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Factors Affecting the Growth of Eco-entrepreneurship in the Solid Waste Management Sector in India

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Abstract. Eco-entrepreneurship addresses ecological degradation using market mechanisms primarily using circular economy principles. The current research examines the factors affecting eco-entrepreneurship growth in India's solid waste management sector. The challenges in India's waste management landscape are multifaceted, stemming from intricate socio-economic and cultural factors. Government agencies tasked with waste management have grappled with inadequate infrastructure, outdated technology, and frail governance structures, leading to their inability to address the waste issues effectively. However, the commitment by the Indian government to environmental protection and the actions of eco-responsible business organisations, among other factors, led to a conducive environment for eco-entrepreneurs to thrive. Drawing from the examples of several actors and cases, this study explored that the growth of eco-entrepreneurship in India's solid waste management sector can be attributed to the implementation of stricter environmental regulations, eco-responsible practices by business organisations, investors' preference for ecological performance, activism by civil society organisations and courts of law, and adoption of eco-values by consumers. Further, this study attempts to chart a path towards understanding eco-entrepreneurship and how it differs from social and sustainable entrepreneurship by focusing on the planet and profit dimensions of the People-Planet-Profit framework.

Keywords: eco-entrepreneurship, social-entrepreneurship, sustainable entrepreneurship, solid waste management in India.

1. Introduction

Although entrepreneurship is widely celebrated for stimulating economic growth and technological innovations, it can also profoundly damage our natural environment and lead to unequal wealth distribution (Cohen & Winn, 2007). Research scholars and practitioners explored methods for achieving sustainable economic development without damaging the natural environment. In 1987, the United Nations World Commission on Environment and Development defined sustainable development as "the development that meets the needs of the present without compromising the ability of future generations to meet their own needs", suggesting that economic development and environmental protection are not

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mutually exclusive. Further, establishing the World Business Council for Sustainable Development in 1995 and the United Nations Global Compact in 2000 facilitated businesses' focus on sustainability. Mainstream commercial organisations are motivated to practice sustainability for competitive reasons, legitimising efforts, and ecological values (Bansal & Roth, 2000). However, such measures may lead to the gradual greening of organisations rather than a transformational change toward global sustainability (Hart & Milstein, 1999). Global sustainability requires the Schumpeterian (1934) creative destruction of the well-entrenched, eco-inefficient business models, products, and services. Since large incumbent organisations may not respond swiftly to the challenges and opportunities presented by such creative destruction, sustainable development focus offers "one of the biggest business opportunities in the history of commerce" for entrepreneurs (Hart & Milstein, 1999, p. 25). Research into the role of entrepreneurship in resolving environmental and social problems has gained prominence in the last three decades. Recognition of the role of entrepreneurship in addressing environmental degradation and social exclusion led to the growth of eco-entrepreneurship, social entrepreneurship, and sustainable entrepreneurship literature (Muñoz & Cohen, 2018).

Eco-entrepreneurship combines environmental awareness with entrepreneurial action in the overall transition towards a more eco-responsible business paradigm (Schaper, 2016). It is a promising field for scientific inquiry due to its potential to disrupt the market forces attributable to environmental degradation and facilitate societal transformation. Eco-entrepreneurship literature is relatively new compared to other lines of research, such as social entrepreneurship; hence, a separation of definitions is needed. The burden of environmental disasters and climate change is disproportionately felt by economies in transition, developing and least developed nations. Thus, it is crucial to understand the factors influencing eco-entrepreneurship growth in developing countries. Their challenges are unique due to their socio-cultural, economic and political environments. Policymakers and entrepreneurs must understand these challenges to apply best practices within a more constrained context.

The faster rate of urbanisation is evident worldwide. By 2030, 61% of the world's population will live in urban areas (United Nations, 2004). One of the environmentally threatening consequences of global urbanisation is the increasing amount of solid waste. Effective solid waste management is crucial from the health security perspective. It also has a significant impact on climate change. A direct correlation exists between the effectiveness of fundamental management procedures like collection, transportation, and disposal of solid waste and the reduction of greenhouse gas emissions.

Although the discussion on managing urban solid waste gained global interest in the 1970s, its interest in some developing countries is relatively recent. Developed countries have the financial resources and skills to manage the issues

arising from solid waste adequately. However, developing countries such as India face enormous challenges in solid waste management due to their unique social, cultural, political and economic contexts. The primary contributing factors to the poor waste management record are the absence of widespread environmental awareness, inefficient waste collection, storage, treatment and disposal, lack of accountability, and insufficient budgets by government bodies. India's waste management context is different from that of developed nations. For instance, the composition of waste in India differs from that of waste generated in developed countries. Rapid urbanisation and population growth have significantly strained India's waste management infrastructure. Although recycling is a deeply ingrained habit in India, informal sector players such as waste merchants and rag pickers dominate the waste supply chain. They primarily focus on recyclables and other waste of economic value, thus leaving organic and degradable waste to government agencies. Furthermore, the waste collection and recycling methods they adopted are unscientific, inefficient and unsafe, thus posing significant dangers to community well-being and the environment. However, India witnessed positive changes in this domain due to entrepreneurial actions in the last decade. Eco-entrepreneurs bring much-needed technological solutions and innovative processes to address the challenges. They operate independently or collaborate with government and business organisations to tackle solid waste management challenges.

