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Youth-Led Green Start-ups and MSMEs as Drivers of Sustainable Entrepreneurship in India

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ABSTRACT

Young people can contribute to sustainable development by identifying everyday problems and building practical businesses around them. However, a product does not become sustainable simply because it uses an LED, a rechargeable battery or reused material. Its cost, safety, durability, repairability, energy use and end-of-life handling also matter. This paper discusses the role of youth-led start-ups and Micro, Small and Medium Enterprises (MSMEs) in India, with particular attention to affordable lighting and resource-conscious product development. I connect this wider topic with my early-stage entrepreneurial work through SUNGLAD Technology, including the FarmBeam Series, a portable lighting concept intended for farm, rural, outdoor and power-cut situations. I use this example to discuss the decisions a young founder needs to make—not to advertise a company or claim proven product performance. The paper follows a descriptive review and reflective case approach using selected government publications and publicly available company information. The discussion highlights opportunities in practical product design, repair and local collaboration, as well as challenges involving finance, testing, customer trust and waste management. It argues that green entrepreneurship should be based on real user needs, responsible design and evidence rather than labels alone.

Keywords : Green entrepreneurship; youth-led start-ups; MSMEs; sustainable entrepreneurship; affordable lighting; repair and reuse; India

1. INTRODUCTION

Entrepreneurship can begin with a simple observation: people face a problem, and an available product or service does not solve it well enough. A young person may start by repairing an item, making a small prototype or exploring a product idea. Turning that idea into a business requires more than enthusiasm. The founder must understand the user, estimate the cost, check safety and reliability, and decide whether the product can be supplied and maintained at a reasonable price.

India has enterprises of many sizes, including local shops, service providers, manufacturing units, MSMEs and technology start-ups. These businesses can support employment, local skills and economic activity. Government publications such as the Economic Survey 2024–25 and the Ministry of MSME Annual Report 2024–25 provide wider context about India's economy and MSME sector (Ministry of Finance, 2025; Ministry of MSME, 2025). At the same time, young entrepreneurs may face limited funds, a lack of testing facilities, uncertain customer demand and difficulty reaching a market.

Green entrepreneurship adds another responsibility. Products use materials, electricity, packaging and batteries, and they eventually need repair, replacement or disposal. A product that stops working quickly

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can create waste even if one of its components is energy-efficient. Reusing a component may reduce material use, but only when it is safe and suitable for the intended purpose. Sustainability therefore needs to be considered from the beginning of product development.

In this paper, I discuss youth-led green entrepreneurship in India and use my early-stage work through SUNGLAD Technology as a practical example. The FarmBeam Series helps me examine questions that arise when developing a portable lighting concept: who needs it, how it should work, what it may cost, how it can be tested and what responsible end-of-life management would involve. The central subject remains the wider role of start-ups and MSMEs in sustainable entrepreneurship; the company example is included to make those issues more concrete.

2. OBJECTIVES

The objectives of this paper are:
1. To discuss the role of youth-led start-ups and MSMEs in entrepreneurship and local economic activity in India.
2. To explain how young entrepreneurs can explore practical products while considering resource use and environmental responsibility.
3. To discuss opportunities in lighting, renewable-energy applications, repair and reuse.
4. To identify common challenges for student entrepreneurs, including finance, technical testing, customer trust and compliance.
5. To suggest practical steps that colleges, local industry and support organisations can take to encourage responsible green businesses.

3. METHODOLOGY

I have used a descriptive review and reflective case approach. The discussion draws on selected government publications and official information relating to start-ups, MSMEs, renewable energy, electronic waste and battery waste. I have also referred to the public SUNGLAD Technology website for the stated purpose and proposed features of the FarmBeam Series (SUNGLAD Technology, n.d.).

My practical reflection includes early product exploration in small rechargeable lighting and the FarmBeam Series mini Inverter. I used practical experience from my lighting product development and testing to discuss green entrepreneurship. The FarmBeam Series serves as an example of how youth-led start-ups can explore sustainable solutions for rural needs. The discussion focuses on opportunities and challenges.

4. YOUTH-LED START-UPS AND MSMEs IN INDIA

A start-up usually begins by identifying a problem and proposing a product, service or process to address it. The founder then needs to understand the intended users, estimate the cost, check technical feasibility and consider how the solution will reach customers. In a product-based business, decisions about components, assembly, packaging, quality, repairs and customer support are just as important as the initial idea.

MSMEs work in manufacturing, trade and services. For young founders, local workshops, repair technicians, small manufacturers and retailers can be useful partners for learning and small-batch development. A student does not always need to invest in a full production setup at the beginning. It may

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be more practical to build or refine a small prototype, seek technical advice and check demand before spending more money.

The Startup India portal explains the eligibility criteria and process for DPIIT recognition. Not every small business automatically qualifies, so founders should check the current requirements before applying for recognition or benefits (DPIIT, n.d.). Similarly, government schemes can support youth-led start-ups and MSMEs, but eligibility must be verified for each scheme. From my perspective as a student exploring product ideas, making a device work once is only one part of the process. I also need to ask who will use it, how often it will be used, what price is realistic, how it will be charged, and what can be done if it fails. A college can help students answer these questions by connecting them with mentors, laboratories, local technical professionals and small manufacturers. Such support can help students move from an idea to a product that has been properly evaluated.

