracking businesses over the years, researchers can thus better understand the transition towards sustainability and determine factors that may lead to lasting success. Fourthly, study would involve the influence of cultural disparities on sustainable entrepreneurship. Enterprises are a part of the diverse ecosystem. Cultural factors may be a reason for the way they approach sustainability. The examination of such variations may be helpful for companies to come up with the most suitable strategies depending on the context. To conclude, the study of how stakeholder involvement may affect sustainable entrepreneurship will be the focus of future research. Stakeholders, for example, customers, employees, and investors, have a decisive role in the shaping of sustainability. Getting into the details of the best practices for stakeholder involvement might give businesses a chance to develop practical knowledge and skills which will help them in their sustainability activities.

In sum, sustainable entrepreneurship in the age of internet is a dynamic field of fast changing that has a huge potential to bring about positive changes. Through CSR, digital technology implementation, and financial stability, the business sector can be a powerful driver towards a more sustainable and fairer planet. The recommendations, implications, and future research directions in this paper mark the direction the businesses and the stakeholders should pursue in order to move forward with this important plan.

References

Abdullah, F., Khan, M. I. Y., Mahmood, G., & Abbas, Z. (2023). Examining the Extent of and Determinants of SDG Reporting. *Journal of Accounting and Finance in Emerging Economies*,

9(3), 199–212. https://doi.org/10.26710/jafee.v9i3.2711

Ahmad, Z., Chao, L., Chao, W., Iqbal, W., Muhammad, S., & Ahmed, S. (2022). Assessing the performance of sustainable entrepreneurship and environmental corporate social responsibility: revisited environmental nexus from business firms. *Environmental Science and Pollution Research*, *29*(15), 21426–21439. https://doi.org/10.1007/s11356-021-17163-5

Alberico, T. R., Ricardo, J. R., & Cruz, S. (2022). Sustainable entrepreneurship: a current review of literature. *International Journal of Business Research*, *14*(5556), 1–25.

Bhatnagar, M., Taneja, S., & Özen, E. (2022). A wave of green start-ups in India—The study of green finance as a support system for sustainable entrepreneurship. *Green Finance*, *4*(2), 253–273. https://doi.org/10.3934/GF.2022012

Broccardo, L., Zicari, A., Jabeen, F., & Bhatti, Z. A. (2023). How digitalization supports a sustainable business model: A literature review. *Technological Forecasting and Social Change*, *187*. https://doi.org/10.1016/j.techfore.2022.122146

Cardinali, P. G., & De Giovanni, P. (2022). Responsible digitalization through digital technologies and green practices. *Corporate Social Responsibility and Environmental Management*, *29*(4), 984–995. https://doi.org/10.1002/csr.2249

Demianchuk, M., Koval, V., Hordopolov, V., Kozlovtseva, V., & Atstaja, D. (2021). Ensuring sustainable development of enterprises in the conditions of digital transformations. *E3S Web of Conferences*, *280*, 1–7. https://doi.org/10.1051/e3sconf/202128002002

Di Vaio, A., Hassan, R., Chhabra, M., Arrigo, E., & Palladino, R. (2022). Sustainable entrepreneurship impact and entrepreneurial venture life cycle: A systematic literature review. *Journal of Cleaner Production*, *378*(September), 134469. https://doi.org/10.1016/j.jclepro.2022.134469

Etter, M., Fieseler, C., & Whelan, G. (2019). Sharing Economy, Sharing Responsibility? Corporate Social Responsibility in the Digital Age. *Journal of Business Ethics*, *159*(4), 935–942. https://doi.org/10.1007/s10551-019-04212-w

Haldar, S. (2019). Towards a conceptual understanding of sustainability-driven entrepreneurship. *Corporate Social Responsibility and Environmental Management*, *26*(6), 1157–1170. https://doi.org/10.1002/csr.1763

Herden, C. J., Alliu, E., Cakici, A., Cormier, T., Deguelle, C., Gambhir, S., Griffiths, C., Gupta, S., Kamani, S. R., Kiratli, Y.-S., Kispataki, M., Lange, G., Moles de Matos, L., Tripero Moreno, L., Betancourt Nunez, H. A., Pilla, V., Raj, B., Roe, J., Skoda, M., … Edinger-Schons, L. M. (2021). "Corporate Digital Responsibility." *Sustainability Management Forum | NachhaltigkeitsManagementForum*, *29*(1), 13–29. https://doi.org/10.1007/s00550-020-00509-x

Hou, T. C. T. (2019). The relationship between corporate social responsibility and sustainable financial performance: firm-level evidence from Taiwan. *Corporate Social Responsibility and Environmental Management*, *26*(1), 19–28. https://doi.org/10.1002/csr.1647

Huang, W., Chau, K. Y., Kit, I. Y., Nureen, N., Irfan, M., & Dilanchiev, A. (2022). Relating Sustainable Business Development Practices and Information Management in Promoting Digital Green Innovation: Evidence From China. *Frontiers in Psychology*, *13*(June), 1–12. https://doi.org/10.3389/fpsyg.2022.930138

