Exploratory factor of green entrepreneurial intention towards sustainable startup operation

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Abstract: This study tries to identify the factors influencing sustainability in green entreperenurial start-up. Thus, the goal of the research was to recognize the factors influencing sustainability in green entreperenurial start-up., use the Theory Planned Behaviour approach to analyze the interrelationship among these factors and develop conceptual startup green entreperenurial framework using Structural Equation Modeling. As a result, this goal will assist start-up industry managers and practitioners in better understanding the interactions of enablers and identifying critical enablers that influence the sustainability in green entreperenurial start-up. A knowledge gap exists in how startups, especially in developing economies with less institutional support, can navigate sustainability challenges. There's a clear need for detailed empirical research to explore into these issues. In research methodology side It also emphasizes the importance of ensuring research validity through methods like AMOS-SEM for robustness checks in the models. The researcher could intgrate other theory to measure sustainable business acceptance. Previously the study focusses on sustainability in start-up operations 4.0 but the researcher extends the research on Green entrepreneurial Intention toward Sustainable Startup operations.

Keywords: Green entrepreneurial, Startup, Sustainable.

1. Introduction

The sustainability effects of start-up green entrepreneurial orientation are still being studied, and further study is required to completely comprehend the sustainability implications of start-up in terms of the impact of digitalization on society, the economy, and the environment. Start-up Green entrepreneurship Orientation technologies provide the linking of all stakeholders into a resource for sustainability and future growth, in addition to raw resources and completed items. It is necessary to research the start-up Green entrepreneurial Orientation technology's potential in relation to sustainable environmental aspects. There is growing demand on startups to consider and manage their environmental impacts. The effects of climate change are felt in both what we produce and how we market it. It improves the triple-bottom line. It has sparked attention in academia and business. Startups can help establish a sustainable environment by introducing more interesting user interfaces and innovative product concepts more quickly. In order to develop environmentally sustainable products, startups can learn a great deal about the connections between user experiences and products.

A study on the elements influencing sustainability in green entrepreneurial start-up technology has not yet gotten the required attention, despite research on the aspects influencing sustainability in industry 4.0 [Bai et al (2020), Brozzi et al, Jamwal et al, Kamble, et al (2021)]; and so on having been conducted.

Thus, the purpose of this study is to determine the variables that influence sustainability in green entrepreneurial start-ups. The study aimed to identify the characteristics that contribute to sustainability in green entrepreneurial start-ups.(b) "Analyze the interrelationship among these factors using the Theory Planned Behavior approach and m-TISM," and (c) "validate the green entreperenurial framework using structural equation modeling."Therefore, this goal will contribute significantly to the current industry 4.0 theory and help start-up "industry managers" and "practitioners" better understand the interactions of enablers and identify critical enablers that impact the sustainability in green entrepreneurial start-ups.

The aim of this research is to examine the variables that impact the transition from intention to conduct in green entrepreneurship. A few variables were added to achieve this goal, including management support utilizing Theory Planned Behavior and m-TISM, which helped to validate the relationship.The development of green entrepreneurs is not yet prioritized in scholarly or policy discourse. This generation believes that they can make a much bigger contribution to society if given the chance. Pendrani and Ferguson [2013] claim that scholars have ignored green entrepreneurship, which could have affected public support for green companies. There is no particular empirical evidence in prior research on the relationship between sustainable acceptance and green entrepreneurship intention that takes into account start-up management support and green consumption commitment in Indonesia and, most likely, in international settings, according to a review of seminar papers and important meta-reviews. Thus, this study will contribute to closing the research gap.