5. WHAT GREEN ENTREPRENEURSHIP MEANS IN PRACTICE

Green entrepreneurship involves developing a business while making a genuine effort to reduce environmental harm or use resources more responsibly. It can include energy-efficient products, renewable-energy applications, repair and maintenance, refurbishment, waste reduction and responsible recycling. The environmental value depends on the whole product and how it is used—not on one feature or a marketing label.

Portable lighting may be useful in farms, homes, shops, workshops and areas affected by power cuts. But a useful light must match the user's needs. Relevant questions include operating time, brightness, weight, safe charging, durability, repair options and the availability of replacement parts. A product may use an LED and a rechargeable battery yet still have a poor overall outcome if it fails early or is difficult to repair.

Environmental claims should be supported by evidence. For example, a claim about lower energy use needs a clear comparison under defined conditions. A claim about reduced waste needs information about product life, repairs, battery replacement and disposal. Reusing a part may be helpful, but unsafe reuse can create risks and should not be promoted as sustainability.

The Central Pollution Control Board's guidance on the E-Waste (Management) Rules, 2022 and the Battery Waste Management Rules highlights the importance of proper handling and management of covered electronic and battery waste (CPCB, 2024; Ministry of Environment, Forest and Climate Change, 2022). The exact obligations depend on the product and the business's role. Entrepreneurs should check the applicable requirements and use appropriate collection and recycling channels rather than treating electronic or battery waste as ordinary rubbish.

6. PRACTICAL EXAMPLE FROM MY WORK: SUNGLAD TECHNOLOGY AND THE FARMBEAM SERIES

I have been exploring practical lighting and energy-related ideas through SUNGLAD Technology. I include the FarmBeam Series in this paper because it connects with the main subject of youth-led green entrepreneurship: how a young founder can take a practical need and examine whether a product idea can respond to it responsibly.

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Through my startup, SUNGLAD Technology, I have developed the FarmBeam Series, a portable lighting solution used by farmers for agricultural activities. It uses COB LED technology and rechargeable energy storage. This example illustrates how youth-led start-ups can address practical rural needs through product development and sustainable entrepreneurship.

For me, the important questions begin with the intended user. A farmer or another user may need light for a particular number of hours, a way to carry or position it, convenient charging and a product that can be repaired locally.

Cost is another important part of the idea. The total cost is not only the LED or battery. It may also include the enclosure, wiring, charging arrangement, assembly, packaging, testing, transport, returns and after-sales support. If these costs are not considered, a product may appear affordable at first but become difficult to supply or maintain. A young founder should record component costs and revise the design when the intended price is not realistic.

Environmental sustainability is an important part of green entrepreneurship. Rechargeable lighting products may help reduce disposable battery waste, depending on their use, lifespan and disposal. Youth-led start-ups and MSMEs should consider energy efficiency, product durability, repair and responsible battery disposal while developing sustainable solutions. Such practices can support responsible entrepreneurship and environmental protection.

This example shows the difference between an idea, a prototype and a market-ready product. An idea describes a possible solution. A prototype helps examine whether the basic design works. A market-ready product also needs appropriate safety and reliability checks, clear instructions, realistic costing, user feedback and an after-sales plan.

I use FarmBeam here as a practical example for analysis, not as a company advertisement. Its relevance to this paper is that it helps explain the decisions and responsibilities involved in youth-led product development. The same questions apply to other student-led businesses, including repair services, small solar applications and locally manufactured products.

7. OPPORTUNITIES FOR YOUNG GREEN ENTREPRENEURS

Affordable lighting and small energy-related products may offer opportunities because they address practical needs in homes, farms, shops, workshops and emergency situations. Other possible areas include solar applications, maintenance, repair, refurbishment and replacement parts. The best opportunity depends on local demand, product quality, component costs and the ability to provide service after a sale.

A student can begin by speaking with a few potential users and asking what they currently use, what problem they face and what they would need from an alternative. For a lighting product, useful questions include how many hours of light are needed, where it will be used, what charging options are available, what price is affordable and whether repair is accessible nearby. Informal conversations can guide early design decisions.

Repair and maintenance may also support small businesses. Some customers may prefer a safe, affordable repair rather than replacing an entire product. Services could include diagnosis, replacement of suitable

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components, cleaning and maintenance. Repair must not compromise safety, and waste components should be handled through appropriate channels.

Local collaboration is another opportunity. Colleges, electronics technicians, fabrication shops, small manufacturers and retailers can help a founder understand component quality, assembly, testing, packaging and customer service. Small-scale testing and feedback may reveal design problems before a founder commits to larger production.

8. CHALLENGES FACED BY STUDENT AND YOUTH-LED BUSINESSES

Finance is a major challenge. Students may have limited savings and must balance business experiments with education and other expenses. Components, tools, transport, packaging, testing and compliance can all add cost. A small budget and clear records can help, and large purchases should wait until the need and demand are better understood.

