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Connecting Keralam's Startup Ecosystem and Sustainable Development Goals: A Conceptual Analysis

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Abstract

Sustainable Development Goals (SDGs) are a comprehensive global blueprint for making the world a better place to live by addressing the most pressing issues of the world like poverty, inequality, environmental degradation, quality education etc, by 2030. A The startup ecosystem of Keralam act a vanguard in fostering innovation, investment and entrepreneurship. In this context, Keralam's startup ecosystem, driven by Keralam's startup mission (KSUM) lines up with the Sustainable Development Goals by interlinking academics, health, agriculture, climate and digital services is very noticeable at the global level.

In this decade of innovation, by integrating Keralam's startup ecosystem with over 6900 plus startups and SDGs can foster the state as world recognizable, hub for Economic Social and Governance (ESG) compliant economy, sustainable job creation, attracting investment and can outperform the standards set in sectors like health, education, agriculture and energy.

Over the past decade the catalytic role played by the Government of Keralam has revolutionized the startup ecosystem in state. Along with this the paradigm shift in the mindset of youth, redirecting them to startups instead of moving to traditional occupational patterns have contributed to this transformation. Despite this progress, challenges such as financial constraints bureaucratic barriers, scarcity of skilled human capital, outmigration of skilled professionals, COVID 19 induced challenges, and importantly limited consciousness among the startups to come in line up with the sustainable development goals act as barriers in the way of flourishment.

This study aims to analyse the alignment between Keralam's startup ecosystem and sustainable development goals highlighting existing challenges in this regard and proposing policy intervention to tackle this problem

Keywords: Sustainable Development Goals, Keralam's startup ecosystem, Economic Social and Governance, digital services, Job creation

Introduction

Keralam, god's own country's startup ecosystem system now emerging as a top most hub for startups in India for entrepreneurs looking to create their own business. Keralam

offers a set of advantages thus making it an unique platform to convert their ideas into successful ventures. Highly skilled labourers and affordable cost of living are the two main reason for this. Everything in this regard was spearheaded by Keralam Startup Mission (KSUM), the state has built a successive ecosystem by including incubators, accelerators, techparks, innovation hubs and funding support mechanisms. In 2015, United Nations put forward a blueprint consisting 17 goals which is to be achieved by 2030, for making the world a better place to live by improving all spheres that touches life. Poverty, education, climate change, gender equality, water, sanitation, energy, environment, industrial development and social justice are the predominant areas covered by SDGs. These aims are part of the larger 2030 Agenda for Sustainable Development, which is an evidence-based framework with 169 targets and 232 indicators that must be met by 2030. (UN General Assembly, 2015).



Figure 1. Sustainable development goals relevant to the study
Source: United Nations (2015)

Keralam's startup ecosystem's alignment with SDGs has increased over the past decade fostering innovation led, more inclusive and sustainable inclusive growth is noticeable at the global level. Most importantly Government of Keralam's strategic policy manoeuvres has helped the state to strengthen its startup ecosystem. Traditionally, Keralam's economy relied on remittances and service sector. However in the past few years, there is an evident shift in the thinking pattern of young minds of Keralam from job seekers to job creators, has also added colours to this. Importantly this ecosystem has designed in such a way that to not only foster innovation and employment but also to achieve the broader SDGs. This study examines how Keralam's startup ecosystem directly contribute to some selected SDGs.

Statement of the problem

Keralam is widely known for its achievements in human development indices which is more that the national average. Yet Keralam continues to struggle with a serious concern of high educated unemployment and increasing brain drain causing a scarcity in areas that require highly skilled professionals. Many young creative minds leave the state in search of better living opportunities thus creating a gap. To address this issue Keralam is actively promoting its startup ecosystem spearheaded by Kerala Startup Mission (KSUM) and many technology hubs such as Technopark and Info park. The present investigation

examines, while startups promote innovation and employment, concerns exist regarding inclusiveness, sustainability. Therefore it becomes necessary to examine the alignment with Keralam's startup ecosystem and SDGs.

Objectives

- To examine the theoretical link between Keralam's startup ecosystem and particularly SDGs 4,5,8,9,10,12 and 13
- To identify the lacunae in aligning startup with Sustainable Development Goals.

