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The Role of IP in Sustainable and Green Entrepreneurship

Sai Varun Konda
Dept. of Computer Science and Engineering RV College of Engineering Bengaluru, India
saivarunkonda.cs22@rvce.edu.in

Manas M N
Dept. of Computer Science and Engineering RV College of Engineering Bengaluru, India manasmn@rvce.edu.in

Sahil Santosh Naik
Dept. of Computer Science and Engineering RV College of Engineering Bengaluru, India
sahilsnaik.cs22@rvce.edu.in

Abstract—Intellectual Property (IP) plays a pivotal role in promoting sustainability and eco-innovation. This paper explores how strategic IP frameworks can support the development, protection, and dissemination of green technologies. Using a combination of literature review, case studies, and analysis of Indian startups, we investigate adaptive IP models—including green patents, collaborative licensing, and hybrid approaches—that align with sustainable development goals (SDGs). Special emphasis is placed on India's entrepreneurial landscape to assess how localized IP strategies can simultaneously foster innovation and address environmental concerns.

Index Terms—Green Entrepreneurship, Intellectual Property, Sustainability, Innovation, Green Technology, Patent Strategy

I. Introduction

With growing awareness of climate change and ecological degradation, the need for sustainable innovation has never been more critical. Green entrepreneurship has emerged as a response, focusing on eco-friendly technologies and sustainable business practices that balance profitability with environmental stewardship.

A. Role of Intellectual Property

Intellectual Property Rights (IPRs) provide essential legal backing for green innovators, offering both protection and incentives to invest in sustainable solutions. In this context, IP not only safeguards inventions but also facilitates collaborative ecosystems, technology diffusion, and scalable innovation aligned with ecological goals.

B. Challenges with Conventional IP Systems

Despite its potential, traditional IP frameworks often present barriers to green innovation—particularly in terms of high costs, rigid licensing models, and limited access to marginalized innovators. These obstacles can slow down the diffusion of vital environmental technologies, especially in emerging economies.

C. Towards Responsible IP Approaches

There is a growing shift toward more inclusive and adaptable IP models. The Responsible IP Strategy (R-IPS), for instance, emphasizes co-creation, open knowledge-sharing, and alignment with sustainability targets. These approaches aim to balance exclusivity with accessibility and public interest.

D. India's Evolving Landscape

India is gradually embracing green entrepreneurship through programs like Startup India and fast-track patenting for green technologies. However, challenges remain—ranging from procedural bottlenecks to insufficient awareness. Customized IP strategies rooted in the local context can unlock innovation and sustainability potential in Indian startups.

E. Objective of the Study

This study aims to explore the dual function of IP as a protective tool and an enabler for environmentally responsible entrepreneurship. Focusing on the Indian startup ecosystem, we assess frameworks, practices, and opportunities for aligning IP strategies with sustainable development.

II. Related Work

Vimalnath et al. [1] introduced the Responsible IP Strategy (R-IPS), outlining five key dimensions—deliberation, inclusiveness, sustainability alignment, timing flexibility, and co-creation. Their work positions IP as an active facilitator of sustainable transitions.

In a related study, Vimalnath et al. [2] observed that startups and universities often adopt open or hybrid IP models to accelerate innovation, whereas large corporations tend to maintain closed approaches.

Khan and Singh [3] reviewed legal mechanisms supporting green IP, including fast-tracked patent processing, IP

audits, and eco-innovation subsidies, advocating for more policy-level interventions.

Rahul et al. [4] analyzed Indian green startups and found that while IP literacy and enforcement are areas of concern, trademarks and design registrations are being leveraged effectively for competitive edge.

III. Methodology

This study follows a qualitative, exploratory methodology consisting of the following steps:

A. Step 1: Literature Review and Framework Selection

We reviewed academic literature and policy documents to identify the R-IPS model and green IP instruments relevant to sustainability.

B. Step 2: Identification of Key Indicators

Key indicators such as type of IP, licensing openness, SDG alignment, and participation in collaborative platforms were extracted for evaluation.

C. Step 3: Case Mapping

Indian startups across sectors like clean energy, sustainable agriculture, and eco-packaging were selected based on publicly available IP filings and media reports.

D. Step 4: Comparative Evaluation

Cases were analyzed to uncover trends, gaps, and best practices in responsible IP adoption.

E. Step 5: Synthesis

Insights were consolidated into a proposed model for integrating IP with sustainability-driven entrepreneurship.

IV. Experimentation

A. Startup Selection

Startups were shortlisted from domains such as renewable energy, biodegradable packaging, and sustainable transportation, based on their active IP filings and documented eco-impact.

B. Data Collection

Data was sourced from WIPO GREEN, Indian Patent Office records, and secondary research. Evaluated parameters included:

- IP types: patents, trademarks, industrial designs
- Technology domain and SDG alignment
- Licensing model: open, closed, or hybrid
- Visibility in collaborative platforms

C. Evaluation with R-IPS

Startups practicing collaborative or open licensing scored high on co-creation and inclusiveness, while those targeting pollution reduction ranked well in sustainability alignment.

