

Green Startups: A New Way to Achieve Sustainable Development Goals

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Abstract

Green startups have become an important factor in solving the global sustainability crisis and contribute to the UN Sustainable Development Goals (SDGs). Research focuses on the ways in which environmentally conscious startups generate sustainable development through innovation in areas such as clean energy, waste management and sustainable urban planning. Drawing on existing literature, the study demonstrates the mechanisms through which green startups can support several SDGs at once and identify the conditions in the ecosystem under which their success depends. Through a combination of global trends and the Indian context – home to one of the fastest growing startup ecosystems in the world – the study uses case studies of companies such as ReNew Power and Banyan Nation to provide concrete examples of the impact of green startups on reducing CO2 emissions, increasing resource efficiency and promoting responsible consumption. The results demonstrate that the three most important factors that will determine the success of green startups are policy frameworks, access to financing and raising public awareness, while regulatory barriers and funding shortages continue to be the biggest obstacles to green startup success. The paper also presents hypothetical connections between institutional support, consumer behavior and the success of green startups, as a starting point for future empirical studies. Methodologically, the study uses a descriptive method based on secondary data and examples to summarize the key trends.

Keywords: Green Startups, Sustainable Development Goals (SDGs), Environmental Innovation, Sustainability Ecosystem, Impact Investment.

Introduction

Green startups are new companies that focus on creating products and/or services that have an environmental dimension (i.e., sustainable) and develop their business model according to sustainable practices. As such, green startups intend to create value economically while addressing ecological problems [1]. Over the last few years, policymakers and investors have started to emphasize the significant role that early stage green startups play in achieving global environmental sustainability goals. For example, the World Economic Forum states that "early stage startups are working on breakthrough technologies that could help the world meet the promises of the Sustainable Development Goals" [2]. Through the creation of new technologies and business models, green startups can address various SDGs (for instance, clean energy, sustainable cities, responsible consumption) simultaneously [1], [2].

In the last five years, the number of startups focused on sustainability has grown exponentially. India's startup ecosystem, currently ranked third in the world, includes approximately 90,000 companies, with over 100 unicorns generating over \$30 billion in value. Most of these companies are green startups in sectors like renewable energy, waste management and clean transportation. This growth is largely due

to government policies (like India's National Solar Mission and FAME electric vehicle program), and rising consumer awareness of sustainability. Therefore, it is essential to investigate how green startups can facilitate the achievement of the SDGs. In this paper, we review existing research and present examples to understand the impact, challenges and facilitators of green startups.

Literature Review

Researchers agree that startups are uniquely suited to addressing sustainability issues. Boulahlib (2024) indicates that "startups play a fundamental role in promoting sustainable development through the creation of innovative solutions to address the economic, social, and environmental challenges of society", allowing startups to contribute to multiple SDG objectives (including poverty, inequality, climate change etc.) [3]. Additionally, analysts have argued that a healthy green startup ecosystem can "greatly accelerate progress toward sustainable development goals through the integration of environmental benefit and economic opportunity" [4]. In short, green entrepreneurs can create jobs and reduce environmental degradation at the same time.

Research studies have identified specific characteristics of green entrepreneurship. For example, Phani et al. (2024) defined green entrepreneurship as "the process of achieving economic growth through the use of natural resources and minimizing pollution" [1]. They indicate that green startups generally prioritize resource efficiency, waste reduction and carbon reduction in their products. Furthermore, the literature has shown that many green startups draw extensively upon innovation networks and partnerships with stakeholders. For example, case studies from an Indian technology incubator have demonstrated that early stage green startups rely on social and human capital (university labs, technical mentors etc.) to develop their products [5], [6].

However, researchers also recognize that obstacles exist. Some argue that green startups are more costly and have uncertain cash flows compared to non-green startups, primarily because the benefits of environmental protection are non-excludable [7]. Research has repeatedly cited limited access to finance, regulatory barriers and lack of awareness among consumers as impediments to green entrepreneurship. Meera (2024) emphasizes that institutional support is necessary, and that governments that encourage renewable energy and green investments can guide economies towards SDGs [8]. Overall, the literature describes green startups as the engines of innovation for sustainability but also recognizes that green startups' success is dependent upon a supportive system.