Methodology

This study adopts a descriptive research to examine the alignment between Keralam's startup ecosystem and SDGs. The study focuses particularly on SDGs 4,5,8,9,10,12 and 13. The study is primarily secondary data based combining conceptual analysis. This helps to evaluate selected SDG indicators. The SDGs are selected based on their conceptual relevance to startup led development. The analysis is based upon the secondary sources including Kerala Startup Mission (KSUM) ecosystem reports, Government of Keralam policy documents, NITI Aayog's SDG-related reports, United Nations SDG framework documents, relevant academic related articles, selected reports and new sources relating to state's startup ecosystem

The study uses thematic analysis to examine how startup activities and policy interventions contribute to selected SDGs. The analysis also identifies key gaps and challenges, including access to finance, gender related barriers, migration, regional concentration, regulatory constraints and limited adoption of sustainable business practices.

Review of literature

Startups are identified as major contributors to achieve sustainable development goals because of their dynamic nature. The one thing that make from others is its flexibility to adapt to the changing needs, solving real world problems and ability to contribute to SDGs (Cohen & Winn, 2007). The SDGs established why United Nations in 2015 presents an ambitious agenda to address global challenges such as poverty, inequality and environmental degradation by 2030 (United Nations, 2015). To achieve these objectives or goals it requires the joint efforts of all strata's of the society which includes business startups and their innovative nature which have emerged as major contributors.

Across the globe the startup ecosystem has emerged as a major driver of economic growth characterized by technological innovation and employment generation. Regardless of the nature of the economy that is developed or developing startups have contributed to the commercialization of new ideas encouraging innovation and enhancing competitiveness. Many studies have highlighted that a supportive startup ecosystem consisting of efficient investors incubators, government support research organization and highly skilled human capital is essential for nurturing entrepreneurial ventures. According to (Ali M, 2009) the development of startups largely depends on the presence of an

enabling environment that provides adequate infrastructure access to financial resources and regulatory support such an ecosystem encourages individuals to take entrepreneurial risk and supports sustainability of innovative business models.

Keralam traditionally recognized for its high human development indicators like literacy health standards and social welfare has shifted its focus towards entrepreneurship as a strategy for economic diversification and employment generation in recent years the state government has actively promoted a startup friendly environment to stimulate innovation and support new business ventures characterized by sustainability. The official government reports uh indicate A consistent increase in the number of registered startups in the state reflecting growing entrepreneurial culture and policy support.

A primary driving force which help this transformation is Kerala Startup Mission (KSUM) which plays a pivotal role in shaping the startup ecosystem by offering incubation facilities, mentoring, financial assistance and networking opportunities for entrepreneurs (Kerala startup mission, 2019: Kerala startup mission, 2023). The technology parks for example techno park in Thiruvananthapuram, Info park in Kochi and Cyber park in Kozhikode provide startups with access to infrastructure, professional networks and collaboration opportunities with established firms. Additionally, innovation and entrepreneurship cells established within education institutions have played an important role in promoting student entrepreneurship by encouraging young innovators to develop business ideas and launch startups in their academic careers. For this Innovation and Entrepreneurship Development Centre (IEDC) is an example in this regard. These initiatives collectively contribute to the gradual evolution of Keralam as a world recognizable startup hub. (Times of India, 28 July 2025).

Results and Discussion

Linkages between Keralam's Startup Ecosystem and SDGs 4, 5, 8, 9, 10, 12 and 13

SDG 4 : Quality education

Education plays a pivotal role in the development of societies, serving as foundation of social, economic and cultural advancements. With the rapid development in technology, agencies including government are redefining education to equip students with necessary skills to match demand of new era. In this regard, education Technology (EdTech) has emerged as a new hand in helping this transformation. EdTech encompasses a range of technological tools, including software, hardware and associated technologies with the goal of promoting, engaging, interactive and individualized learning experiences. A study conducted in Keralam revealed that majority of the students use EdTech in their learning journey. (EdTech, Examining experiences, challenges and future directions, Centre for public policy research August,2023).

SDG 5 : Gender equality

The startup ecosystem in Keralam supports women entrepreneurship and gender inclusiveness. The women entrepreneurship in Keralam is experiencing a significant surge driven by high literacy, government support, and many community initiatives like kudumbashree. There is an increase in female led enterprises in Keralam. The Keralam Government actively promotes this through Keralam startup mission's soft loan scheme which provides up to Rs. 15 lakhs for working capital. According to 2013-14 Economic census, only 13.7% of establishment in Keralam were owned by women. After the state formulated its first startup policy in 2014, recent data shows that 31% of newly registered startups are women-led.