2. Literature Reviews
2.1. Sustainability in Green Entrepreneurship and Sustainable– Past Literature

Customers become more environmentally concerned, they tend to prefer greener solutions. Entrepreneurs are recognizing their obligation to promote sustainable firms for a better future, with green entrepreneurship emerging as a new but evolving profession. This field, which focuses on generating environmentally friendly commodities, is beginning to be studied, integrating sustainable development, green markets, and modern entrepreneurship. However, the specific influence of the green market on sustainable development and green entrepreneurship requires further investigation. The study by (Gupta and Dharwal, 2020) emphasizes the early stages and steady maturity of green entrepreneurship, as well as its significance in the production of environmentally friendly goods and technologies. (Gupta and Dharwal, 2020) also proposes a conceptual model for further investigation to address a research gap on the interaction between green markets, entrepreneurship, and sustainable development.Later, a study by (Nunes, Morioka and Bolis, 2022) investigates the difficulties startups encounter when incorporating business models aimed at sustainability. This study, which focuses on Brazilian startups, uses the Sustainable Value Exchange Matrix (SVEM) to identify problems in the institutional, organizational, and market sales areas. It stresses the need for public policy transformation and improved stakeholder participation to address these barriers. The study's main limitation is the small sample size, which may have an impact on the ability to generalize of the findings. This study contributes to a better understanding of the practical obstacles of establishing sustainable business models in startups, and it advises adapting SVEM for more in-depth analysis of value creation and delivery systems in response to these challenges. At some point, a study by (Mondal, Singh and Gupta, 2022) presents a detailed examination of the relationships between green entrepreneurship, sustainable entrepreneurship, and sustainable development. It employs a meta-analytic structural equation modeling approach to investigate the impact of economic, social, strategic, and environmental variables on these domains. The study reveals significant interactions and the moderating effects of venture properties (age, size, and type) on these relationships, providing valuable insights into how strategic sustainable development can influence green and sustainable entrepreneurship and thus contribute to sustainable development goals. In addition to that, a study by (Li, Sun and Gao, 2022) explores the

relation between green entrepreneurial orientation, the integration of opportunity and resource capacities, and long-term competitive advantage. It investigates how green entrepreneurial orientation (GEO) influences sustainable competitive advantage (SCA), focusing on the importance of combining opportunities and resources.

In another study by (Sreenivasan and Suresh, 2023) examines sustainability considerations in the context of the fourth industrial revolution (Industry 4.0) and their impact on startups. It identifies and ranks ten significant elements that determine sustainability in startup operations using Modified-Total Interpretive Structural Modelling (M-TISM) and MICMAC analysis. The study emphasizes the significance of management support for sustainability, decentralized systems, green design, and machine learning systems, among others. It adds greatly to our understanding of how digitization and Industry 4.0 technologies might be used to create sustainability in startup operations.

In a detailed method and instruments, Aswathy Sreenivasan, M Suresh (2023) focuses on examining the factors influencing sustain-ability in start-up operations 4.0. Based on the study's findings, four research questions were addressed. The first RQ deals with identifying factors influencing sustainability in start-up operations 4.0. The current study has identified 10 factors influencing sustainability in start-up op- erations 4.0. The identified factors for this study are management support for sustainability adoption (F1), green design (F2), sustainable human resource management (F3), adoption of sustainability supportive policies (F4),managing data security and handling (F5), reverse logistics (F6), decentralized system (F7), advanced information-sharing systems (F8), quality improvement techniques (F9), and machine learning system (F10) The study emphasizes the significance of management support for sustainability, decentralized systems, green design, and machine learning systems, among others. It adds greatly to our understanding of how digitization and Industry 4.0 technologies might be used to create sustainability in startup operations.

Based on these previous studies, several common themes, gaps, and recommendation for future research were identified. First and foremost, we would like to extend the study by Aswathy Sreenivasan, M Suresh (2023) focuses on examining the factors management support for sustainability adoption management support for sustainability adoption (F1), decentralized system (F7), green design (F2), and machine learning system (F10) are the "driving or key factors., influencing sustain-ability in business acceptance by Green entrepreneurial Orientation Startup Technology. Secondly, green entrepreneurship plays a crucial role in sustainable development, focusing on green innovation, consumer awareness, and environmental concerns. Moreover, technology and Innovation Impact: Green technology and sustainable business models have been shown to improve corporate acceptance and competitiveness. While in term of gaps in the literature, firstly, Lack of Empirical Evidence for Theoretical Models: Although conceptual frameworks relating green entrepreneurship and sustainable development have been suggested, empirical testing is needed to validate these models. Secondly, limited research on the direct environmental impact of green entrepreneurship, highlighting a need for a better understanding of its sustainability implications. Lastly, for future research opportunities include empirical validation of conceptual models that link green entrepreneurship and sustainable development.

The Theory of Planned Behavior (TPB) is a widely used theoretical paradigm in studies of entrepreneurial purpose. Given TPB's cohesive characteristic, parsimonious nature, high generalizability, and robustness as a theoretical framework for explaining and forecasting behavior, intention models were built based on it to explain behavioural actions (Krueger at al. 2000). Three cognitive variables make up the theoretical model: the measure of individual purpose called perceived behavioral control, subjective norms, and attitude toward the conduct. Intention is defined as "indications of how hard people are willing to try, of how much of an effort they are planning to exert, in order to perform the behavior" under the impact of "motivational factors" in Ajzen's (1991) explanation of the relationship between intention and conduct. Greater intention to act should probably result in a comparable level of accomplishment. The TPB model has been used in the field of entrepreneurship on a regular basis. "There are grounds for predicting that a cognitive approach may also yield positive results when applied to the field of entrepreneurship," according to Baron (2004), citing the remarkable success of cognitive approaches in other fields (such as psychology and education). Most people choose to become entrepreneurs knowingly and willingly (Krueger et al., 2000). To engage

