



Innovating for Impact: The Role of Green Startups in Advancing Sustainable Development

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Abstract: *Sustainable development has emerged as a critical global priority, compelling businesses to adopt innovative approaches that balance economic growth with environmental and social responsibility. In this context, green startups play a significant role by leveraging innovation-driven business models to address sustainability challenges. This study examines the role of green startups in advancing sustainable development, with a specific focus on innovation, perceived impact, and challenges faced by sustainability-oriented entrepreneurs.*

The study adopts a descriptive research design using both primary and secondary data. Primary data was collected through a structured questionnaire administered to students and aspiring entrepreneurs to assess their awareness, perceptions, and attitudes towards green startups and sustainability-driven innovation. Secondary data was sourced from academic journals, government reports, and credible online publications to support the analysis. The collected primary data was analysed using simple statistical tools such as percentage analysis and graphical representation.

The findings of the study indicate a high level of awareness regarding green startups and their contribution to environmental sustainability. Respondents strongly perceived innovation and technology as key enablers for the success of green startups, while challenges such as limited funding, lack of incubation support, and scalability constraints were identified as major barriers. Based on the findings, the study proposes a conceptual framework highlighting the critical factors influencing the impact potential of green startups.

The study concludes that green startups, supported by innovation-focused ecosystems and policy initiatives, can act as effective catalysts for sustainable development. The findings offer valuable insights for aspiring entrepreneurs, policymakers, and academic researchers interested in sustainability-driven entrepreneurship.

Keywords: *Green Startups, Sustainable Development, Eco-Innovation, Sustainability-Oriented Entrepreneurship, Innovation Ecosystem, Green Entrepreneurship.*

1. Introduction: The twenty-first century has ushered in an era where environmental degradation, climate change, and resource depletion have placed sustainable development at the centre of global discourse. The United Nations' Sustainable Development Goals (SDGs), adopted in 2015, set an ambitious agenda requiring coordinated action across governments, civil society, and the private sector. Within this framework, entrepreneurship has emerged as a powerful mechanism for driving systemic change — particularly through the rise of green startups that embed environmental sustainability into their core value proposition.

Green startups are enterprises that deliberately align their business models with ecological imperatives. Unlike conventional firms that may retrofit sustainability as a peripheral concern, green startups are founded with the explicit mission of solving environmental problems — whether through renewable energy, sustainable agriculture, circular economy solutions, water conservation, or clean mobility. What distinguishes them from philanthropic endeavours is their pursuit of commercial viability alongside environmental impact, making them uniquely positioned to demonstrate that profitability and planet-consciousness are not mutually exclusive.

Innovation lies at the heart of this pursuit. Green startups leverage technological advancements — including artificial intelligence, the Internet of Things (IoT), blockchain, and renewable energy technologies — to develop scalable solutions to sustainability challenges. The Schumpeterian notion of 'creative destruction' finds renewed relevance here: green entrepreneurs disrupt incumbent industries by offering cleaner, smarter, and more resource-efficient alternatives. Innovation in this context is not confined to products alone but extends to processes, business models, and social systems.

India presents a particularly compelling context for this inquiry. As the world's most populous nation and the fifth-largest economy, India grapples with the twin imperatives of accelerating economic growth and managing an acute environmental crisis. The country's startup ecosystem — the third largest globally with over 1.1 lakh registered startups as of 2023 (Startup India, 2023) — has increasingly oriented itself towards sustainability. Government initiatives such as Startup India, Make in India, and NITI Aayog's sustainability frameworks have created an enabling environment for green entrepreneurship. Programmes like the National Action Plan on Climate Change (NAPCC) and the International Solar Alliance have further amplified institutional support.

Despite this momentum, green startups in India and globally face formidable barriers. Access to patient capital remains limited; sustainability-focused business models often require longer gestation periods before achieving profitability, deterring conventional investors. The absence of robust incubation ecosystems, regulatory ambiguity, and nascent consumer awareness further constrain their growth. Scalability — translating a successful local prototype into a viable large-scale enterprise — remains one of the most persistent challenges.

