7 Entrepreneurship and Innovation for Sustainable Development: An Evidence from Emerging Start-up Ecosystem in India

Tapas Kumar Sahoo[1*], Ghanashyam Kafley[2] & Susita Tamang[3]
[1]Assistant Professor, Faculty of Management and Commerce, M. S. Ramaiah University of Applied Sciences, Bengaluru, India.
[2]Assistant Professor, Department of Commerce, SRM University, Sikkim, India.
[3]Student, Department of Commerce, SRM University, Sikkim, India.

*Corresponding Author: tapassahoo7537@gmail.com
DOI: 10.62823/MGM/2026/III/9789349468061/07

Abstract

Start-up ecosystems have been responsible for enhancing innovation, employment and economic development across many developing regions world-wide; particularly where there are geographical obstacles to development. This study aims to examine how the start-up ecosystem can support the region of Sikkim, India with its emerging ecosystem to enhance sustainable economic growth. The primary data collected from 212 entrepreneurs across all districts in Sikkim using structured questionnaire will be analysed by statistical tools such as descriptive statistics, One-sample t-test, analysis of variance (ANOVA) and relative importance index (RII). From the outcome it is observed that government support, digital connectivity, tourism potential and local entrepreneurship initiatives positively contribute to develop the start-up ecosystem of Sikkim. However, challenges such as limited access to funds, lack of infrastructure, market accessibility issues and skill gap continue to limit entrepreneurial growth. The study has also pointed out that policy implementation must be strengthened, incubation support should be improved, financial accessibility should be facilitated and entrepreneurship development programmes should be provided to promote sustainable economic development in the region.

Keywords: Entrepreneurship, Innovation, Start-up Ecosystem, Sustainable Development, Government Support.

Introduction

Entrepreneurship and Start-Up Ecosystems have developed into major drivers of sustainable development, economic growth and innovation around the world. Within Developing Economies such as India, there has been increased

recognition of the role of start-ups in creating job opportunities, promoting innovation, and using technology and market-based solutions to address socio-economic challenges (Chillakuri et al., 2020; Isenberg, 2010). An entrepreneurial ecosystem consists of entrepreneurs, investors, universities/educational institutions, government agencies, incubators, and other forms of supportive infrastructure that assist in establishing and expanding entrepreneurial ventures (Maisnam & Meitei, 2025; Stam & Spigel, 2016). The degree to which these entrepreneurial ecosystems are effective impacts regional competitive advantage, economic diversification and long-term sustainability (Porter, 1990). Following the implementation of initiatives such as Start-up India, Digital India, Atmanirbhar Bharat, and State Level Entrepreneurial Policies, the start-up ecosystem has grown rapidly in India. The purpose of these initiatives was to establish an innovative culture by increasing access to funding, enhancing skills development, improving infrastructure, and increasing digital connectivity (Sarkar, 2025). Due to rapid growth in venture capital investments, technological advancements, and favourable government policies, India is now considered one of the fastest-growing start-up ecosystems globally (Nagar & Ahmad, 2024; Autio et al., 2018). Despite rapid growth in metropolitan areas, entrepreneurial ecosystems in geographically-constrained small regions face many challenges related to infrastructure, financing and markets (Maisnam & Meitei, 2025; Valdez & Richardson, 2013).

Sustainable Development is becoming a primary focus area in modern-day economics policy-making and entrepreneurism. The integration of Sustainability into Entrepreneurship is based upon achieving economic success while maintaining social welfare and protecting the environment via the Triple Bottom Line approach (Chillakuri et al., 2020). Sustainable Entrepreneurship encourages companies to produce economic value while also solving ecological and societal problems through innovation and socially-responsible actions (Kamysbayev et al., 2025). Studies show that entrepreneurial ecosystems that embrace sustainability have greater resiliency, inclusivity and ability to promote long-term regional development (Mukherjee et al., 2025). Furthermore, the types of start-ups operating in sustainable ways include those specializing in eco-friendly products, renewable energy systems, tourism operations, organic farms and digital services all contributing to a sustainable transformation of the economy (Kafley et al., 2025).

The state of Sikkim presents a unique context for examining the relationship between start-up ecosystems and sustainable economic development. With its focus on organic farming practices, ecologically-sensitive nature and tourist potential, Sikkim has implemented an increasing number of strategies to utilize entrepreneurship as a means to achieve inclusive and sustainable economic growth. The state government has implemented numerous initiatives designed to support entrepreneurship, enhance skill development opportunities for youth and rural

ISBN: 978-93-49468-06-1

residents, as well as provide self-employment opportunities for residents (Nepal & Das, 2025). Additionally, vocational education programs, digital inclusion initiatives and entrepreneurial training programs associated with SDG's will strengthen the state's developmental framework (Nepal & Das, 2025). Nonetheless, entrepreneurs in Sikkim experience multiple challenges including limited access to finance, inadequate physical infrastructure, poor connectivity to markets, regulatory hurdles and limited knowledge about available government support schemes (Sarkar, 2025; Maisnam & Meitei, 2025).