in entrepreneurial behaviors, one would need to have the intention to start up or have an entrepreneurial intention (Fayolle, Gailly, & Lassas-Clerc, 2006; Kolvereid, 1996). Ajzen's TPB model consists of three main elements: perceived behavioral control, subjective norms, and attitudes. In empirical investigations, these elements are frequently called cognitive variables (Liñán & Chen, 2009). According to Ajzen (1991), attitudes are defined as "the extent to which an individual has a favorable or unfavorable evaluation or appraisal of the behavior in question." Subjective norms were defined by Iakovleva, Kolver, Eid, and Stephan (2011) as an individual's perception of social pressure to engage in a particular action. It may also be described as an individual's judgment of the significance of a certain conduct in their life (Krueger et al., 2000). Conversely, perceived behavioral control describes one's capacity and viability to carry out a desired activity (Ajzen, 1991). Based on Ajzen's (1991) Theory of Planned Behavior (TPB) and m-TISM, green entrepreneur intention can be understood as a subset of start-up entrepreneurial intention. An individual's intention to become a green entrepreneur will improve if he finds being a green entrepreneur appealing as a professional option and feels that it has great personal importance for him. Similarly, if someone thinks they can handle the risks and obstacles of green entrepreneurship, they will be more motivated to start their own green business. An individual's interest in becoming a green entrepreneur is more likely if they obtain more support from their management.

2.2. Green Entrepreneurial Intention

Green entrepreneurship was first described as the mindset of "environmental entrepreneurs" who generate meaningful areas of value that can be capitalized on for business purposes. (Anderson, 1998). Volery (2002) went on to say that "green entrepreneurs" and "environment-conscious entrepreneurs" should be distinguished from one another. The former are people who are conscious of environmental issues and have a business venture that focuses on pursuing opportunities that are environmentally friendly, while the latter are people who create innovative solutions that minimize resource use and environmental impacts. According to Isaak (2002) and Pearce and Barbier (2000), green entrepreneurs are people who start businesses in a certain industry with a green design, green processes, and a lifelong commitment to sustainability with the goal of transforming that industry towards sustainability. Green entrepreneurs are distinguished from traditional ones by Lacroix and Stamatiou (2007), who highlight their readiness to make financially advantageous business decisions and prioritize socially and environmentally responsible acts. In a more recent explanation, the OECD (2011) succinctly said that "green entrepreneurship" will be understood to mean "entrepreneurship" in "green" sectors, where "green" refers to particular output categories. There are two ways to define "green": the first is to use a set of indicators to evaluate how environmentally efficient manufacturing is, and the second is to list the many kinds of economic activities that go hand in hand with environmental goods and services. The degree to which environmental goals are intentionally prioritized over financial returns, equated with financial goals, or viewed as secondary to economic feasibility varies widely across green entrepreneurs. The deliberate nature of a green entrepreneur's operations will distinguish them from "accidental ecopreneurs," or business owners whose enterprises function sustainably but more as an unexpected byproduct of other business operations (Schaper, 2005). There aren't many quantitative GEI research in the literature. Previous research has primarily addressed the theoretical underpinnings of green entrepreneurship (Anderson, 1998; Isaak, 2002; Schick et al., 2002); traits of green entrepreneurs (Schaper, 1993, 2005, 2010); issues and challenges facing green entrepreneurs today (Volery, 2002); developing models and theoretical frameworks (Majid & Koe, 2012; Schaltegger, 2002; York & Venkataraman, 2010); and the incentives and motivations of green entrepreneurs (Gagnon, 2012; Kirkwood & Walton, 2010, 2014). The development of green entrepreneurial intent or orientation among student populations (Ahmad et al., 2015; Kuckertz & Wagner, 2010; Paramashivaiah et al., 2013; Sudyasjayanti, 2017; Yoon & Hui, 2015) and SME managers and owners (Koe, Omar, & Majid, 2014; Koe et al., 2015; Koe & Majid, 2013) has not been the subject of many quantitative studies. In addition to perceived hurdles related to marketing green products and obtaining financial help, an Indian study that looked at the GEI of engineering and MBA graduates indicated positive perceptions towards green entrepreneurship and green business opportunities (Paramashivaiah et al., 2013). Ahmad et al. (2015)

looked into the propensity of Generation Y undergraduates for green entrepreneurship in a recent study conducted in Malaysia. Self-efficacy was found to be non-significant among the factors tested, whereas sustainable orientation and sustainable education were found to be non-significant.