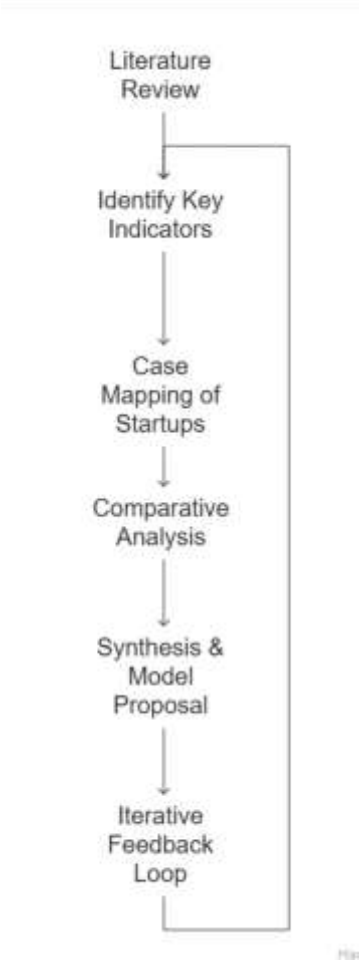

Fig. 1. Stepwise Framework for IP-Driven Green Entrepreneurship Analysis

D. Observed Trends

- Increasing use of trademarks for green branding
- Strategic adoption of design rights in eco-friendly packaging
- Hybrid licensing to balance openness and protection
- Engagement in IP forums and public-private collaborations

V. IP and Sustainability

A. Relevant Forms of IP

Patents, trademarks, copyrights, industrial designs, and plant variety rights all contribute to protecting green innovations. Patents are crucial for technologies like solar energy systems and pollution control devices. Trademarks and eco-labels help convey sustainability values to consumers. Design rights support green aesthetics, and copyrights cover sustainability-related software or educational content.

B. Legal and Policy Framework

Global treaties and national initiatives are fostering eco-innovation through IP. Platforms like WIPO GREEN enable green tech matchmaking. Indian policy initiatives like expedited examination for green patents and subsidies aim to support this transition, but implementation challenges remain.

C. Challenges to Green IP Use

Developing countries often struggle with limited IP awareness, cost barriers, and weak enforcement. Ethical concerns like biopiracy and traditional knowledge exploitation also highlight the need for equitable IP systems. Emerging solutions include patent pools, benefit-sharing agreements, and open licensing.

VI. The Role of IP in Advancing Green Entrepreneurship

A. Driving Innovation

Strong IP systems motivate entrepreneurs to invest in R&D by ensuring returns and market exclusivity. Green patent fast-tracking and reduced fees encourage sustainable invention.

B. Supporting Collaboration and Knowledge Transfer

IP enables structured partnerships where technology is shared under clear terms, fostering cooperative innovation without compromising ownership.

C. Market Positioning

IP helps green startups differentiate themselves. Trademarks and eco-labels signal authenticity, attracting environmentally conscious customers.

VII. Case Insights

A. Effective IP Use

Examples include startups patenting solar cooling devices and licensing them regionally, generating income and spreading innovation.

B. Open Innovation Models

Some firms adopt open-source IP for carbon monitoring tools, demonstrating how shared knowledge can aid collective climate action.

C. Industry Leadership Lessons

Companies like Tesla showcase how partial IP disclosure can shape industry norms while retaining competitive advantages.

Discussion

IP can be a game-changer for sustainability if its barriers—cost, access, and complexity—are addressed. Incentives like fast-tracked green patents and affordable IP services for startups can widen participation. Future IP models should aim for a balance between exclusivity and openness to maximize societal benefit.

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Conflict of Interest

The authors declare no conflict of interest.

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References

[1] P. Vimalnath et al., "Responsible intellectual property strategy for sustainability transition," World Patent Information, vol. 73, 2023.
[2] P. Vimalnath et al., "IP strategies for green innovations: A study of European Inventor Awards," Journal of Cleaner Production, vol. 377, 2022.
[3] Z. A. Khan and S. Singh, "IPR Regime in Green Technology: Pathways to Sustainability," Nature Environment and Pollution Technology, vol. 22, no. 4, pp. 2145–2152, 2023.
[4] R. Rahul et al., "Sustainable Development Through Green Entrepreneurship: Insights from India," EPRA IJMR, vol. 11, no. 6, 2025.
[5] WIPO, "WIPO GREEN: Marketplace for Sustainable Technology," [Online]. Available: https://www3.wipo.int/wipogreen/en/
[6] Government of India, "The Patents Act, 1970," Ministry of Law and Justice.
[7] B. Mustafi, "Green IP: Tool for Environmental Sustainability," IPR Journal, vol. 7, no. 1, pp. 23–31, 2021.
[8] M. Deren, "Green IP for Climate Action," Environmental Law Review, vol. 18, no. 3, 2022.
[9] S. Chanda and M. Rao, "Green Patents: Strategy for Environmental Protection," Journal of Environmental Policy and Law, vol. 49, no. 2, 2019.
[10] Y. Su, "Trends in Green Tech Innovation," Asian Journal of Innovation and Policy, vol. 6, no. 2, 2017.
[11] Y. Wira and F. Abadi, "Sustainability and Green Technology Integration," Journal of Sustainable Development, vol. 10, no. 4, 2017.
[12] A. Lima, "Environmental Innovation through Green Patents," Intellectual Property Quarterly, vol. 3, 2013.