SDG 8 : Decent work and economic growth

The director general's report to 87th session of the international labour conference introduced the idea of decent work in 1999. The notion captures many and diverse aspects of work in the modern world in a way that is understandable to all (Ghai, 2003). The creation of high skill employment opportunities in IT, AI, biotechnology, fintech and tourism technology is a notable thing in this regard. K-AI (Kerala-Artificial Intelligence) is a flagship initiative of Government of Keralam, designed to accelerate the adoption of AI across governance, public service delivery and innovation ecosystem. This initiative was formally inaugurated by the hon'ble chief secretary of Kerala on 12th June, 2025. Another initiative is that, Keralam development and innovation strategic council (K-DISC) initiative, Keralam Knowledge Economy Mission (KKEM), aims to create jobs for educated by transforming Keralam into a knowledge society. Through startups supporting local industries such as agriculture, tourism and health care, there will be an increased inflow of investment and regional economic growth.

SDG 9 : Industry, innovation and infrastructure

Keralam has emerged as a top performer in India for startups, heavily aligning its ecosystem with SDG 9. The ecosystem is recognized for its affordable talent, ranking 4th globally in the 2024 global ecosystem report (World Economic Forum). KSUM operates major infrastructure projects, including the integrated startup complex, Digital Hub and Maker Village. Keralam is a home to a super Fab Lab and 23 mini Fab Labs prototyping facilities for hardware startups.K-FON & Startup infinity is a major land mark in this way. Startups are not just business ventures but creators of solutions for sustainability.

Examples include

- GenRobotics (Sanitation robots)
- Navalt Solar Boats(Electric Boats)

Keralam is the first state in India to launch an Environmental, Social and Governance (ESG) policy, aligning economic growth with environmental stability.

SDG 10 : Reduced inequalities

The promotion of fintech startups ensure financial inclusion. Many digital platforms supports rural entrepreneurship and small enterprises. There are many affordable technological solutions for healthcare, education and financial services. The state government also provides many incentives to ensure the participation of marginalized sections like women, SC/ST communities, transgenders, and the elderly in entrepreneurship. Kudumbashree micro enterprises, Prathyasha project, Saranya scheme and women construction groups are the major examples. The Entrepreneur Support Scheme (ESS) provide 25% subsidy for SC/ST, women and young entrepreneurs compared to 15% for general categories. The backward classes development department (BCDD) provides up to Rs 10 lakh to graduates from backward communities for technology driven startups. An important step in this regard is the "new innings" project where the KSUM helps citizens aged 50 and above to start ventures. These initiatives are not only aimed to achieve economic growth but also to ensure that the benefits are shared by all sections of the society.

SDG 12 : Responsible consumption and production

Every startups commence its operations by focusing on sustainable production and environmentally accountable business models. Responsible consumption and production is defined as " the use of services and related products which respond to basic needs and bring a better quality of life while minimizing the use of natural resources and toxic materials as well as emission of waste and pollutants over the life cycle of the service or product so as not to jeopardize the needs of future generations" (Tukker et al., 2006). Keralam startup ecosystem is trying to line up with the SDG12 and the state is continuously ranked as a top performer in the NITI Aayog's SDG India Index, is focusing on making an economy with reduced waste and sustainable practices. To replace single use plastics material biodegradable packaging solutions and eco friendly products are developed by startups in Keralam. To reduce food waste and to increase resource efficiency in agriculture initiatives like "subhiksha Keralam" project and Kerala innovation festival 2025 which was held on July 2025 give importance to purpose driven green and sustainable startups bringing together innovators investors and policymakers.

SDG 13 : Climate action

Keralam startups support climate action group green innovation and environmental technologies. The possible relationship between SDG 13 and Keralam startup ecosystem is the development of clean energy and its focus on renewable energy startups climate tech innovations such as carbon monitoring environmental data analytics and disaster

management system are examples of this. The Keralam state which is ranked as 1 in SDG performance by NITI Aayog (2023-24), give importance to incorporating green technologies waste management and climate resilience into its startup ecosystem. Keralam is supporting startups which is dedicated to climate action with a special focus on renewable energy, electric vehicles (EVs), sustainable packaging and a waste management. These all contribute in achieving SDG 13. Keralam startup mission provides grants and support for innovative ideas that address environmental challenges. State's 2025-26 budget also focus on ESG practices offering incentives for sustainable industries. Partnership between higher education department and KSUM encourage students to develop green sustainable solution for campuses.