2.3. Perceived Attitude

According to Ajzen (2005), attitude is a person's disposition to react either positively or negatively to a thing, someone, an organization, or an occasion. It is also the primary factor that determines behavioral intentions (Ajzen, 1991). According to Armitage and Conner (2001), a person's degree of intention to carry out a conduct is positively correlated with how positively they feel about it. It makes sense to distinguish between a person's general attitudes and their particular attitudes toward entrepreneurship in the context of entrepreneurship (Robinson, Stimpson, Huefner & Hunt, 1991). Numerous studies, such as model comparison studies (Krueger et al., 2000), cross-country studies (Autio et al., 2001), self-employment intention studies (Douglas & Shepherd, 2002), and multi-dimension attitudes studies (Gelderen et al., 2008), have established the importance of attitudes to entrepreneurial intention. On the other hand, other research indicates that attitude has a role in entrepreneurial intention. According to Schwarz et al. (2009), there is a substantial correlation between Austrian students' intentions to start their own business and their views toward change and money, but not toward competitiveness. The attitude was found to be adversely significant to entrepreneurial intention at the first level in another study using levels of factor-regression test, and the opposite result was reached at the second level (Liñán, Rodriguez-Cohard, and Rueda-Cantuche, 2011). In Liñán and Chen's (2009) cross-cultural study, sentiments toward entrepreneurial intention had a greater impact on Spanish respondents than Taiwanese respondents. Despite the lack of actual data on individual attitudes toward green entrepreneurship, a meta-analysis of 128 research published between 1971 and 1987 revealed a strong correlation between views and green behaviors overall. (Hines, Hungerford & Tomera, 1987). Many green behaviors, including buying green products (e.g., Abdul Wahid et al., 2011; Aman, Harun, & Hussein, 2012; Chen & Tung, 2014; Rahim, Shamsudin, Mohamed, & Radam, 2013; Ramayah, Lee, & Mohamad, 2010; Rezai et al., 2013), adopting green HR initiatives (Sawang, Kivits, Coast, & Queensland, 2014), intending to return to green hotels (Han & Kim, 2010), using the public bike system (Chen, 2016), recycling (Ramayah et al., 2012; Ramayah & Rahbar, 2013), etc. There is a strong theoretical association between personal attitude and green entrepreneurial ambition, as evidenced by researchers' keen interest in the function of personal attitude towards green behavior. It follows that having a favorable outlook (positive attractiveness and higher satisfaction) should improve one's desire to start a green business., as shown in the hypothesis:

H_1: Attitude positively influences Green Entrepreneurial Intention among startup business.

2.4. Perceived Behavioural Control

According to Gerelderen et al. (2008), perceived behavioral control was first defined as the perceived ease or difficulty of the behavior in question. This makes perceived behavioral control consistent with Bandura's (1982) concept of perceived self-efficacy (Ajzen, 1991), which affects an individual's goals, choices, emotional responses, effort, capacity for coping, and persistence (Bandura, 1982, 1986). Most human performance is attributed to high levels of self-efficacy, according to literature (Bandura, 1993, 1999; Bandura, Pastorelli, Barbaranelli & Caprara, 1999). Additionally, self-efficacy is a great indicator of perceived behavioral control in a corporate setting (Ajzen, 1991). Scherer, Adams, Carley, and Wiebe (1989) operationalized entrepreneurial self-efficacy as proficiency in a range of business domains, including human resources, production, marketing, accounting, and general organizational abilities. By using a standard measurement for entrepreneurial self-efficacy created by Mcgee, Peterson, Mueller, and Sequeira (2009), Martinez and Campo (2011) discovered that the concept of self-efficacy was firmly embedded in the literature on entrepreneurship. There is clear empirical support for the hypothesis that entrepreneurial purpose and perceived behavioral control are related. A substantial correlation was found between global perceived feasibility (SEE), self-efficacy (TPB), and entrepreneurial intents by Krueger et al. (2000) in their comparison of Ajzen's theory of planned behavior (TPB) and Shapero's model of the entrepreneurial event (SEE). Similar to a study by Liñán and