Importance/Relevance of the Study

To meet the SDGs, not only is top-down policy change needed, but also bottom-up innovation. Green startups constitute a bottom-up force capable of filling technological and market gaps in sustainability. Since the formal goals of the SDGs were established for 2030, it is imperative to understand how entrepreneurial activity aligns with them. The World Economic Forum has called for an "entrepreneurial revolution to achieve the SDGs," arguing that "there is no better way to do this than to support innovative early-stage start-ups" [9]. Worldwide and in India, evidence on the actual impact of green startups on SDG outcomes is still emerging. By systematically reviewing the existing cases and data, this study fills gaps in knowledge on which startup activities are the most effective at driving SDGs and what factors facilitate or impede their effect. The results can provide guidance to policymakers, investors and ecosystem builders about how to direct entrepreneurial momentum towards sustainable development.

Problem Statement

Although the promise of green entrepreneurship has been widely recognized, the linkages between startup activity and SDG progress are not well-defined. Therefore, several questions remain unanswered: Exactly how do green startups contribute to specific SDG objectives? What scale of impact do green startups have on issues such as the adoption of clean energy, or the reduction of pollution? Moreover, what institutional and market barriers limit the ability of green startups to realize their full potential? The problem studied in this study refers to the limited empirical evidence on the role of green startups in sustainable development, specifically in the Indian context which is rapidly building out its startup ecosystem. The study articulates this problem clearly by summarizing the examples and cases presented in the literature to form the basis for targeted policy and investment strategies.

Objectives

The objectives of the study are:

- To assess the contribution of green startups to sustainable development objectives. Examine the ways in which startup innovations align with and enhance the achievements of SDG objectives (e.g. affordable clean energy, reduction of waste).
- To analyze the institutional support and frameworks. Identify government programs, policy incentives and ecosystem elements that allow or restrict green entrepreneurship.
- To identify drivers, challenges and success factors. Investigate what encourages entrepreneurs to establish green startups and what difficulties they experience in scaling up their activities.
- To provide illustrative examples of green startups. Provide examples of specific green startups to describe their strategic approaches, innovations and measurable environmental effects.
- To project future trends and prospects. Evaluate the expected growth of green startups and propose how they may be used to expedite the progress toward SDGs globally and in India.

Hypotheses

On the basis of the literature and objectives, the study presents the following hypotheses:

- H₁:** There is a statistically significant positive relationship between the activities of green startups and the progress toward Sustainable Development Goals.
- H₂:** Green startups that obtain strong institutional support (funding incentives, simplified regulations etc.) perform significantly better in terms of achieving SDG-related outcomes than those that do not receive similar support.
- H₃:** Increased awareness of consumer demand for environmentally sustainable products moderates the effect of green startups so that increased public demand for green products enhances the contributions of green startups to the SDGs.

Research Methodology

This research uses an exploratory and descriptive method based on secondary data and case studies [10]. We collect insights on green startups and SDGs from recent scientific literature, industry reports and reliable online sources (think tank publications and press) to obtain data. Important data consist of statistics regarding the numbers of green startups and investment in green sectors, policy documents describing programs of support, and reports on the environmental impact of green startups if available. Additionally, we selected a few representative green startups as illustrative cases to describe real-world practices; the information on these companies comes from news articles, company reports and academic citations. Since this study did not involve primary data collection or surveys, it depends on existing information to explain trends and arrive at conclusions. The descriptive methodology enables the systematic aggregation of the current state of knowledge on the topic [10].

Limitations of the Study

There are several limitations associated with this study. First, it is based on secondary sources, thus the analysis depends on the availability and quality of existing reports and literature. Although we relied on peer reviewed journals and credible data wherever possible, some industry or media sources may have biases or may contain incomplete information. Second, the study is wide-ranging (it covers the global and Indian contexts), however, it is not comprehensive. The examples and case studies selected are exemplary and therefore do not represent all sectors or geographic locations. Third, since we did not conduct primary data collection, we cannot empirically test the hypotheses; rather we suggest plausible relations based on qualitative evidence. Fourth, the rapid evolution of both startups and SDG initiatives implies that new developments may occur subsequent to this analysis. When interpreting the results of this study, these limitations should be considered.

Results

Although there are many studies on green entrepreneurship and green start-ups, very few of them focus on the linkages between green entrepreneurship and sustainable development. Most studies look at green entrepreneurship from a microeconomic perspective and rarely consider the broader societal implications of their activities. The literature identifies two main barriers to successful green

entrepreneurship: financial constraints and lack of knowledge about sustainable development. There are many examples of successful green start-ups around the world, but little systematic analysis of what makes them successful. Examples of successful green start-ups include Ecovative (biodegradable packaging), H&M Conscious (clothing made from recycled material), and Vestas Wind Systems (wind turbines).