There exists a large volume of existing literature that examines entrepreneurship and start-up ecosystems in India in relation to sustainable development; however, few empirical studies have analysed the specific start-up ecosystem located in Sikkim. While most studies have focused on metropolitan regions or overall national level assessments of entrepreneurship, they leave a void in understanding how entrepreneurial ecosystems operate within smaller Himalayan States that have unique geographic characteristics and socio-economic conditions. This study aims to analyse the function of the start-up ecosystem as it relates to the promotion of sustainable economic development in Sikkim by evaluating the current status of the start-up ecosystem in Sikkim; identifying key opportunities for strategic development; and assessing major entrepreneurial challenges faced by entrepreneurs in Sikkim. The study adds to an ever-expanding body of literature on regional entrepreneurship and provides evidence-based policy recommendations for strengthening inclusive and sustainable start-up ecosystems in emerging regions throughout India. The paper is organized into five components consisting of an introduction section; a review of relevant literature; description of research methodology; discussion of results from data analysis; and presentation of findings with conclusions and recommendations for future action.

Literature Review

The start-up ecosystem has received increased focus from scholars because it can stimulate innovation; create new jobs; and provide for sustainable economic development. There are many reasons why entrepreneurship is considered the engine of economic and social change, especially in developing countries. As mentioned earlier, one example is India (Chillakuri et al., 2020). The various components of the start-up ecosystem include: Entrepreneurs; Investors; Government Institutions; Educational Organizations; Incubators; Infrastructure; and Policy Support Systems that all together help grow entrepreneurial ventures and generate innovation (Maisnam & Meitei, 2025; Stam & Spigel, 2016). Research shows that when there are strong entrepreneurial ecosystems at the local level they play a significant role in creating competitive advantages for regions economically, technologically, and in terms of their ability to achieve more inclusive forms of economic development.

ISBN: 978-93-49468-06-1

Many researchers have studied the expansion of the Indian start-up ecosystem over time. Some of those researchers have focused on how government programs have supported entrepreneurship. For instance, Sarkar (2025), among others, discussed that government programs such as Start-up India, Digital India, and Atmanirbhar Bharat provided a favourable environment for the creation of innovative businesses; job creation; and for the development of entrepreneurial ventures within India. Nagar and Ahmad (2024), along with other authors, have pointed out that Start-up India had a positive effect on the number of start-up registrations, the availability of funds for start-ups, and the degree of innovation-related activity in businesses throughout the country. In addition, Chandiok (2016) stated that as a result of advancements in technology; the presence of favourable policies; and increasing interest from investors, India has rapidly developed into one of the most quickly expanding start-up ecosystems around the world.

In recent years, there has been substantial scholarly inquiry into the relationship between entrepreneurship and sustainable development. Specifically, Chillakuri et al. (2020) presented a theoretical framework for relating start-up ecosystems to sustainable development based upon the three-dimensional model known as the triple bottom line which includes: economic sustainability; environmental sustainability; and social sustainability. Additionally, Kamysbayev et al. (2025) argued that sustainable entrepreneurial ecosystems encourage long term economic transformations by providing green innovations; facilitating open innovation systems; and promoting socially accountable practices. Moreover, Shivhare et al. (2024) found that sustainable entrepreneurship increases entrepreneurial empowerment; builds trust with customers; fosters social inclusion; and promotes long-term sustainability in business ventures.

Research conducted on both regional and rural entrepreneurial endeavours demonstrate the value of establishing local entrepreneurial ecosystems and institutional supports. For example, Mukherjee et al. (2025) indicated that entrepreneurship generates livelihoods; creates self-employment opportunities; and contributes to the overall socio-economic development of communities, particularly since the onset of the COVID-19 pandemic. Furthermore, Mukherjee et al. (2025) emphasized that entrepreneurship development institutions; training programs; and skill-building initiatives strengthen entrepreneurial sustainability. Likewise, Nepal and Das (2025) reported that vocational education; entrepreneurship training; and skill-development policies in accordance with SDG-4 have promoted self-employment opportunities and fostered entrepreneurial cultures in Sikkim.

Additionally, researchers identify several obstacles that impede start-up ecosystems, primarily in underdeveloped regions. For example, Maisnam and Meitei (2025) documented that although the number of start-up activities are increasing in North East India; inadequate infrastructures; restricted funding options; poor

ISBN: 978-93-49468-06-1

connectivity; and reduced levels of investment inhibit the growth of entrepreneurs. Similar findings were made by Sharma et al. (2020) who identified barriers including: restricted market access; difficulties acquiring customers; and limitations in marketing capabilities that hinder growth for start-ups in India. Also, Kafley et al. (2025) stated that a lack of consumer knowledge about; affordability of; and accessibility to sustainable entrepreneurial products hinder the adoption of these types of products in Gangtok.