Chen (2009) involving students from Taiwan and Spain, Autio et al. (2001) found that perceived behavioral control emerges as the most important determinant of entrepreneurial intent in their TPB model involving samples from Finland, Sweden, the US, and the UK. Studies conducted in the United States (Wilson, Kickul, & Marlino, 2007), Spain (Liñán, Rodriguez-Cohard, et al., 2011), the Netherlands (Gelderen et al., 2008), and other countries have likewise demonstrated the importance of perceived behavioral control to entrepreneurial ambition. Wilson et al.'s (2007) study, which selected MBA students as its target respondents, is very significant to this investigation. Ahmad et al. (2015), on the other hand, looked at the relationship between generation Y's predisposition toward green entrepreneurship and self-efficacy and found none. Nonetheless, given the compelling empirical evidence from earlier entrepreneurship studies, the lack of specificity regarding the measuring components in the literature suggested that a more reliable and valid measurement tool might provide a different outcome. Thus, under the heading of perceived behavioral control, entrepreneurial self-efficacy is assessed as an independent variable in this study with a predicted influence on green entrepreneurial intention among startup business. The hypothesis developed is as follow:

H_2: *Perceived Behaviourial Control positively influences Green Entrepreneurial Intention among startup business.*

2.5. Subjective Norms

Both the theory of reasoned action and the theory of planned conduct have evaluated the idea of subjective norms using normative belief and social norm (Madden, Ellen & Ajzen, 1992). People's elaborate ideas about subjective norms are based on their assessments of whether or not society, their friends, and family expect them to act in a certain way (Ajzen, 1991). TPB takes into account social influence, such as social norms and normative belief, based on collectivistic culture-related variables, whereas most models are framed inside individual cognitive space. According to TPB, among other sources of perceived normative belief, perceived family support offers the crucial basis of subjective norms that prospective entrepreneurs use to assess whether or not their intention to launch a new business is acknowledged and supported by others and is, in their opinion, significant (Ajzen, 1991). It is widely accepted that the formation of entrepreneurial-related attitudes is influenced by a person's upbringing, interactions with other businesspeople, and prior work experiences (Morris & Lewis, 1995). According to Ajzen's (2002) revised perspective, these people are also likely to be more entrepreneurially inclined if they believe their family supports them in doing so. It has been discovered that references, such as a spouse (Yaacob, 2010) or other industry participants (De Clercq & Voronov, 2011), have an impact on a person's decision to start a green firm. While it is clear that subjective norms have an impact on entrepreneurial intention (Kolvereid, 1996; Krueger et al., 2000), this impact is not constant. When the dependent variable was non-committal, social norms were found to be a more important explanatory variable than behavioral expectancies. (Gelderen et al., 2008). Rather than directly influencing entrepreneurial intention, subjective standards have been observed to alter the impact of perceived attitude and perceived behavioral level (Liñán & Chen, 2009). Perceived social norms are only found to positively significantly influence entrepreneurial intention at the first level of factor regression, while being negligible at the second level, according to Liñán et al. (2011). The perceived agreeableness of allusions to the target respondents' choice to become green entrepreneurs in this study is known as a perceived subjective norm. The measurements used in this study were taken from Liñán and Chen (2009), who evaluated the perceived agreeableness of three references—close friends, family, and university colleagues—with regard to the target respondents' decision to become green entrepreneurs. Apart from this shared set of references, the study evaluated the perceived agreeableness of society overall and the government. This is due to the fact that Malaysia is a typical collectivist society (Hofstede, 2001), where behavior is heavily influenced by social opinion. However, since 2007, the Malaysian government has acted as the primary provider of startup capital and assistance. The government's share of Malaysia's venture capital market was 36% (RM1.2 billion out of RM3.31 billion) in 2007, 54% (RM5.46 billion out of RM5.7 billion in 2011 and 2012) in 2011, and a substantial 61% (RM3.54 billion out of RM5.8 billion) in 2013 (Nor, 2015). Therefore, as part of perceived subjective norms, it is expected that perceived government support for green

entrepreneurship has a considerable impact on green entrepreneurial intention. The hypothesis developed is as follow:

H₉: Subjective norms positively influence perceived green entrepreneurial intention among startup business