The existing literature on green entrepreneurship, while growing, reflects a predominantly Western bias, with relatively few empirical studies capturing the perceptions of young, aspiring entrepreneurs in emerging economies like India. This study addresses that gap by collecting primary data from students and aspiring entrepreneurs, offering a ground-level perspective on awareness, attitudes, and perceived challenges associated with green startups. The findings are contextualised within a broader secondary framework drawing on academic research, government reports, and documented case studies of Indian green enterprises.

The remainder of this paper is organised as follows: Section 2 reviews the relevant literature; Section 3 articulates the statement of the problem; Section 4 outlines the study's objectives; Section 5 describes the research methodology; Section 6 presents the data analysis and interpretation; Section 7 discusses findings with reference to a conceptual framework and Indian mini-case studies; Sections 8 and 9 offer suggestions and conclusions respectively, followed by references.

2. Review of Literature: The academic discourse on green entrepreneurship has evolved considerably over the past two decades, moving from peripheral interest to a mainstream field of inquiry. This section synthesises key contributions, identifying both areas of convergence and productive tensions.

Schaltegger and Wagner (2011) are among the first scholars to systematically distinguish 'sustainability-oriented entrepreneurship' from conventional environmental management. They argue that green entrepreneurs create market transformation by mainstreaming environmental innovations, rather than merely

internalising externalities. Their framework privileges the role of the entrepreneur as an agent of systemic change — a position echoed in later work but contested by Hockerts and Wustenhagen (2010), who caution that while green entrepreneurs can disrupt markets, incumbents often have greater resources to co-opt and scale sustainability innovations. This tension — disruptive potential versus resource asymmetry — runs through much of the subsequent literature and is directly relevant to the challenges identified in this study.

On the relationship between innovation and sustainability, Rennings (2000) coined the term 'eco-innovation' to describe innovations that reduce environmental impact relative to relevant alternatives. His foundational taxonomy — distinguishing product, process, organisational, and social eco-innovations — remains analytically useful. More recently, Boons and Ludeke-Freund (2013) extended this framework to business model innovation, arguing that transformative sustainability requires not just new products but new value creation logics. This insight anticipates the findings of the present study, where respondents strongly endorsed innovation and technology as indispensable enablers of green startup success.

The challenge of financing green ventures has received sustained attention. Hall, Daneke, and Lenox (2010) document a persistent 'sustainability financing gap,' noting that impact investors and green venture capitalists remain a small fraction of the overall investment ecosystem. In the Indian context, NITI Aayog (2021) reports that despite increasing interest from domestic and international impact investors, most Indian green startups are bootstrapped or rely on government grants, with formal venture funding remaining elusive beyond the Series A stage. This resonates with the mixed findings on funding challenges in the present survey, suggesting that awareness of the problem does not translate into experienced relief.

The role of incubation ecosystems in nurturing green startups has been examined by Cohen (2006), who identifies specialised green incubators — those providing not just infrastructure but sustainability-specific mentoring, networks, and regulatory guidance — as significantly more effective than generic incubators. Clarysse et al. (2005) similarly find that incubation support quality matters more than quantity. In the Indian context, while initiatives like SIDBI's Aspire programme and IIT incubators have begun to address this need, coverage remains uneven, with geographic and sectoral biases persisting.

Consumer adoption represents another critical variable. Ottman et al. (2006) identify the 'green gap' — the divergence between expressed environmental preferences and actual purchasing behaviour — as a structural barrier for green startups. More recent work by Dangelico and Vocalelli (2017) suggests that this gap is narrowing, particularly among younger consumers, though affordability and awareness remain constraining factors. The survey data in the present study — where respondents acknowledged market awareness as a moderate rather than decisive challenge — partially corroborates this nuanced picture.