The study reviewed the current state of the literature on green start-ups and their relationship to the UN Sustainable Development Goals (SDGs). The literature provides significant insight into the motivations and behaviors of green entrepreneurs. However, it is primarily theoretical and lacks direct evidence of the positive impacts of green start-ups on sustainable development. Therefore, the study will also collect direct evidence from the field using case studies of successful green start-ups in order to analyze their positive impacts on sustainable development. The case studies will provide a rich source of data to answer the research questions posed in this study.

Background and Rationale

As the global community continues to face significant environmental challenges, including climate change, deforestation, biodiversity loss, air and water pollution, and soil degradation, it is clear that the old growth paradigm is unsustainable and that new approaches to solving these problems are needed. One promising approach is green entrepreneurship. While green entrepreneurship is often seen as a niche area of research within entrepreneurship studies, the scope of the topic is broad and includes both large multinational corporations (MNCs) and small and medium-sized enterprises (SMEs). The term "green entrepreneurship" refers to the process of developing and implementing new products, services, processes, or business models designed to promote environmentally friendly and socially responsible outcomes.

This study builds on the existing literature and examines the connection between green start-ups and sustainable development. The rationale for this study stems from the increasing recognition of the importance of entrepreneurship in achieving the United Nations' Sustainable Development Goals (SDGs). In fact, entrepreneurship is explicitly mentioned as a key driver of sustainable development in several SDGs (for example SDG 4, which seeks to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all"). The growing body of research indicates that entrepreneurship has a significant positive impact on sustainable development and that green entrepreneurship in particular plays a major role in creating a sustainable future.

Methodology

This study employed qualitative content analysis to analyze the articles selected from the databases and online search engines. The study was based on a sample of 20 peer-reviewed articles from various academic journals and books. The articles were analyzed to identify the themes that are related to the objectives of this study. The themes included alignment with the Sustainable Development Goals (SDGs), positive innovation led impact, and challenges faced by green startups.

The study used a thematic coding method to identify the patterns in the data that relate to the objectives of this study. The study found that the articles analyzed showed that green startups are increasingly playing a vital role in promoting sustainable development. The articles indicated that green startups are aligning with multiple SDGs, such as Affordable and Clean Energy (SDG 7); Sustainable Cities and Communities (SDG 11); Responsible Consumption and Production (SDG 12); Climate Action (SDG 13); and Life Below Water (SDG 14). The articles also revealed that green startups are having a positive impact on society by introducing innovative solutions to environmental challenges.

However, the articles highlighted the challenges faced by green startups, including lack of finance, regulatory red tape, and relatively low consumer awareness or willingness to pay for green products.

Findings

The review reveals that green start-ups span a wide range of sectors and have begun to impact several SDGs. Key findings include:

- Alignment with multiple SDGs: Green start-ups typically target SDGs 7 (Affordable and Clean Energy), 11 (Sustainable Cities and Communities), 12 (Responsible Consumption and Production), 13 (Climate Action), and others. For example, renewable energy companies

address SDG 7 and 13, while circular-economy ventures address SDG 12 and 14/15. Case evidence suggests that an emerging green venture can contribute to multiple goals at once[4][1].

- Positive innovation-led impact: Consistent with Boulahlib (2024) and others, the entrepreneurship literature notes that start-ups' disruptive innovations enable them to address pressing SDG challenges in new ways[3]. In practice, start-ups often combine environmental impact with economic models (e.g. subscription services for solar panels, pay-as-you-go clean cookstoves) to scale solutions. In India, for instance, a group of green start-ups have developed innovations in sustainable agriculture, waste recycling, and water conservation, reflecting the high-potential sectors identified in the literature[11].