Although prior studies have examined entrepreneurship, start-up ecosystems, and sustainability in India in great detail, empirical research related to start-up ecosystems in Sikkim is limited. While existing literature focuses primarily on large metropolitan areas or broad national perspectives, it leaves a void in understanding the dynamics of start-up ecosystems in smaller Himalayan States. Thus, this study aims to fill this void through an empirical analysis of entrepreneurial opportunities, strategies, and challenges within the context of Sikkim's start-up ecosystem in relation to fostering sustainable economic development in Sikkim

Research Methodology

- **Research Design**

The present study uses an Empirical Research Design that is Descriptive to assess the impact of the Start-Up Ecosystem on Sustainable Economic Development for the State of Sikkim. The Descriptive aspect of this Study used to identify and report the current status of Entrepreneurship, Opportunities and Challenges related to Entrepreneurial Activities. The Empirical nature of this Study allows the researcher to analyse Primary Data that was obtained through direct interactions with Entrepreneurs and Stakeholders within the Start-Up Ecosystem.

- **Sources of Data Collection and Questionnaire**

The present study relies on primary data obtained directly from entrepreneurs and start-up stakeholders that are operational in all districts of Sikkim. The data were collected via a structured questionnaire. This questionnaire was developed to assess the role of the start-up ecosystem in facilitating sustainable economic development. Depending on the geographic location of the respondent and the accessibility of the surveyors, the questionnaire was distributed via field surveys or telephonically during telephone interviews with the respondents.

The questionnaire consisted of four main parts. Part one included questions about demographic characteristics (i.e., age, gender, level of education, type of business, number of years in business, and annual income). Part two asked about the state of the start-up ecosystem in Sikkim, including government support, infrastructure and digital connectivity. Part three evaluated ways that the sustainable economic development can be enhanced using start-ups. Finally, part four was to identify barriers to entrepreneurship that include lack of funds; limited market

ISBN: 978-93-49468-06-1

accessibility; gaps in skills; and inadequate infrastructure. A five-point Likert-type scale was utilized to determine how respondents perceive and think about each variable being studied.

- **Sample Size and Geographical Scope of the Study**

The target population of this research consists of the entrepreneurs/individuals involved in start-up & small businesses in the State of Sikkim. In order to adequately sample from the wide range of entrepreneurial sectors and geographic locations within the state, a total of 212 respondents have been included in the research. Samples were obtained by way of telephone interview & face-to-face survey across each district of Sikkim based on their location/accessibility. The study covers a wide array of sectors including: Tourism; Organic Farming; Handicrafts; Retail Business; Food Processing; Digital Services; etc. Due to a higher concentration of entrepreneurship/establishments in urban and semi-urban areas, a larger number of responses were received from those areas. An effort was however made to collect responses from remote/rural areas so that an overall view can be obtained regarding the start-up eco-system across the entire State. Collecting data from all of the Districts will add credibility/reliability to the results of this study and provide a wider perspective regarding the opportunities/challenges related to sustainable entrepreneurship development in Sikkim.

- **Statistical Tools and Techniques**

Data collected were coded, categorized and presented using both Microsoft Excel and Statistical Package for Social Sciences (SPSS) software. Microsoft Excel was used to present the data while SPSS software was utilized to perform both descriptive and inferential statistics to analyse the results of this study and to determine how well a start-up ecosystem supports sustainable economic growth within Sikkim. To examine the reliability and internal consistency of the questionnaire items, Cronbach's Alpha test was applied. Cronbach's Alpha measures the consistency among multiple items included in a scale and is represented by the following formula:

$$\boldsymbol{\alpha = \frac{K}{K-1}\left(1 - \frac{\sum \sigma_i^2}{\sigma_t^2}\right)}$$

Where, α represents Cronbach's Alpha coefficient, which measures the internal consistency and reliability of the questionnaire items. K denotes the total number of items included in the scale, σ_i^2 represents the variance of individual items, and σ_t^2indicates the total variance of the overall scale. Cronbach's Alpha is widely used to assess the reliability of survey instruments, and a coefficient value greater than 0.70 is generally considered acceptable, indicating satisfactory internal consistency and reliability among the variables used in the study.

ISBN: 978-93-49468-06-1

The One-Sample t-test was employed to determine whether the mean perception of respondents regarding different aspects of the start-up ecosystem significantly differed from the neutral value. The formula used for the One-Sample t-test is:

$$t = \frac{\bar{X} - \mu}{S/\sqrt{n}}$$

Where, $\bar{X}$ represents the sample mean, μ denotes the hypothesized population mean, S refers to the sample standard deviation, and n indicates the sample size. The One-Sample t-test is used to determine whether the mean value of the sample significantly differs from the assumed population mean, thereby helping to test the statistical significance of respondents' perceptions regarding different aspects of the start-up ecosystem.