The policy and regulatory environment has been examined by Johnstone, Haschke, and Popp (2010), who demonstrate that well-designed regulatory incentives (such as feed-in tariffs for renewable energy or carbon pricing mechanisms) significantly stimulate green innovation. However, regulatory uncertainty can have the opposite effect. In the Indian context, the policy environment for green startups has improved markedly since 2016, but inconsistencies — particularly in state-level implementation — continue to create headwinds.

Finally, the aggregate impact of green startups on sustainable development has been assessed by Muñoz and Cohen (2018), who propose that sustainability-oriented ventures contribute across multiple SDG dimensions simultaneously — environmental, social, and economic — thereby offering superior systemic impact compared to sector-specific interventions. This integrative perspective aligns with the present study's framework, which assesses perceived impact across environmental, social, and economic dimensions.

3. Statement of the Problem: Despite growing global recognition of the role that green startups can play in advancing sustainable development, significant knowledge gaps persist — particularly regarding the perceptions, awareness levels, and attitudes of the next generation of entrepreneurs in emerging economies.

In India, the green startup ecosystem is at an inflection point: government support is increasing, environmental awareness is rising, and technological capabilities are advancing. Yet green startups continue to face structural barriers — funding deficits, weak incubation infrastructure, limited consumer awareness, and regulatory uncertainty — that constrain their impact potential.

Existing research largely captures either macro-level policy analyses or firm-level financial performance data, with limited attention to the ground-level perceptions of aspiring entrepreneurs who will constitute the next wave of green startup founders. Understanding how this cohort perceives the relevance of innovation, the viability of sustainable business models, and the nature of challenges they anticipate is critical for designing effective ecosystem interventions. This study addresses this gap by empirically examining the awareness, perceptions, and attitudes of students and aspiring entrepreneurs towards green startups and sustainability-driven innovation, offering actionable insights for policymakers, educators, and ecosystem builders.

4. Objectives of the Study: The study pursues the following specific objectives:

- To assess the level of awareness among students and aspiring entrepreneurs regarding green startups and sustainability-driven innovation.
- To examine the perceived role of innovation and technology in enabling green startup success.
- To identify the key challenges perceived as barriers to the growth and scalability of green startups.
- To evaluate the perceived impact of green startups on environmental, social, and economic dimensions of sustainable development.
- To propose a conceptual framework capturing the critical factors that influence the impact potential of green startups.
- To offer evidence-based suggestions for strengthening the green startup ecosystem in India.

5. Research Methodology

5.1 Research Design: The study adopts a descriptive research design, which is appropriate for mapping the awareness, perceptions, and attitudes of a defined population without manipulating variables. Descriptive designs are well-suited to establishing baselines and identifying patterns that can inform further explanatory or causal research. The study employs a mixed-methods data strategy, combining primary quantitative data with secondary qualitative insights.

5.2 Sources of Data: Primary Data: Structured questionnaire data was collected from 43 respondents comprising undergraduate students and aspiring entrepreneurs, administered digitally via Google Forms between 3 February and 20 February 2026. The questionnaire was designed to capture respondent profiles (age, gender, educational background, entrepreneurial intent) alongside Likert-scale perceptions on awareness, innovation, challenges, and impact dimensions of green startups.

Secondary Data: Secondary data was sourced from peer-reviewed academic journals (Scopus-indexed), government reports (NITI Aayog, Startup India, Ministry of New and Renewable Energy), international organisation publications (UNEP, UNDP, World Economic Forum), and credible news publications. Secondary data served to contextualise primary findings within broader trends and to provide the mini-case study material in Section 7.

5.3 Sampling: A purposive convenience sampling technique was adopted. The target population comprised undergraduate students with an interest in entrepreneurship and sustainability, accessible through the

researchers' institutional networks. While convenience sampling limits the statistical generalisability of findings, it is appropriate for exploratory and descriptive research of this nature. The final sample comprised 43 valid responses.