2.6. Perceived Educational Support

American institutions were the first to provide courses on entrepreneurship (Kuratko, 2003). According to Gürol and Atsan (2006), there were over 1,600 American schools and universities providing entrepreneurship courses in 2003, up from a negligible number in the 1970s. From the early 1990s, institutions in Asian, European, and African nations led the way in increasing the focus on entrepreneurship education outside of the United States (Gürol & Atsan, 2006). now higher education has historically been the focus of entrepreneurial education, some academics have now suggested that entrepreneurship education should begin earlier in the educational process (Kroon & Meyer, 2001; Stevenson & Lundström, 2001). Due to the enormous influence that entrepreneurship education has on the growth of entrepreneurship, numerous nations are pushing for the introduction of entrepreneurship education at all educational levels, including colleges, universities, and schools (Fayolle & Klandt, 2006). The field of entrepreneurship education has broadened the scope of traditional classroom instruction to encompass the cultivation of an entrepreneurial culture, the encouragement of enterprise, the launch of new projects, and the cultivation of entrepreneurial mindsets via instruction and learning (Kuratko, 2003). With a few notable exceptions (Oosterbeek, Praag & Ijsselstein, 2010), prior research has demonstrated the importance of entrepreneurship education in fostering an entrepreneurial mindset among university graduates (Carter & Collinson, 1999; Galloway & Brown, 2002; Ibrahim & Soufani, 2002; Katz, 2003; Kolvereid & Moen, 1997; Robinson & Haynes, 1991; Solomon et al., 2002). According to Cheng et al. (2009), studying entrepreneurship gives people the ability to "grasp the opportunities with innovative enterprise skills." Young people have profited from entrepreneurship education, according to Co and Mitchell (2006), who noted that it has helped them acquire opportunity searching, recognizing skills, and a clear grasp of risks and benefits. Mohamed et al. (2012) discovered that participants in Malaysia's Basic Student Entrepreneurial Programme (BSEP) for recent graduates had a strong desire to become agro-entrepreneurs. Thus far, empirical studies have demonstrated notable distinctions between students who participate in entrepreneurial education programs and those who do not in terms of their attitudes and intention levels (Fayolle & Liñán, 2014). A small but significant correlation between entrepreneurship education and entrepreneurial intentions was found by Bae, Qian, Miao, and Fiet (2014) in their meta-analysis of 73 studies. This correlation is also larger than the one between general business education and entrepreneurial intentions. However, it is yet unclear if and how those findings might be generalized to a variety of contexts (Zhao et al., 2005). Fayolle and Gailly (2015) also found that little is known about the possible causal relationship between a number of educational variables and the impact of entrepreneurship education programs on the antecedents of intention and/or behavior (attitudes, values, skills, etc.). These variables include participant selection and prior entrepreneurial exposure, course contents, pedagogical methods, teachers' professional profiles, and available resources. For instance, it is still unclear how creating a business strategy influences intents, as raised by Krueger and Carsrud (1993). Additionally, Fayolle and Linan (2014) enumerated a number of crucial but as-yet-unstudied factors in entrepreneurship education that have an impact on students' intentions: the kind of pedagogies used, the background and profile of educators, their own entrepreneurial aspirations, the contents of entrepreneurship education programs (theoretical versus practice-based knowledge), etc. The reciprocal relationships between students' entrepreneurial intentions, the caliber of their entrepreneurial learning, and the growth of their entrepreneurial competencies in educational settings were also suggested by a meta-analysis conducted in 2013 by Martin, McNally, and Kay. These uncharted areas offered a wealth of opportunities for further research on entrepreneurial intention and education. The present study posits that schooling plays a pivotal role in fostering the requisite competencies and establishing the essential cognizance that are required for green entrepreneurial aspirations. It is therefore hypothesised that university students receive some educational support that spurs them to launch their own green businesses. The hypothesis is developed as follow:

H_4: Perceived education support positively influence startup business green entrepreneurial intention.

Green design is essential for a start-up 4.0 to attain sustainability. In order to create more environmentally friendly products, services, and procedures, green design integrates environmental considerations into the creative process (Liu, Zhu, & Seuring, 2017). Low-energy consumption technologies and energy-efficient components can be used by Start-up 4.0 to produce energy-efficient products and services. This may be developing software with less energy requirements, designing hardware with energy-saving features, or sourcing the items' electricity from renewable sources. Start-up 4.0 can produce circular goods and services by reducing waste, using sustainable materials, and creating goods and services that can be recycled and reused. This may mean creating services that motivate users to repurpose goods, utilizing closed-loop manufacturing methods, and creating goods made of recycled or biodegradable materials. Sustainability can be achieved by Start-up 4.0 through the application of green design principles, which can also increase resource efficiency and encourage sustainable behavior. increased competitiveness, improved reputation, and sustained business success. The hypothesis is developed as follow:

H_5: Green design support positively influence startup business green entrepreneurial intention.

3. Methodology

A knowledge gap exists in how startups, especially in developing economies with less institutional support, can navigate sustainability challenges. There's a clear need for detailed empirical research to explore into these issues. In research methodology side It also emphasizes the importance of ensuring research validity through methods like AMOS-SEM for robustness checks in the models.

3.1. Data Collection Procedure

This study uses structural equation modelling (SEM) to test and confirm the factor structure by using items. A total of 384 responses will be collect using multistage clustered sampling.