Khakwani, M. S., Zafar, A., Mahmood, G., & Khan, Q. M. (2024). Impact of Digital Transformation and Green Manufacturing Practices on Firm Performance with Mediating Role of Green Product Innovation: An Empirical Investigation with PLS-SEM Modeling. *Sustainable Business and Society in Emerging Economies*, *6*(1), 83–98. https://doi.org/10.26710/sbsee.v6i1.2926

Kraus, S., Burtscher, J., Vallaster, C., & Angerer, M. (2018). Sustainable entrepreneurship orientation: A reflection on status-quo research on factors facilitating responsible managerial practices. *Sustainability (Switzerland)*, *10*(2). https://doi.org/10.3390/su10020444

Lotfi, M., Yousefi, A., & Jafari, S. (2018). The effect of emerging green market on green entrepreneurship and sustainable development in knowledge-based companies. *Sustainability*

(Switzerland), *10*(7). https://doi.org/10.3390/su10072308

Ma, M., Zhu, X., Liu, M., & Huang, X. (2023). Combining the role of green finance and environmental sustainability on green economic growth: Evidence from G-20 economies. *Renewable Energy*, *207*(February 2023), 128–136. https://doi.org/10.1016/j.renene.2023.02.046

Mahmood, G., Abbas, N., & Ali Raza, M. (2023). Sustainable Business and Society in Emerging Economies Fostering Social Entrepreneurial Intentions: The Dynamic Interplay of Support Systems and Cultural Intelligence. *Sustainable Business and Society in Emerging Economies*, *5*(3), 305–318. www.publishing.globalcsrc.org/sbsee

Mahmood, G., Khakwani, M. S., Zafar, A., & Abbas, Z. (2024). Impact of Digital Transformation and AI through Fostering Digital Leadership Excellence: A Focus on Sustainable Organizational Performance. *Journal of Accounting and Finance in Emerging Economies*, *10*(1), 33–48. https://doi.org/10.26710/jafee.v10i1.2925

Mittelstädt, E., Mykolenko, O., & Wiepcke, C. (2023). Entrepreneurship education. *Handbook Transdisciplinary Learning*, *4*(2), 123–132. https://doi.org/10.14361/9783839463475-014

Mondal, S., Singh, S., & Gupta, H. (2022). A meta-analysis of green and sustainable business models: A comprehensive approach. *Journal of Cleaner Production*, *371*(August), 133623. https://doi.org/10.1016/j.jclepro.2022.133623

Munir, S., Mahmood, G., Abdullah, F., & Noreen, A. (2023). Exploring the Impact of Digital Leadership on Sustainable Performance with Mediating Role of Artificial Intelligence. *Journal of Accounting and Finance in Emerging Economies*, *9*(3), 213–226. https://doi.org/10.26710/jafee.v9i3.2712

Popescu, C. R. G., & Popescu, G. N. (2019). An Exploratory Study Based on a Questionnaire Concerning Green and Sustainable Finance, Corporate Social Responsibility, and Performance: Evidence from the Romanian Business Environment. *Journal of Risk and Financial Management*, *12*(4). https://doi.org/10.3390/jrfm12040162

Sadiq, M., Nonthapot, S., Mohamad, S., Chee Keong, O., Ehsanullah, S., & Iqbal, N. (2022). Does green finance matter for sustainable entrepreneurship and environmental corporate social responsibility during COVID-19? *China Finance Review International*, *12*(2), 317–333. https://doi.org/10.1108/CFRI-02-2021-0038

Sannino, G., Di Carlo, F., & Lucchese, M. (2020). CEO characteristics and sustainability business model in financial technologies firms: Primary evidence from the utilization of innovative platforms. *Management Decision*, *58*(8), 1779–1799. https://doi.org/10.1108/MD-10-2019-1360

Sarango-Lalangui, P., Santos, J. L. S., & Hormiga, E. (2018). The development of sustainable entrepreneurship research field. *Sustainability (Switzerland)*, *10*(6), 1–19. https://doi.org/10.3390/su10062005

Shiri, N., & Jafari-Sadeghi, V. (2023). Corporate social responsibility and green behaviour: Towards sustainable food-business development. *Corporate Social Responsibility and Environmental Management*, *30*(2), 605–620. https://doi.org/10.1002/csr.2377

Ullah, H., Wang, Z., Mohsin, M., Jiang, W., & Abbas, H. (2022). Multidimensional perspective of green financial innovation between green intellectual capital on sustainable business: the case of Pakistan. *Environmental Science and Pollution Research*, *29*(4), 5552–5568. https://doi.org/10.1007/s11356-021-15919-7

Voinea, C. L., Logger, M., Rauf, F., & Roijakkers, N. (2019). Drivers for sustainable business models in start-ups: Multiple case studies. *Sustainability (Switzerland)*, *11*(24). https://doi.org/10.3390/su11246884

Ye, Q., Zhou, R., Anwar, M. A., Siddiquei, A. N., & Asmi, F. (2020). Entrepreneurs and environmental sustainability in the digital era: Regional and institutional perspectives. *International Journal of Environmental Research and Public Health*, *17*(4). https://doi.org/10.3390/ijerph17041355