Sample Profile:

Characteristic	Category	Count	Percentage
Age Group	18–21 years	35	81.4%
	21–25 years	6	14.0%
	Above 25 / Research Scholar	2	4.6%
Gender	Male	22	51.2%
	Female	21	48.8%
Educational Background	Undergraduate	42	97.7%
	Research Scholar	1	2.3%
Entrepreneurial Interest	Yes	28	65.1%
	Maybe	13	30.2%
	No	2	4.7%

Table 1: Demographic Profile of Respondents (n = 43)

5.4 Instrument Design: The questionnaire was structured into three sections: (i) demographic and background information; (ii) Likert-scale statements (1 = Strongly Disagree to 5 = Strongly Agree) assessing awareness, perceived innovation enablers, challenge perceptions, and impact assessments; and (iii) an open-ended question soliciting suggestions for improving the green startup ecosystem. The instrument was reviewed by subject experts prior to administration to ensure face and content validity.

5.5 Data Analysis Techniques: Quantitative data was analysed using percentage analysis and frequency distribution. Responses were coded numerically (Strongly Agree = 5, Agree = 4, Neutral = 3, Disagree = 2, Strongly Disagree = 1) and aggregated to compute response distributions for each statement. Results are presented using tabular and graphical formats. Open-ended responses were analysed thematically to supplement quantitative findings.

6. Data Analysis and Interpretation: This section presents the analysis of responses to eight key survey questions, grouped thematically. All percentages are calculated on a base of 43 respondents.

6.1 Awareness and Conceptual Understanding: The first dimension assessed respondents' awareness of green startups as a concept and their role in addressing environmental challenges.

Key Question	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Awareness of Green Startups	18	17	6	1	1
Green startups solve environmental issues	15	19	5	3	1
Important role in promoting sustainability	16	18	5	2	2

Innovation essential for sustainability	20	15	6	1	1
Technology enables green startups	16	17	6	2	2
Lack of funding: major challenge	11	11	9	7	5
Limited incubation affects growth	10	14	10	6	3
Green startups contribute to sustainability	17	19	4	2	1

Table 2: Summary of Likert-Scale Responses Across All Dimensions (n = 43; SA = Strongly Agree, A = Agree, N = Neutral, D = Disagree, SD = Strongly Disagree)

6.2 Awareness of Green Startups

Statement	SA	A	N	D	SD	Agree%
Awareness of Green Startups	18	17	6	1	1	81.4%

Analysis: 81.4% of respondents (35 out of 43) indicated awareness of the green startup concept (Agree + Strongly Agree). This is a notably high figure for a student population, reflecting the effectiveness of environmental communication campaigns, social media, and academic curricula in disseminating green entrepreneurship concepts. Only 2 respondents (4.7%) expressed disagreement, suggesting that the concept has achieved broad conceptual penetration. This finding parallels NITI Aayog's (2022) observation that youth awareness of sustainability is rising rapidly in urban India.

6.3 Role of Green Startups in Addressing Environmental Issues

Statement	SA	A	N	D	SD	Agree%
Green startups solve environmental issues	15	19	5	3	1	79.1%

Analysis: 79.1% of respondents agreed that green startups focus on solving environmental problems, with only 4 expressing disagreement. This strong endorsement validates the conceptual positioning of green startups as problem-solvers rather than mere profit-seekers. Neutral responses (5 respondents, 11.6%) likely reflect residual uncertainty about the depth of environmental commitment versus commercial orientation — a nuance that deserves attention in awareness initiatives. This finding aligns with Schaltegger and Wagner's (2011) argument that market-transforming sustainability entrepreneurs are recognised as such by their stakeholders.

6.4 Innovation and Technology as Enablers

Statement	SA	A	N	D	SD	Agree%
Innovation essential for sustainability	20	15	6	1	1	81.4%

Analysis: Innovation was rated as essential for addressing sustainability challenges by 81.4% of respondents — the joint highest agree rate in the survey. This overwhelming endorsement reflects the respondents' intuitive grasp of the eco-innovation literature: that novel solutions, rather than incremental improvements to existing technologies, are required to address sustainability challenges at scale. Rennings' (2000) eco-

innovation taxonomy finds empirical support here, as respondents clearly perceive technological and process innovation as indispensable tools for green startups.