Figure 2. Keralam's startup ecosystem and selected SDGs
Source: Compiled by the author based on secondary sources

Comparative perspective: Keralam, Karnataka and Maharashtra

Keralam, Karnataka and Maharashtra have strong startup ecosystems, but they differ in strengths and challenges. Keralam's Startup Mission (KSUM), Universities and many government initiatives supports Keralam's ecosystem. Karnataka, particularly Bengaluru, has a strong technology base while Maharashtra benefits from large markets, financial institutions and diversified industries especially around Mumbai and Pune. In terms of SDG alignment, Keralam shows greater alignment with inclusive development, green innovation and social entrepreneurship, whereas Karnataka's ecosystem is strongly technology driven and Maharashtra's is supported by financial and industrial base. However, Keralam continues to face challenges such as limited funding, migration, concentration of startups in urban centers.

The lacunae or challenges of Keralam's startup ecosystem in aligning with Sustainable Development Goals

- Majority of the startups have the problem of limited access to capital as a primary issue. Green and socially relevant startups needs more time and investment even

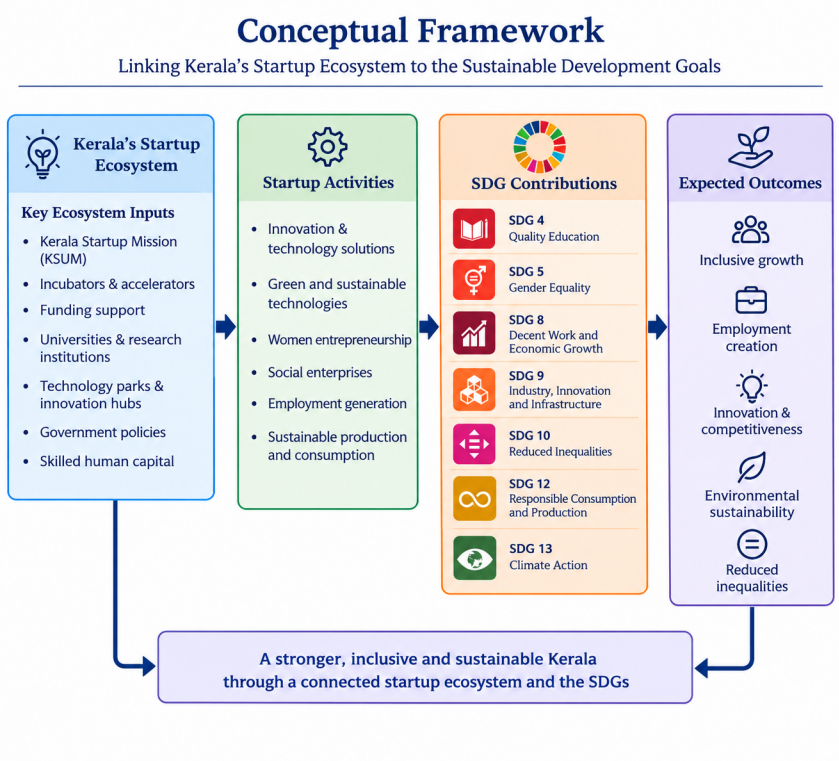


Figure 3. Conceptual framework showing the link between Keralam's startup ecosystem and SDGs
Source: Author's own conceptualisation.

before they become profitable. Investors who prefer quick returns as they follow the traditional path can struggle to get adequate funding. As a result some promising SDG related ideas may remain at the early stage or fail to expand.

- Inadequate physical or digital infrastructure particularly in rural areas act as a barrier in the spreading of green tech and rural innovation.
- One of the important problem faced by Keralam startup ecosystem is the talent migration and skill gap. Keralam's relatively high educational attainment created a strong human capital base, but migration of skilled professionals can reduce the availability of specialized talent within the emerging startup sectors. This is particularly relevant for areas such as artificial intelligence, biotechnology, advanced manufacturing and climate technology. This can lead to increased recruitment cost and limit the ability to startups.
- Startups focusing on social impact or environmental sustainability often face difficulties in accessing finance. Because sustainable startups may require longer gestation periods which means them less attractive . So this adversely effects SDG related innovation.
- Although Keralam has several schemes to support women entrepreneurs, especially in rural areas may still face difficulties in accessing finance, networks and mentorship. Unnecessary social expectations and limited opportunities can also discour-

age women from starting and expanding businesses. Addressing these problems can help improve women's participation in startup ecosystem and support SDG 5.