Lack of technical knowledge, negligence, and financial resources are common barriers to effectively managing solid waste in developing countries. India is a country that has been less explored in terms of research. India represents a rich context regarding diversity in race, religion or culture. Due to its current economic, political and social status, it provides a valuable setting for other countries to learn from the context of India. Hence, any research on the eco-entrepreneurs tackling solid waste management issues and the factors contributing to their growth would help policymakers and potential entrepreneurs in India and other developing countries (Maria et al., 2020). This study explores the factors affecting eco-entrepreneurship growth using case studies of eco-ventures operating in the solid waste management sector. Further, this study attempts to chart a path towards understanding eco-entrepreneurship and how it differs from social and sustainable entrepreneurship, drawing insights from the operations of these eco-ventures.

This paper aims to a) distinguish between social entrepreneurship, eco-entrepreneurship, and sustainable entrepreneurship using the three Ps — People, Planet and Profit — or the triple bottom line framework, b) review the specific challenges involved in the solid waste management sector in India and c) examine factors influencing the growth of eco-entrepreneurship in the solid waste management sector.

The following section analyses the overlaps between social, sustainable, and eco-entrepreneurship and the key differences that draw a conceptual boundary between these forms of entrepreneurship.

2. Social, Eco-, and Sustainable Entrepreneurship — Overlaps and Differences

Although there are overlaps among the concepts – social, eco, and sustainable entrepreneurship – a significant difference exists. All three types of entrepreneurship involve identifying business opportunities, mobilising resources, developing and executing a business plan, and nurturing business growth. However, entrepreneurial motivation and the value creation domains distinguish the three entrepreneurship types.

2.1. Social Entrepreneurship

Social entrepreneurship, commonly defined as an entrepreneurial activity with a social purpose (Austin et al., 2006; Saebiet al., 2019), is recognised for its potential to redirect resources to neglected social problems. The idealised approach defines the role of social entrepreneurs as change agents in the social sector. The pragmatic approach views social entrepreneurs as those who generate earned income to pursue social outcomes (Boschee, 2001). Social entrepreneurship addresses fundamental and neglected societal issues involving localised positive externalities (Santos, 2012), such as poverty, hunger, unclean water, unemployment, transportation, education, and human rights (Austin et al., 2006). Social entrepreneurs' actions are generally aimed at the issue of social exclusion. According to the European Commission, social exclusion is a "process whereby certain individuals are pushed to the edge of society and prevented from participating fully by their poverty, or lack of basic competencies and lifelong learning opportunities, or as a result of discrimination." (2004, p. 3). Social entrepreneurs develop new market-based solutions to address problems arising from social exclusion that the government, mainstream entrepreneurs, and social institutions fail to fulfil (Mair & Marti, 2006). The solutions are developed using the logic of empowerment rather than control (Santos, 2012) and often transform marginalised groups' economic, social and political contexts (Alvord et al., 2004). Social ventures tend to combine for-profit and not-for-profit organisational entities, leading to a hybrid organising model to achieve sustainability and efficiency. However, the success of such ventures depends on how well they manage the tensions arising out of conflicting logic, dual identity and mission drift (Mitra et al., 2017, 2019).

Social entrepreneurs lack access to financial capital and find it challenging to recruit and engage human resources for their operations due to the ambiguity associated with identifying and measuring 'social' value. However, social entrepreneurs are resourceful in using their creativity and innovation to acquire and manage scarce resources to achieve their social mission. Unlike commercial entrepreneurs, social entrepreneurs leverage social capital to compensate for limited financial and human capital access inadequacies. They actively collaborate and engage the beneficiary group members and other organisations to maximise the social value (Seelos & Mair, 2007). Social businesses may be for-profit or not-for-profit entities or combine both models to become hybrid ones. Some social innovations include microcredit by Grameen Bank, Bangladesh, agricultural packages by Plan Puebla, Mexico, low-cost cataract surgeries to cure needless blindness by Aravind Eye Hospitals and water and sanitation systems in rural villages by Gram Vikas in India.

2.2. Eco-entrepreneurship

According to York et al. (2016), eco-entrepreneurship is "the use of both commercial and ecological logics to address environmental degradation through the creation of financially profitable organisations, products, services, and markets." Eco-entrepreneurship develops business models that increase productivity while reducing resource use for human health and the sustainability of nonhuman species (Isaak, 2016). Eco-entrepreneurs are known for their solid ethical reasoning and desire to make the world a better place to live by establishing eco-centred ventures (Linnanen, 2016). They identify, evaluate, and exploit entrepreneurial opportunities based on sustainable, environmentally friendly, and green principles (Gast et al., 2017). They value environmental protection and ensure their commercial activities positively affect the natural environment to attain a sustainable future (Schaper, 2016). The environmental sustainability values are deeply embedded in their business design, production, and marketing strategies, which lead them to make a social statement beyond making a profit.