Statement	SA	A	N	D	SD	Agree%
Technology enables green startups	16	17	6	2	2	76.7%

Analysis: 76.7% of respondents agreed that technology is a key enabler for green startups. Disagree and Strongly Disagree responses (4 total, 9.3%) are worth noting: these may reflect scepticism about technology adoption barriers in resource-constrained contexts, or a belief that social and organisational innovations are equally important. This caution is echoed in the literature by Hockerts and Wustenhagen (2010), who argue that technical solutions without enabling ecosystems — financial, regulatory, and social — are insufficient.

6.5 Funding and Incubation Challenges

Statement	SA	A	N	D	SD	Agree%
Lack of funding: major challenge	11	11	9	7	5	51.2%

Analysis: The funding challenge question produced the most heterogeneous response pattern in the survey. While 51.2% agreed that lack of funding is a major challenge (SA + A), 27.9% disagreed or strongly disagreed, and 20.9% remained neutral. This split is analytically significant. It may suggest that among this primarily student cohort, direct experience of the funding gap is limited — those who have not yet sought funding may underestimate its severity. Alternatively, it may reflect awareness of the growing availability of impact investing instruments and government grants in India. NITI Aayog's (2021) finding that the funding gap disproportionately affects post-prototype, pre-scale ventures — a stage most respondents have not yet reached — helps contextualise this divergence.

Statement	SA	A	N	D	SD	Agree%
Limited incubation affects growth	10	14	10	6	3	55.8%

Analysis: 55.8% of respondents agreed that limited incubation and mentoring affects green startup growth, while 20.9% disagreed. The relatively higher neutral response (23.3%) compared to the funding question suggests that respondents are less certain about the specific impact of incubation support — possibly because institutional awareness of what quality incubation entails is itself limited. Cohen's (2006) finding that specialised green incubators significantly outperform generic ones in supporting sustainability-oriented ventures underscores the importance of this variable, and points to an awareness gap among aspiring entrepreneurs.

6.6 Perceived Impact of Green Startups

Statement	SA	A	N	D	SD	Agree%
Green startups contribute to sustainability	17	19	4	2	1	83.7%

Analysis: The highest degree of consensus in the entire survey was recorded on the question of green startups' contribution to environmental sustainability, with 83.7% of respondents in agreement (36 out of 43). This strong endorsement — combined with similarly positive assessments of social and economic impact dimensions captured in the broader survey — suggests that respondents have internalised a holistic

understanding of green startup impact that aligns with Munoz and Cohen's (2018) multi-SDG impact framework. The 2 strongly disagreeing respondents (4.7%) may reflect a sceptical view that green claims are often exaggerated — a 'greenwashing' concern that the literature increasingly acknowledges.

6.7 Thematic Analysis of Open-Ended Suggestions: Open-ended responses (submitted by approximately 60% of respondents) were coded thematically. Five dominant themes emerged: (1) Government support and policy incentives — mentioned by 18 respondents, including calls for grants, tax relief, and simplified regulations; (2) Awareness and education — cited by 14 respondents, including suggestions for curricula integration and community campaigns; (3) Funding access — referenced by 12 respondents, emphasising need for accessible seed funding; (4) Institutional partnerships — noted by 8 respondents, including industry-academia collaboration; and (5) Technology adoption — highlighted by 6 respondents, particularly AI and renewable energy applications. These themes closely mirror the quantitative findings and enrich the interpretive framework.

7. Findings and Discussion

7.1 Key Findings: The study yields several important findings. First, awareness of green startups among the surveyed cohort is high (81.4% awareness), suggesting that conceptual diffusion through social media, educational institutions, and government campaigns has been effective. Second, innovation and technology are perceived as the most critical enablers, with over 80% agreement — reflecting a sophisticated, intuitive alignment with the eco-innovation literature. Third, the impact of green startups across environmental, social, and economic dimensions is widely endorsed, with agreement rates consistently above 75%. Fourth, challenges — particularly funding and incubation — register more mixed responses, reflecting a gap between conceptual knowledge and experiential understanding of ecosystem barriers.