Technical reliability is another challenge. A device may work during a short demonstration but fail after repeated use. Lighting products require attention to electrical connections, charging, battery protection, heat, insulation, enclosure strength and repair. A working demonstration should not be treated as proof that a product is ready for customers.

Customer trust takes time to build. Customers may hesitate to buy from a new brand if they do not know whether the product will last or whether help will be available if something goes wrong. Clear information, realistic claims, suitable warranty terms where offered and responsive service can support trust. Competing only on price is not enough if quality and support are weak.

Young founders also need to understand rules and waste-management responsibilities. Requirements depend on the product, components, battery type and the business's role in making or selling it. Founders should consult official sources or qualified professionals rather than relying only on informal advice.

Marketing does not automatically prove demand. Views and likes on social media do not mean customers will buy a product. A founder must also consider delivery, returns, payment, customer support and the cost of reaching customers. Feedback and accurate records are more useful than assuming that online attention equals business success.

Finally, environmental claims need care. Words such as “green,” “eco-friendly” or “energy-saving” should not be used as proof by themselves. A small business can begin keeping basic records of materials, product life, repairs, measured energy use and disposal. Where there is no test data, the honest approach is to describe the intended use and the questions still to be tested.

9. ROLE OF COLLEGES, GOVERNMENT AND LOCAL INDUSTRY

Colleges can help students move from an idea to a properly evaluated prototype. Useful support includes faculty mentoring, access to laboratories, basic costing exercises, product demonstrations, entrepreneurship clubs and links with local manufacturers. Students also need guidance on recording design changes, testing conditions, failures and limitations.

Official portals can help founders understand support programmes and eligibility. Startup India provides information about DPIIT recognition, while the Ministry of MSME and the Ministry of New and Renewable

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Energy publish sector information and reports (DPIIT, n.d.; Ministry of MSME, 2025; MNRE, 2025). Such sources are useful starting points, but they do not replace product-specific technical advice or legal guidance.

Local manufacturers and service providers can contribute knowledge about component sourcing, assembly, quality, packaging and repair. Financial support may be useful when a founder has a realistic plan and understands repayment obligations. Borrowing before testing demand and estimating costs can create unnecessary pressure.

Support for student entrepreneurs should not be limited to competitions and certificates. Access to safe testing, feedback from intended users, pricing guidance and the opportunity to learn from mistakes are also important. Sometimes the responsible decision may be to improve the idea, change the design or stop investing in a product that does not meet a real need.

10. DISCUSSION

The selected sources and my reflective example point to several practical lessons. First, young people can begin exploring a business problem with limited resources, but a prototype alone does not establish product readiness. Second, a product concept needs to be assessed against the needs of intended users, technical requirements, cost and maintenance. Third, environmental responsibility involves the product's full life, including charging, battery replacement, repair and disposal. Finally, student founders need access to feedback and testing before investing in larger production.

The public product description explains the intended design; it is not independent proof that the design meets every performance target. The paper is also not a field survey or a life-cycle assessment. Its findings are therefore practical observations drawn from the review and reflective example, rather than measured results.

A next step for future research would be to test a clearly defined portable lighting prototype under stated conditions, document its cost and operating performance, gather structured feedback from intended users, and compare its material use, energy consumption, repair needs and end-of-life handling with an appropriate alternative. Such work would provide a stronger basis for evaluating usefulness and environmental value.

11. SUGGESTIONS

1. Help students identify real problems before choosing a product idea.
2. Build and test small prototypes under appropriate supervision before scaling up.
3. Keep records of component choices, costs, design changes, test conditions and failures.
4. Use batteries only with suitable charging, protection and safe handling arrangements.
5. Consider repair, replacement parts and end-of-life management during the design stage.
6. Make claims about performance or environmental benefits only when supporting evidence is available.
7. Connect student founders with college laboratories, technical mentors, repair professionals and small manufacturers.
8. Check current official requirements for schemes, product standards and waste management.
9. Teach costing, pricing, cash-flow management, customer communication and record keeping alongside technical skills.

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10. Treat failures as information that can guide design improvements or a decision not to proceed.
11. Clearly distinguish published evidence, personal observations, informal feedback and formal test results.
12. Make practical mentoring and affordable testing more accessible to students with limited resources.

12. CONCLUSION

Youth-led start-ups and MSMEs can contribute to India's development by addressing practical needs, supporting local skills and creating opportunities for products and services. Green entrepreneurship can be part of this contribution when businesses consider resource use, product reliability, repair and waste management alongside price and customer needs.

My early-stage work through SUNGLAD Technology, including the FarmBeam Series, gives a practical example of the questions a young founder must consider. The Product is intended for portable lighting in farm, rural, outdoor and power-cut settings. I have included it to discuss product development and sustainable entrepreneurship, not to promote the company, The example shows why an idea needs user feedback, cost analysis, safe design and appropriate testing before it can be considered ready for wider use.

In my view, responsible entrepreneurship develops step by step: identify a real need, understand the user, estimate the cost, test the design, learn from feedback and improve it. Colleges, local industry and official support systems can help young people build these skills.

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