The study also applied Analysis of Variance (ANOVA) to examine whether significant differences existed in facing challenges among respondents belonging to different age groups. ANOVA helps compare the mean values of more than two groups simultaneously and identifies whether variations among groups are statistically significant.

$$F = \frac{SSB/(k-1)}{SSW/(N-k)}$$

Where, F represents the ANOVA test statistic used to determine whether significant differences exist among the mean values of different groups. MSB refers to the Mean Square Between Groups, while MSW indicates the Mean Square Within Groups. SSB denotes the Sum of Squares Between Groups, SSW represents the Sum of Squares Within Groups, k indicates the number of groups, and N refers to the total number of observations. ANOVA helps identify whether variations among groups are statistically significant.

Further, the Relative Importance Index (RII) was used to rank the strategic factors and challenges affecting entrepreneurial development in Sikkim according to respondents' perceptions. The formula used for RII is:

$$RII = \frac{\sum W}{A \; x \; N}$$

- **Scope and Limitation of the Study**

The focus of this research was to explore the impact that the start-up ecosystem has had on the growth of sustainable economic activity for entrepreneurs working within the confines of the designated districts of Sikkim. In addition to providing an important insight into the start-up opportunities and challenges that exist, this research has provided a unique perspective on entrepreneurship through the lens of the ecosystems that foster such ventures.

ISBN: 978-93-49468-06-1

Analysis of Data

- **Descriptive Analysis**

Table 1 outlines the demographics of the study participants. Approximately 45.3 percent of study participants were from the ages of 25-35. This represents an active level of engagement by younger people in entrepreneurial activity. The majority of male participants (63.2 percent) participated in this study, while 36.8 percent of female participants also participated in this study. This demonstrates that there is still growing interest in women's entrepreneurship within Sikkim. With regard to their educational backgrounds, approximately 83.7 percent of participants had some form of higher education or have completed at least two years of college education. This illustrates that the education and skills development component is important for all aspects of new business ventures. Data also revealed that Tourism/Hospitality, Retail Business, and Organic Farming were the primary entrepreneurial industries identified as being present in Sikkim. More than 40 percent (approximately 41.5 percent) of these firms operated for less than three years, which indicates that many of these firms are new to the local start-up ecosystem. Furthermore, the results indicate that approximately 67.6 percent of these entrepreneurs earned annual incomes ranging from Rs. 200,000 – Rs. 500,000 per year, illustrating that the majority of firms engaged in entrepreneurial activities in this area operate on a smaller scale and are in a developmental stage.

Table 1. Demographic Profile of Respondents

Demographic Variable	Category	Frequency	Percentage
Age Group	Below 25 Years	32	15.1
	25–35 Years	96	45.3
	36–45 Years	58	27.4
	Above 45 Years	26	12.2
Gender	Male	134	63.2
	Female	78	36.8
Educational Qualification	Higher Secondary	28	13.2
	Undergraduate	92	43.4
	Postgraduate	74	34.9
	Others	18	8.5
Nature of Business	Tourism & Hospitality	54	25.5
	Organic Farming	38	17.9
	Retail Business	46	21.7
	Handicrafts & Handloom	24	11.3
	Digital & Online Services	30	14.2
	Others	20	9.4
Years of Business Operation	Less than 3 Years	88	41.5
	3–5 Years	64	30.2
	6–10 Years	42	19.8
	Above 10 Years	18	8.5

ISBN: 978-93-49468-06-1

Annual Income	Below ₹2 Lakhs	46	21.7
	₹2–5 Lakhs	92	43.4
	₹5–10 Lakhs	52	24.5
	Above ₹10 Lakhs	22	10.4

Source: SPSS output based on Primary data

- **Reliability Analysis**

Table 2 presents the reliability statistics of the different variables used in this study. All Cronbach's Alpha coefficients exceeded .7 on the scale from 0-1. Therefore, each construct has high internal consistency reliability. Sustainable economic development had the highest Cronbach's alpha of 0.874, start-up ecosystem development had an alpha of 0.842. Government assistance, policy issues, and other entrepreneurial challenges were also consistently above the 0.8 mark on the alpha scale (0.816 & 0.798). Overall, the Cronbach's Alpha coefficient for the entire survey was found to be 0.857. This confirms the validity of the survey as a data collection tool; therefore, it can be used for further statistical testing and interpretations.