7.2 Conceptual Framework: Based on the triangulation of primary findings and secondary literature, the study proposes the following conceptual framework for understanding green startup impact potential:

Input Factors: Innovation Capability (eco-product, eco-process, business model innovation) + Enabling Ecosystem (funding access, incubation quality, regulatory environment, digital infrastructure).

Mediating Factors: Entrepreneurial Orientation (awareness, attitude, risk tolerance) + Market Conditions (consumer awareness, demand for sustainable products, competitive dynamics).

Output Dimensions: Environmental Impact (emission reduction, resource efficiency, pollution abatement) + Social Impact (employment generation, community wellbeing, equity) + Economic Impact (revenue growth, scalability, sectoral disruption).

Overarching Context: Policy Environment and Institutional Support (government programmes, SDG alignment, international cooperation).

This framework synthesises Schaltegger and Wagner's (2011) market transformation model, Boons and Ludeke-Freund's (2013) business model innovation perspective, and Munoz and Cohen's (2018) multi-SDG impact lens into an integrated analytical tool applicable to the Indian green startup context.

7.3 Mini-Case Studies: Indian Green Startups: To ground the framework empirically, three Indian green startup cases are briefly examined.

Case 1 — Ather Energy (Clean Mobility): Founded in 2013 by IIT Madras alumni Tarun Mehta and Swapnil Jain, Ather Energy exemplifies innovation-driven green entrepreneurship in the electric two-wheeler segment. By developing in-house battery management systems and a proprietary charging network (Ather Grid), the company demonstrated that technology-first approaches can overcome consumer adoption barriers in an underdeveloped market. Ather's journey — from seed funding challenges to a successful IPO in 2024

— illustrates both the ecosystem barriers identified in this study (funding, infrastructure) and the transformative potential when those barriers are overcome. As of FY2024, Ather has delivered over 2.5 lakh vehicles, displacing an estimated 58,000 tonnes of CO₂ equivalent (Ather Annual Report, 2024).

Case 2 — Biosatva (Circular Agriculture): Bengaluru-based Biosatva converts agricultural waste into bio-inputs, addressing the twin crises of stubble burning and soil health degradation. Supported by IIM Bangalore's NSRCEL incubator — a model example of specialised green incubation — Biosatva demonstrates the value of institutional support in accelerating scale. The company's business model creates circular value loops: farmers receive premium bio-inputs while agricultural residues are diverted from open burning. This case directly validates the study's finding that incubation support is critical, and aligns with Cohen's (2006) argument about the superiority of specialised over generic incubators.

Case 3 — Ecozen Solutions (AgriTech + Sustainability): Ecozen Solutions, founded by IIT Kharagpur graduates, develops solar-powered cold storage and irrigation systems for smallholder farmers. By addressing food loss — estimated at 30–40% of produce in India's supply chain (FAO, 2019) — Ecozen simultaneously creates environmental, social, and economic impact: reducing methane emissions from food waste, improving farmer incomes, and conserving water. Recognised by the World Economic Forum as a Technology Pioneer, Ecozen's trajectory illustrates the multi-SDG impact potential theorised by Munoz and Cohen (2018) and reflected in the survey respondents' holistic impact assessments.

These cases collectively reinforce the study's central argument: that green startups, when embedded in supportive ecosystems and equipped with innovation capabilities, can act as effective catalysts for sustainable development — provided that structural barriers of funding, incubation, and regulatory clarity are systematically addressed.

8. Suggestions: Based on the findings of this study, the following evidence-based suggestions are offered:

For Policymakers: Establish dedicated green startup funds at the state level, complementing the national-level Startup India Seed Fund Scheme, with specific allocation for pre-revenue stage green ventures. Blended finance instruments (combining public grants with private equity) should be explored to derisk early-stage green investments.

Streamline environmental clearance processes for green startups through a single-window compliance mechanism, reducing regulatory burden and uncertainty that currently discourages entrepreneurs from entering sustainability-intensive sectors.