3.2. Scale Development

The questionnaire has been adapted from Venkatesh et al. (2003), as shown in Table 1. The items comprised Theory Planned Behaviour dimensions, while a few items have been added according to expert suggestions.

3.3. Measurement Instrument

All items in the questionnaire were measured using the Likert scale. These scales used fixed choice response formats and were designed to measure variables addressing individual attitudes, trust, opinions, and emotion (Rattray & Jones, 2007). All five variables of the study were measured on a seven-point Likert scale, i.e., (1) totally disagree to (7) totally agree. Target respondents were asked to reveal their agreement to specific statements that form the measurement item. The scale of agreement is from 1 to 7, where 1= total disagreement and 7=total agreement.

Table 1.
Measurement construct instrument.

Construct	Measurement item		Source
Green entrepreneurial intention (GEI)	1.	Becoming a startup green entrepreneur is my preferred career choice.	Kolvereid (1996)
	2.	My professional goal is to become a startup green entrepreneur.	
	3.	I am committed to run my own start up green business. I	Liñán & Chen (2009)
	4.	am determined to create a start upgreen business in the	
	5.	future.	
		I have been thinking about start up green business ideas.	
Perceived attitude (PA)	1.	Being a start-up green entrepreneur brings more advantages than disadvantages to me.	Liñán & Chen (2009)
	2.	A career as a green entrepreneur is attractive to me.	
	2.	If I had the opportunity and resources, I would like to become a green entrepreneur.	
	3.	Being a green entrepreneur would entail great satisfaction for me.	
	5.	The society should act in a more environmentally conscious way.	Bamberg (2003)
	6.	I support environmental protection measures even if this will cause a loss of jobs.	
	7.	I am concerned about the environmental conditions our children must live under.	
	8.	News reports concerning environmental problems makes me angry.	
	9.	I believe the world is approaching an environmental disaster.	
Perceived behavioural control (PBC)	1.	To start a green business and keep it working would be easy for me.	Liñán & Chen (2009)
	2.	I am prepared to start up a viable green business.	
	3.	I can control the creation process of a new green business.	
	4.	I know the necessary practical details to start up a green business.	
	5.	I know how to develop a green entrepreneurial project.	
	6.	If I tried to start-up a green business, I would have a high probability of success.	
	7.	If I start-up a green business, I can succeed in accomplishing my business ideas.	Chen et. al. (2014)
	8.	If I start-up a green business, I can achieve most of my business goals.	
	9.	If I start-up a green business, I can perform effectively on my business missions.	
	10.	If I start-up a green business, I can effectively overcome environmental problems.	

Subjective norm (SN)	1. If I decided to become a green entrepreneur, my family will support my decision. 2. If I decided to become a green entrepreneur, my friends will support my decision. 3. If I decided to become a green entrepreneur, my degree course-mates will support my decision. 4. If I decided to become a green entrepreneur, I will receive support from the government. 5. If I decided to become a green entrepreneur, I will receive support from the society.	Liñán & Chen (2009)
Perceived educational support (PES)	1. The degree education I have received has helped me to develop knowledge about the green entrepreneurial environment. 2. The degree education I have received has helped me to develop greater recognition of a green entrepreneur's figure. 3. The degree education I have received has helped me to develop a preference to become a green entrepreneur The degree education I have received has helped me to develop the necessary abilities to become a green entrepreneur. 5. The degree education I have received has helped me to develop the intention to become a green entrepreneur.	Liñán, Rodriguez-Cohard et al. (2011)
Green design (GD)	1. Management support is essential for start-up operation 4.0 to adopt sustainable practises and include green design 2. Setting the sustainability agenda and providing the resources required for sustainability projects are essential roles management plays 3. The management will offer incentives for adopting innovations and guarantee that the necessary resources are available for implementing innovations in environmental practices	Sreenivasan & Suresh (2023)

4. Result

After running EFA which being analyse by dimension reduction factor independently for all the constructs which are Perceived Attitude, Perceived Behavioural Control, Subjective Norms, Perceived Educational Support, Green Design, and Green Entrepreneurial Intention. For further procedure of EFA could be run, we need to check for these 2 item which are the value of KMO which need to be higher than 0.50 (Hair, 2014), and Bartlett's Test of Sphericity should be large, and significant at $p < 0.001$ (Hair, 2014). In the nutshell, these constructs were suitable for further EFA analysis as shown in Table.

Table 2.
Summary of KMO for all constructs.