Variables	Number of Items	Cronbach's Alpha
Start-up Ecosystem Development	8	0.842
Government Support and Policies	6	0.816
Sustainable Economic Development	7	0.874
Entrepreneurial Challenges	6	0.798
Overall Scale Reliability	27	0.857

Source: SPSS output based on Primary data

- **Analysis of the Current Status of the Start-up Ecosystem in Sikkim**

The One-Sample t-test was conducted to examine whether respondents' perceptions regarding different aspects of the start-up ecosystem significantly differ from the neutral mean value. The test helps determine the statistical significance of respondents' opinions related to government support, infrastructure, funding accessibility, entrepreneurial opportunities, and sustainable economic development in Sikkim. Table 3 presents the results of the One-Sample t-test conducted to analyse respondents' perceptions regarding various dimensions of the start-up ecosystem in Sikkim. The test value was fixed at 3, representing the neutral point on the five-point Likert scale. The findings reveal that all variables recorded mean values significantly higher than the neutral value, indicating positive perceptions toward the start-up ecosystem in the state. Among all variables, start-up opportunities in Sikkim recorded the highest mean value (4.02) and t-value (18.473), indicating strong agreement among respondents regarding the entrepreneurial potential of the state. Similarly, digital infrastructure, government support, and entrepreneurial awareness programs were also found to be statistically significant with p-values less than 0.05. These findings suggest that policy initiatives, technological development, and entrepreneurship training are positively influencing start-up activities in Sikkim.

ISBN: 978-93-49468-06-1

Although access to funding facilities and market accessibility showed comparatively lower mean values, the results were still statistically significant, indicating that respondents moderately agree about the availability of these facilities.

Table 3. Result of One Sample t test

Variables	Test Value	Mean	t-value	Sig. value	Result
Government Support for Start-ups	3	3.84	14.926	0.000	Significant
Availability of Digital Infrastructure	3	3.92	17.184	0.000	Significant
Access to Funding Facilities	3	3.21	3.205	0.002	Significant
Availability of Skilled Workforce	3	3.47	7.842	0.000	Significant
Entrepreneurial Awareness and Training	3	3.78	13.761	0.000	Significant
Market Accessibility	3	3.18	2.894	0.004	Significant
Institutional and Policy Support	3	3.69	11.608	0.000	Significant
Start-up Opportunities in Sikkim	3	4.02	18.473	0.000	Significant

Source: SPSS output based on Primary data

- **Analysis of Strategies for Sustainable Economic Development**

This section examines the primary strategic elements supporting the start-up ecosystem and hindering entrepreneurial development in Sikkim. A Relative Importance Index (RII) was used to rank variables by respondent perception. The results of this study will provide information on which strategic requirements have the greatest influence on sustainable economic development from start-ups in Sikkim and identify key barriers. Table 4 includes RII values and rankings of the primary strategic factors and entrepreneurial challenges impacting the start-up ecosystem in Sikkim. The study identifies areas that should be addressed to improve entrepreneurial development and promote sustainable economic development in the state. Government Financial Support and Subsidies ranked first with an RII score of 0.884. This indicates that respondents viewed financial assistance, start-up incentives and policy support as vital to the growth and sustainability of entrepreneurial ventures. Due to their geographical constraints, entrepreneurs in Sikkim may heavily depend on institutional support since they do not have adequate access to private investment or venture capital. Digital Infrastructure improvement ranked second with an RII score of 0.861. The finding emphasizes the importance of Internet connectivity, digital platforms and technology availability in increasing business opportunities and improving marketing reach. Entrepreneurial Training/Skill Development Programs were determined to be significant strategic factors and reflect the rising need for entrepreneurial education, technical skills and innovative capability among new venture owners.

Limited Access to Finance/Funding was identified as the largest obstacle to entrepreneurial activity in Sikkim with the highest RII value of .902. The finding suggests that entrepreneurs experience substantial difficulty in obtaining loans, credit

ISBN: 978-93-49468-06-1

facilities and investment funding for both establishing and expanding businesses. Limited Market Accessibility and Lack of Advanced Infrastructure were identified as two other large impediments to entrepreneurship activity. These challenges are pronounced in mountainous/remote locations because there is typically limited connectivity, transportation, logistics etc. Additionally, the findings indicated that a Shortage of Skilled Workforce; Bureaucratic Procedures; Transportation Issues; and High Operational Costs each negatively influenced entrepreneurial activities in the state. In summary, while Sikkim has demonstrated positive entrepreneurial capacity through Government Initiatives and Digital Development, it must address its Financial Constraints; Infrastructural Limitations; and Market Accessibility Challenges if it wishes to create a Sustainable and Equitable Start-Up Ecosystem that can contribute positively to Long-Term Economic Growth.