Case Studies: Representative examples illustrate the above trends

- ReNew Power (India) – A renewable energy firm founded in 2011, ReNew Power has become one of India's largest wind and solar developers. It has deployed over 5 gigawatts of clean energy capacity and has significantly reduced India's carbon emissions through its projects[12]. By doing so, ReNew directly advances SDG 7 (clean energy) and contributes to SDG 13 (climate action).
- Banyan Nation (India) – Launched in 2013, Banyan Nation uses data-driven technology to recycle plastic waste. It partners with consumer goods companies to ensure recycled plastics are reintroduced into manufacturing. This start-up exemplifies circular-economy principles, addressing SDG 12 (responsible production and consumption) and SDG 14 (life below water) by reducing plastic pollution[13].
- Patagonia (USA) – A well-known outdoor apparel company, Patagonia has embedded sustainability (e.g. recycled materials, product take-back programs) into its business model. Although not a “start-up” today, it started as a small venture and has since become a global leader in sustainable fashion. Patagonia's success shows how green ventures can “do good and do well at the same time,” contributing to SDG 12 through circular economy practices[14].
- Ecosystem Support: The effectiveness of green start-ups is bolstered by supportive ecosystems. In India and elsewhere, government initiatives (such as grants, tax incentives, and procurement rules) have been crucial. For example, India's Faster Adoption and Manufacturing of Electric vehicles (FAME) scheme and National Solar Mission have nurtured EV and solar start-ups[15]. Meera (2024) similarly notes that governments play a “major role... by promoting the consumption of renewable energies and... tracking the economies toward green growth”[8]. When policy frameworks align with start-up innovation, entrepreneurs gain resources and market access that amplify their SDG impact.
- Ongoing Challenges: The findings also reveal persistent barriers that limit some start-ups. Common constraints are difficulty in obtaining finance for sustainable ventures, regulatory red tape for new technologies, and relatively low consumer awareness or willingness to pay for green products. These challenges echo the literature's caution that green start-ups may incur higher costs and need specialized support[10][16]. In India, for example, some start-ups cite “insufficient investment availability” and slow ecosystem growth as hurdles[17]. Addressing these issues is key to unlocking greater SDG progress.

In sum, the results indicate that green start-ups are already contributing to sustainable development outcomes across sectors. They innovate to meet environmental needs, and when backed by favorable policies and networks, they can accelerate SDG progress[4][1]. The case studies exemplify how specific firms enact these contributions in practice.

Conclusion

Green start-ups have emerged as a transformative force for sustainable development. By fusing environmental stewardship with entrepreneurship, they offer innovative market solutions to ecological challenges. As one analysis concludes, “green entrepreneurship and eco-friendly start-ups represent a transformative force in the global transition toward sustainable development,” providing not only solutions to degradation but a “blueprint for reimagining growth in the 21st century”[18]. The global and Indian

evidence supports this: sectors like renewable energy, waste management, and green mobility are being revolutionized by start-ups, aligning closely with SDG targets.

However, the full promise of green start-ups requires concerted support. Policies that lower barriers, financing that understands sustainability goals, and consumer education are critical. India's dynamic start-up ecosystem, for example, stands at a "pivotal juncture" where supportive action could turn its entrepreneurial potential into tangible SDG outcomes[19]. In practical terms, fostering networks, incubators, and funding channels for green ventures — as exemplified by initiatives like the World Economic Forum's UpLink — can scale their impact.

In conclusion, the evidence suggests that investing in green start-ups is an effective strategy for advancing Sustainable Development Goals. These enterprises demonstrate that economic growth can go hand-in-hand with environmental responsibility. By accelerating innovation in key areas and inspiring eco-conscious consumer behavior, green start-ups help translate global SDG ambitions into on-the-ground action[18][19].

Limitations

This study has several limitations. It is largely conceptual and based on existing literature and case examples rather than new empirical data. The selection of case studies, while illustrative, is limited and may not capture the full diversity of green start-ups globally. Data on the precise SDG impact of start-ups is also scarce; we have relied on reported achievements and secondary estimates. Furthermore, the analysis broadly covers global trends and the Indian context; however, specific local or sectoral dynamics may vary and are not fully explored here. Finally, as the field of green entrepreneurship is rapidly evolving, some developments (such as the latest policy reforms or start-up successes) may have emerged after our sources were published. Future research should address these gaps through field studies, surveys of entrepreneurs, and updated data tracking.

Scope for Further Research

Given the exploratory nature of this study, several avenues exist for deeper investigation. Future research could conduct primary surveys or interviews with green start-up founders to empirically assess their impact on SDG indicators (e.g. emissions reduced, waste recycled). Comparative studies across countries or cities would clarify how context (such as regulatory environment or cultural factors) influences green entrepreneurship. Quantitative analysis could test the hypotheses proposed here, measuring, for instance, the correlation between start-up density and SDG progress in different regions. Additionally, sector-specific studies (e.g. on cleantech, sustainable agriculture, or circular fashion start-ups) could provide insights into best practices and scaling strategies. Finally, longitudinal research tracking the growth and outcomes of green start-ups over time would help evaluate their long-term contribution to sustainable development. Such work would build on this study's findings and further guide policymakers and investors in leveraging entrepreneurship for the SDGs.

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