No.	Constructs	KMO (> 0.50)	Bartlett's test of sphericity
1	Perceived attitude	0.877	0.000
2	Perceived behavioural control	0.822	0.000
3	Subjective norms	0.859	0.000
4	Perceived educational support	0.655	0.000
5	Green design	0.620	0.000
6	Green entrepreneurial intention	0.840	0.000

Given that the EFA's outcomes, when EFA was led, the table shows the number of items for each construct. During the extraction process, the number of items for each construct was retained. After EFA, the items that were kept for further analysis.

Table 3.
Summary total item in constructs.

No.	Constructs	Items before run EFA	Number of items dropped	Number of items retained after run EFA
1	Perceived attitude	9	0	9
2	Perceived behavioural control	10	1	9
3	Subjective norms	5	0	5
4	Perceived educational support	5	0	3
5	Green design	3	0	3
6	Green entrepreneurial intention	5	0	5
Total		37	0	34

As a result of the pilot test, the final actual survey will comprises 34 items which means, 3 construct were removed and remaining 34 were retained after the EFA procedure, but the EFA procedure has identified 2 components for PA and PBC constructs which will be used in Confirmatory Factor Analysis procedure as a guidelines.

4.1. Reliability Analysis

According to (Sekaran, 2003) the degree to which a measure is bias-free (error-free) and thus ensures consistent measurement over time and across the instrument's various items is determined by its reliability. To put it another way, a measure's reliability is an indicator of the instrument's stability and consistency in measuring a concept, and it facilitates in determining a measure's "goodness". Cronbach's coefficient alpha (Cronbach, 1946, as cited in (Sekaran, 2003)) is the most widely used test of inter item consistency reliability for multipoint-scaled items.

Cronbach's alpha is a reliability coefficient that measures how well items in a set are positively correlated. The average intercorrelations among the items measuring the concept are used to calculate Cronbach's alpha. The higher Cronbach's alpha is to value 1, the more reliable the internal consistency is. According to (Taber, 2018) alpha values were described as excellent (0.93–0.94), strong (0.91–0.93), reliable (0.84–0.90), strong (0.81), fairly high (0.76–0.95), high (0.73–0.95), good (0.71–0.91), relatively high (0.70–0.77), slightly low (0.68), reasonable (0.67–0.87), adequate (0.64–0.85), moderate (0.61–0.65), satisfactory (0.58–0.97), acceptable (0.45–0.98), sufficient (0.45–0.96), not satisfactory (0.4–0.55) and low (0.11).

Table 4.
Cronbach's alpha.

Reliability statistics		
Construct	**Number of items**	**Cronbach's alpha**
Perceived attitude	9	0.913
Perceived behavioural control	9	0.840
Subjective norms	5	0.887
Perceived educational support	3	0.786
Green design	3	0.734
Green entrepreneurial intention	5	0.974
For all total constructs	34	0.816

Thus, according to table above, all construct of Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions, and Behaviour Intention shows the alpha value between 0.734 and 0.974, which means the construct's internal consistency is excellent. According to (Nunnally, 1978, as cited in (Peterson, 1994)) the author (Nunnally (1978)) first proposed in 1967 that the minimum acceptable reliability Cronbach Alpha for preliminary research to be in the range of 0.5 to 0.6. But, in his 1978 edition of Psychometric Theory, later, Nunnally changed his reliability recommendations from the 1967 edition and increased the recommended level to 0.7. As a consequence, the author proposed a 0.7 rule of thumb, which means that an acceptable level of coefficient alpha to maintain an item in a scale is at least 0.70 and according to above alpha interpretation that (0.76–0.95) considered as fairly high, and (0.70–0.77) considered as relatively high. Since, Green Design and Perceived Educational Support constructs Cronbach Alpha are 0.734 and 0.786 respectively which fall in the range and also above recommended level, so all the Cronbach Alpha for all the construct are valid and reliable according to the test.

5. Conclusion

Using the literature study as a guide, the researchers attempt to formulate a conceptual model here. The study's primary goal is to identify the critical variables that affect sustainability in business acceptability as measured by green entrepreneurial orientation. Customers are increasingly more likely to purchase environmentally friendly products thanks to startup technology, which includes decentralized systems, green design, and machine learning systems. Additionally, consumers' perceptions of the production of environmentally friendly products also contribute to the growth of the green market, which in turn creates a number of entrepreneurial opportunities aimed at empowering and inspiring green entrepreneurs. The interaction between green design, decentralized systems, and machine learning systems and sustainable business acceptability can be used to analyze how business and the environment interact and impact one other. Therefore, one may contend that the growth of the green market is a good thing. Acceptance of Sustainable Business Is Possible. The author's own model, which illustrates the connection between green entrepreneurship and sustainable business adoption, is seen above.

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