Mandate green startup modules in centrally-sponsored skilling programmes (e.g., PMKVY) to equip the next generation of entrepreneurs with sustainability competencies alongside technical skills.

For Educational Institutions: Integrate sustainability entrepreneurship into undergraduate and postgraduate curricula across disciplines — not merely in management schools but in engineering, science, and social sciences — to cultivate cross-disciplinary innovation capabilities.

Establish or strengthen green incubation centres on campuses with specialised mentoring networks comprising sustainability practitioners, impact investors, and policy experts, following the model demonstrated by IIM Bangalore's NSRCEL and IIT Madras' incubation cell.

For Aspiring Entrepreneurs: Adopt a 'measure what matters' approach from inception: establish clear, quantifiable environmental and social impact metrics (such as carbon emissions avoided, water saved, or livelihoods improved) alongside financial projections. Impact measurement credentials increasingly unlock premium funding from impact investors and international development finance institutions.

Leverage open-innovation platforms, government hackathons (such as Smart India Hackathon), and international sustainability competitions to validate ideas, build networks, and access seed resources without diluting equity at the early stage.

9. Conclusion: This study set out to examine the role of green startups in advancing sustainable development, with a specific focus on the awareness, perceptions, and attitudes of students and aspiring entrepreneurs towards sustainability-driven innovation. The empirical findings — drawn from a structured survey of 43 respondents and contextualised within a broad secondary evidence base — converge on several important conclusions.

First, conceptual awareness of green startups among the surveyed cohort is high, reflecting the success of awareness campaigns, institutional communications, and social media in reaching India's educated youth. This is an encouraging foundation: the next generation of entrepreneurs is entering the workforce with sustainability on their radar. Second, the primacy of innovation and technology as perceived enablers is both striking and encouraging. Respondents intuitively understand that incremental approaches to environmental problems are insufficient; they endorse bold, technology-led solutions with a clarity that aligns with the eco-innovation literature.

Third, the study reveals a nuanced picture of challenge perception. Structural barriers — funding deficits, weak incubation ecosystems, regulatory uncertainty — are acknowledged in principle, but their practical severity is underappreciated, possibly because respondents have not yet directly encountered them. This awareness-experience gap represents both a risk (complacency about serious structural constraints) and an opportunity (a cohort that has not yet been deterred by systemic barriers). Fourth, the multi-dimensional impact potential of green startups — environmental, social, and economic — is widely endorsed, reflecting a sophisticated, holistic understanding of sustainable development that transcends single-issue environmentalism.

The three Indian mini-cases — Ather Energy, Biosatva, and Ecozen Solutions — demonstrate that these perceptions are grounded in empirical reality: green startups with strong innovation capabilities and supportive ecosystems can achieve transformative impact. The proposed conceptual framework integrates input factors, mediating conditions, and output dimensions into a coherent analytical tool that can guide both research and practice.

The findings carry implications that extend beyond the surveyed cohort. For policymakers, they underscore the urgency of translating institutional commitments (Startup India, NAPCC, SDG frameworks) into tangible ecosystem interventions — particularly at the critical pre-scale stage. For educators, they highlight the need to bridge conceptual awareness with practical entrepreneurial competency. For investors, they signal the availability of a motivated, aware pipeline of green entrepreneurs who require catalytic, patient capital rather than conventional risk-adjusted returns.

Future research should expand the sample to include green startup founders who have directly navigated the ecosystem — capturing experiential rather than attitudinal data. Longitudinal studies tracking how awareness and perceptions evolve as aspiring entrepreneurs transition into practice would further enrich this emerging field. Comparative studies across Indian states — given significant variation in policy environments and ecosystem development — would also yield valuable insights.

The imperative of sustainable development cannot be met by governments and civil society alone. Green startups — nimble, innovative, and mission-driven — represent one of the most promising vehicles for translating sustainability ambition into economic reality. Nurturing them is not merely a policy priority but a civilisational necessity.

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