Table 4. Result of Relative Importance Index

Strategic Factors	RII Value	Rank	Entrepreneurial Challenges	RII Value	Rank
Government Financial Support and Subsidies	0.884	1	Limited Access to Finance and Funding	0.902	1
Improvement in Digital Infrastructure	0.861	2	Inadequate Market Accessibility	0.874	2
Entrepreneurship Training and Skill Development	0.846	3	Lack of Advanced Infrastructure	0.851	3
Market Linkage and Promotional Support	0.821	4	Shortage of Skilled Workforce	0.826	4
Start-up Incubation and Mentorship Programs	0.807	5	Lack of Awareness about Government Schemes	0.803	5
Access to Low-Interest Loans and Credit Facilities	0.792	6	Bureaucratic and Administrative Procedures	0.788	6
Collaboration with Educational Institutions	0.776	7	Transportation and Connectivity Issues	0.774	7
Promotion of Sustainable and Eco-Friendly Businesses	0.764	8	High Operational Costs	0.752	8

Source: SPSS output based on Primary data

- **Analysis of Variance (ANOVA)**

The result from Table 5 is used to assess if a difference exists in how individuals perceive entrepreneurial challenges when grouped according to different ages in Sikkim. As can be seen from the table, none of the p-values associated with the variables were less than 0.05, thus there is no evidence of a difference in opinion based on respondent's age. In terms of the specific challenges experienced by entrepreneurs in Sikkim, it was found that all entrepreneurs regardless of their age experienced similar levels of difficulty accessing funding and investment

ISBN: 978-93-49468-06-1

opportunities, finding skilled labourers, linking into markets, dealing with bureaucracy, accessing technology and having knowledge of government programs available for start-ups. This implies that regardless of age group, entrepreneurs in Sikkim face the same operational and structural challenges. Among the six items listed in the table, "Cultural and social perceptions about entrepreneurship affect business growth" had the largest F-value of 2.631 with a p-value of .074 while "Awareness and use of government schemes and incentives for start-ups is low" had an F-value of 2.303 with a p-value of .102. In spite of the fact that both of these items demonstrated larger variation in response relative to the remaining five items, neither item produced a statistically significant result at the 5% confidence interval.

Additionally, this study also demonstrated that all entrepreneurs regardless of age category continue to have problems with obtaining financing, creating sufficient infrastructure to accommodate growing businesses, connecting with customers and regulatory issues; as such these are issues that need to be addressed through improved financial accessibility, creation of physical infrastructure, improved technical support systems and effective policy making for start-up businesses.

Table 5: Result of ANOVA

	Sum of Squares	df	Mean Square	F-value	Sig. (p-value)	Result
Entrepreneurial Challenges- Lack of infrastructure facilities affects start-up growth						
Between Groups	3.218	2	1.609	1.871	0.157	Insignificant
Within Groups	179.707	209	0.860			
Total	182.925	211				
Entrepreneurial Challenges- Access to funding and investment opportunities is a major challenge for start-ups in Sikkim						
Between Groups	2.556	2	1.278	0.968	0.382	Insignificant
Within Groups	275.949	209	1.320			
Total	278.505	211				
Entrepreneurial Challenges- Entrepreneurs face difficulties in hiring skilled labour suitable for start-up needs						
Between Groups	1.288	2	0.644	0.470	0.626	Insignificant
Within Groups	286.575	209	1.371			
Total	287.863	211				
Entrepreneurial Challenges- Lack of proper market linkages hinders the expansion of start-ups						
Between Groups	2.340	2	1.170	0.866	0.422	Insignificant
Within Groups	282.490	209	1.352			
Total	284.830	211				
Entrepreneurial Challenges- Bureaucratic and regulatory challenges create barriers to starting and running a business						
Between Groups	4.588	2	2.294	1.270	0.283	Insignificant
Within Groups	377.657	209	1.807			
Total	382.245	211				

ISBN: 978-93-49468-06-1

Entrepreneurial Challenges- Limited access to advanced technology affects business growth in Sikkim						
Between Groups	1.435	2	0.717	0.544	0.581	Insignificant
Within Groups	275.754	209	1.319			
Total	277.189	211				
Entrepreneurial Challenges- Awareness and utilization of government schemes and incentives for start-ups are low						
Between Groups	6.212	2	3.106	2.303	0.102	Insignificant
Within Groups	281.840	209	1.349			
Total	288.052	211				
Entrepreneurial Challenges- Cultural and social perceptions about entrepreneurship impact business growth						
Between Groups	5.724	2	2.862	2.631	0.074	Insignificant
Within Groups	227.319	209	1.087			
Total	233.043	211				

Source: SPSS output based on Primary data

Findings and Discussion

The findings of this research show that the start-up ecosystem of Sikkim serves as a critical platform for achieving sustainable economic development and creating job opportunities for young people. The research shows that there is growing evidence of involvement of younger educated persons into entrepreneurial activity; thus showing an evolving trend away from reliance on conventional employment towards self-employment and entrepreneurial ventures. This growing trend is consistent with the assertions made by Mukherjee et al. (2025) concerning the contribution of entrepreneurship toward generating livelihoods and driving socio-economic transformation especially during the post-pandemic period. Additionally, they pointed out that vocational education, entrepreneurship training and skills development programs related to SDG-4, can foster entrepreneurial inclination or entrepreneurial opportunity-seeking behaviours among youth in Sikkim.