- The concentration of startup infrastructure, incubators, investors and networking opportunities in major urban areas only can create unequal access to entrepreneurial opportunities across regions. Entrepreneurs in rural and semi-urban areas may face higher transaction costs and weaker access to mentorship, technology infrastructure and investment networks. This regional concentration can weaken its contribution to SDG 10.
- Sometimes startups face bureaucratic delays and regulatory complexities. These problems can adversely affect entrepreneurship and slow down innovation.
- Some startups may contribute to increased resource consumption e-waste and energy use so lack of emphasize on green business models may hinder the achievement of SDG 12 and 13.

Suggestions and policy recommendations

Keralam could establish a dedicated state level green startup fund to provide grants, prototype funding and patient capital to startups focusing on environmentally and sustainably relevant areas based on the finance requirements of eligible green startups. The government should change its focus towards green startups by giving special incentives and subsidies. By introducing tax benefits and grants for startups addressing these issues which are closer in achieving sustainable development goals and social challenges. The government should provide low interest loans and seed funding for startups to support SDG related innovations. Another suggestion is that to strengthen the relationship between universities, research institutions and startup incubators. A dedicated women startup cell could provide funding, mentorship, digital skills training and social support especially women in rural and semi-urban areas. Establishing startup incubators and innovation hubs in rural and semi urban areas can bridge the spatial imbalances. Another important measure to solve the gap is to reduce bureaucratic hurdles and regulatory complexities for commencing a startup. The more easier the clearance system the more it will be easier for the young minds to bring up with innovative ideas. By introducing SDG impact assessment frameworks to measure startups contribution to sustainable development we can integrate SDG into startup policies which can ensure sustainability.

Conclusion

The startup ecosystem in Keralam over a decade has became a primary driver of innovation, entrepreneurship and economic development. Through the helping hand of government initiatives, incubation centers and educational institutions the ecosystem has made the young minds of the state from job seekers to job creators. These achievements shows the ability of startups to contribute significantly to the achievement of sustainable development goals particularly SDGs 4,5,8,9,10,12 and 13.

However there exist several challenges in aligning the startup ecosystem with SDGs

some of the challenges include limited funding for social and green startups, inadequate startup and educational collaboration, gender disparities, urban concentration of the startups and insufficient awareness of SDG integration has all become barriers in achieving the sustainable development goals.

Addressing this lacunae requires targeted policy interventions, improved funding mechanism, enhanced capacity building and stronger collaboration among the stakeholders. Keralam's experience shows that startups can be linked with sustainable development through cooperation between government, universities and incubators. Support for green startups, women entrepreneurs and rural innovation can help other Indian states to develop more inclusive and sustainable startup ecosystems. Thus Keralam can set a model for other states in India by integrating its startups with SDGs.

References

Ali, M., Ullah, S., & Khan, P (2009). Managing innovation and technology in developing countries. *arXiv Preprint*

Cohen, B.,& Winn, M.I. (2007). Market imperfections, opportunity and sustainable entrepreneurship. *Journal of Business Venturing, 22(1), 29-49.*

Centre For Public Policy Research. (2023, August).*EdTech: Examining, challenges, and future directions*. Centre for public policy research.

Ghai, D. (2003). Decent work: Concept and indicators. *International Labour Review*, 142(2), 113-145.

Kerala Startup Mission. (2019). The state of Kerala Startup Ecosystem: Ecosystem report 2019. Kerala Startup mission https://startupmission.kerala.gov.in/reports/reports

Kerala Startup Mission. (2023). The state of Kerala Startup Ecosystem: Ecosystem report 2023. Kerala Startup mission https://startupmission.kerala.gov.in/reports/reports

The Times of India.(2025,July 28). Techno park turns 35: India's pioneering IT campus & innovation hub. The Times of India, https://timesofindia.indiatimes.com/city/thiruvananthapuram/technopark-major-contributor-to-states-it-exports-turns-35/articleshow/122956316.cms

Tukker, A., De Zoysa, U., & Hertwich, E. G. (2006). The Oslo declaration on sustainable consumption. *Journal of Industrial Ecology, 10*(1–2), 9–14.

United Nations. (2015). *Transforming our world: The 2030 Agenda for Sustainable Development*. United Nations General Assembly. https://sdgs.un.org/2030agenda