The empirical analysis further showed that the respondents perceived Sikkim as possessing high levels of entrepreneurial capability, particularly in the areas of tourism, organic farming, eco-products, handicrafts, and digital services. These perceptions are consistent with the theoretical assumptions proposed by Chillakuri et al. (2020); which indicated that start-up ecosystems play a vital role in achieving sustainable development if supported by innovative technologies, digital infrastructure and collaborative relationships among various stakeholders. Moreover, the findings confirm those of Kamysbayev et al. (2025) who suggested that entrepreneurial ecosystems create conditions conducive to enhancing economic transformation through stimulating innovation-based business practices and environmental responsibility. Thus, the promotion of organic farming and eco-entrepreneurial practices in Sikkim demonstrates the increased incorporation of sustainability principles into local businesses. Likewise, Kafley et al. (2025) reported

ISBN: 978-93-49468-06-1

that environmentally-conscious consumption patterns and eco-business practices are increasingly playing significant roles in sustainable regional development.

Moreover, the study demonstrated the importance of government support and policy interventions in improving and supporting the start-up ecosystem. Financial assistance and support programs, start-up incentives and entrepreneurial training programs were perceived as being important strategic factors influencing entrepreneurial sustainability. As such, these findings are consistent with those presented by Sarkar (2025) who demonstrated that government-led initiatives such as Start-up India, Digital India, and Atmanirbhar Bharat have greatly enhanced entrepreneurial opportunities and start-up growth throughout India. Furthermore, Maisnam and Meitei (2025) stressed that supportive policies and availability of digital connectivity are crucial for developing start-up ecosystems in northeast India. Consequently, the findings indicate that public institutional support remains an essential component in supporting geographically constrained regions like Sikkim, given that access to private investment and venture capital is relatively lower than other parts of India.

Although the majority of findings indicated a positive trajectory toward sustainable development, the study revealed that there were several structural obstacles impeding sustainable start-up growth in Sikkim. Limited access to financing was identified as the greatest obstacle experienced by entrepreneurs. These findings are consistent with those provided by Maisnam and Meitei (2025) who reported that inadequate funding opportunities and low investor participation are significant impediments to start-up growth in northeast India. Similar findings have been reported by Sharma et al. (2020) in their assessment of the challenges associated with accessing credit, expanding markets, and sustaining operational costs faced by start-ups in emerging economies due to limited financing options and infrastructural shortcomings. Further, the study found that insufficient market accessibility and lack of modern infrastructure severely impacted entrepreneurial development in Sikkim. These challenges are exacerbated in remote and mountainous areas where transportation, communication connectivity and logistics pose ongoing challenges to business operation.

Additionally, it was determined through the study that a lack of qualified personnel, bureaucracy and poor understanding of available government programs inhibit both the efficiency of entrepreneurs and the capacity for expanding their start-ups. Mukherjee et al. (2025) emphasized that for entrepreneurship to be sustained over time, institutional support, continuing skill development/training needs to be provided to entrepreneurs so as to enhance their capacities and flexibility. Finally, Chillakuri et al. (2020) emphasized that for sustainable start-up ecosystems to be established successful coordination among governments, educational institutions,

ISBN: 978-93-49468-06-1

investors and entrepreneurs is required to facilitate long-term sustainable economic and social benefits.

Conclusion and Future Scope

The present study examined the role of the start-up ecosystem in promoting sustainable economic development in Sikkim. The findings reveal that the start-up ecosystem has emerged as an important driver of entrepreneurship, innovation, employment generation, and regional economic transformation within the state. The study highlights that sectors such as tourism, organic farming, handicrafts, eco-friendly products, and digital services possess significant entrepreneurial potential and contribute toward sustainable development. Government initiatives, digital infrastructure, entrepreneurship training programs, and policy support were identified as major strategic factors strengthening the start-up ecosystem in Sikkim. The study further reveals that younger and educated individuals are increasingly participating in entrepreneurial activities, reflecting the growing awareness and acceptance of self-employment and start-up culture in the state. However, despite the presence of entrepreneurial opportunities, several challenges continue to hinder start-up growth and sustainability. Limited access to finance, inadequate market accessibility, infrastructural limitations, shortage of skilled workforce, and bureaucratic procedures were identified as the major barriers affecting entrepreneurial development.

The findings indicate that sustainable entrepreneurial growth in Sikkim requires stronger financial support systems, improved infrastructure, enhanced digital connectivity, and effective implementation of government schemes and start-up policies. The study concludes that the start-up ecosystem in Sikkim possesses substantial potential to contribute toward long-term sustainable economic development if supported through coordinated institutional efforts, entrepreneurial training, innovation promotion, and region-specific policy interventions. Strengthening collaboration among government agencies, educational institutions, financial organizations, and entrepreneurs can further improve the entrepreneurial environment and create inclusive economic opportunities across the state. The present study provides significant insights into the start-up ecosystem and sustainable economic development in Sikkim; however, there remains considerable scope for future research.

Future studies may undertake comparative analyses between Sikkim and other North-eastern states to examine regional differences in entrepreneurial development and start-up sustainability. Researchers may also focus on sector-specific start-up ecosystems such as tourism, organic farming, digital entrepreneurship, and eco-friendly businesses to obtain deeper insights into their economic contribution and sustainability practices. Further research can incorporate larger sample sizes and advanced statistical techniques such as Structural Equation

ISBN: 978-93-49468-06-1

Modelling (SEM), factor analysis, and regression analysis to examine the relationship between entrepreneurial ecosystem variables and sustainable economic outcomes.

References

Autio, E., Nambisan, S., Thomas, L. D., & Wright, M. (2018). Digital affordances, spatial affordances, and the genesis of entrepreneurial ecosystems. *Strategic entrepreneurship journal*, *12*(1), 72-95. https://doi.org/10.1002/sej.1266

Chandiok, C. (2016). India's startup ecosystem: Growth and challenges. *International Journal of Innovation and Applied Studies, 17*(1), 15–23. http://dspace.ediindia.ac.in:8181/xmlui/handle/123456789/4142

Chillakuri, B., Vanka, S., & Mogili, R. (2020). Linking sustainable development to startup ecosystem in India-a conceptual framework. *International Journal of Business and Globalisation*, *25*(2), 139-153. https://doi.org/10.1504/IJBG.2020.107884

Isenberg, D. J. (2010). How to start an entrepreneurial revolution. *Harvard business review*, *88*(6), 40-50. https://growthorientedsustainableentrepreneurship.wordpress.com/wp-content/uploads/2016/07/en-how-to-start-an-entrepreneurial-revolution.pdf

Kafley, G. S., Sahoo, T. K., & Bhutia, T. W. (2025). A study on consumer attitudes toward eco-friendly product in Gangtok district. In P. Debnath & B. K. Dey (Eds.), *Business Economy in India: Current Scenario and Future Prospects* (pp. 62–83). Bharti Publications. https://doi.org/10.70381/978-93-48059-87-1.2025.5

Kamysbayev, M., Talassov, G., Orazgalieva, A., Nursultanov, S., Moldashev, A., & Kaliev, G. (2025). Forming an innovative start-up ecosystem to increase the entrepreneurial activity of companies (as exemplified by asian countries). *Qubahan Academic Journal*, *5*(2), 100-115. https://journal.qubahan.com/index.php/qaj/article/view/1435

Maisnam, V., & Meitei, C. I. (2025). Startup ecosystem of Northeast India: A sectoral analysis. *Advances in Consumer Research, 2*(6), 2828–2834.

Mukherjee, S., Singh, D. V., Das, D. R., & Bhuyan, D. A. (2025). Entrepreneurship towards sustainable livelihood: a literature exploration. *Journal of Global Entrepreneurship Research*, *15*(1), 31. https://doi.org/10.1007/s40497-025-00457-0

Nepal, R. P., & Das, P. K. (2025). Enhancing SDG-4 Outcomes through Vocational Education in Sikkim. *World Journal of Economics, Business and Management*, *2*(8), 14-18. https://hal.science/hal-05217105v1

Porter Michael, E. (1990). The competitive advantage of nations. *Harvard Business Review*, *68*(2), 73-93.

ISBN: 978-93-49468-06-1

Sarkar, S. (2025). STARTUP BUSINESS FOR ENTREPRENEURSHIP IN INDIA: GOVERNMENT POLICY AND CHALLENGES. *VIDYA-A JOURNAL OF GUJARAT UNIVERSITY*, *4*(2), 560-570. https://doi.org/10.47413/egbb0q92b

Schumpeter, J. A. (1934). The theory of economic development. Cambridge, MA: Harvard. *SchumpeterThe Theory of Economic Development1934*.

Sharma, R., Gupta, P., & Singh, M. (2020). Challenges and opportunities for startups in emerging economies. *International Journal of Entrepreneurship and Small Business, 15*(3), 211–225.

Shivhare, A., Kumar, V., & Sharma, S. (2024). Sustainable entrepreneurship and consumer empowerment in emerging markets. *Journal of Sustainable Business and Development, 12*(4), 88–102.

Stam, E., & Spigel, B. (2016). *Entrepreneurial Ecosystems. Utrecht School of Economics. Tjalling C. Koopmans Research Institute*. Discussion Paper Series 16-13.

Valdez, M. E., & Richardson, J. (2013). Institutional determinants of macro–level entrepreneurship. *Entrepreneurship theory and practice*, *37*(5), 1149-1175. https://doi.org/10.1111/etap.12000

Valdez, M. E., & Richardson, J. (2013). Institutional determinants of macro–level entrepreneurship. *Entrepreneurship theory and practice*, *37*(5), 1149-1175. https://doi.org/10.1111/etap.12000.

☯☯☯

ISBN: 978-93-49468-06-1