Environmental Economics, having roots in neoclassic economics, attributes ecological degradation to market failure in externality. An externality is "a cost or benefit arising from any activity which does not accrue to the person or organisation carrying on the activity" (Black, 1997, p. 169) or simply the effect of one individual's action on the utility of another individual (Cowen, 1992). Many environmental assets, such as air, water, and land, are transitory and indivisible, making them vulnerable to externalities. Furthermore, since market processes fail to fix the correct market price reflecting the 'full' or social costs for environmental assets, economic actors use or abuse them, leading to ecological degradation. Environmental economics addresses sustainability issues by

internalising externalities arising from environmental degradation into the economic exchange rates by adjusting prices so that actors involved in such exchanges must pay for the external costs (Beder, 2011). Following environmental economics assumptions, Dean and McMullen (2007) suggested that eco-entrepreneurs simultaneously create economic profit and ecological benefit by pursuing opportunities inherent in environmentally relevant market failures. They asserted that eco-entrepreneurs could create efficient markets for environmental resources through entrepreneurial actions such as developing property rights and economic institutions, reducing transaction costs, disseminating information, and motivating government action. Developing such markets could enable eco-entrepreneurs to profit from the economic value and reduce environmental degradation. However, Stål and Bonnedahl (2016) cautioned about the limitations of framing eco-entrepreneurship using the assumptions of environmental economics, more specifically, viewing environmentally relevant market failures as the source of eco-entrepreneurial opportunities. Following the conventional economic framework of private property and market exchange, eco-entrepreneurs can offer innovative market solutions motivated by super-normal profits and entrepreneurial rents. However, such market solutions may lead to further exploitation of natural resources instead of reducing ecological degradation. Attempts to address climate change concerns using climate engineering methods exemplify how entrepreneurial solutions are conceived to intervene in Earth's climate system despite its enormous environmental risks. Hence, they urged us to reframe eco-entrepreneurship by embracing ecological economics principles.

Ecological economics views environmental and economic concerns as mutually constitutive and co-evolving. The interaction between economic activity and ecosystems provides eco-entrepreneurial opportunities. Since value creation through the transformation of virgin material or non-renewable energy is prohibited, eco-entrepreneurs need to develop innovative means to create value within the limits of ecology. Eco-entrepreneurs can thus identify entrepreneurial opportunities using the circular economic system characterised by business models focusing on reducing, recovering, reusing, recycling, redesigning, and remanufacturing in production/distribution and consumption processes (Kirchherr et al., 2017). Eco-entrepreneurs thus creatively destroy existing unsustainable production methods, products, market structures, and consumption patterns and replace them with superior environmental products and services, stimulating new market dynamics of environmental progress (Schaltegger, 2016; Schumpeter, 1934). Elkington and Burke (1989) argued that innovative eco-entrepreneurial solutions could improve the environment and provide the basis for new business prospects overlooked by mainstream firms. Eco-entrepreneurs developed environmental awareness since childhood, and their interest in ecological topics often led them to accrue information related to their business area. Since starting eco-ventures is more complicated than conventional business

ventures, firm convictions of entrepreneurial individuals play a vital role in success.

The growth of eco-entrepreneurship depends on other systemic changes in politics, society, and culture. For example, when green activists find and broadcast the environmental repercussions of economic activities, it may lead to broader knowledge about the environmental issues, new thinking, and measures to remedy them. Upon observing the support for such thoughts and actions in society, political agents change the "rules of the game" through fiscal and regulatory measures, such as implementing stricter eco-laws, treaties, and agreements. Eco-entrepreneurs develop innovative machine, material, and organisational resource systems to lessen environmental degradation. The socio-cultural system is shaped by the shared values, beliefs, traditions, norms, and social climate that the majority of the population in a society adheres to. So, choosing eco-friendly goods and services may be influenced by environmental awareness and a favourable attitude towards environmental protection by a majority of the population in a society (Kumar, 2022).

2.3. Sustainable Entrepreneurship

Shepherd and Patzelt (2011) defined sustainable entrepreneurship as the "preservation of nature, life support, and community in the pursuit of perceived opportunities to bring into existence future products, processes, and services for gain, where the gain is broadly construed to include economic and non-economic gains to individuals, the economy, and society." (p. 137). Sustainable entrepreneurship integrates social justice and environmentalism with entrepreneurial motivations to pursue triple-bottom-line goals (3BL) — financial, environmental, and social (Dixon & Clifford, 2007). Sustainable entrepreneurs tend to capitalise on market opportunities in serving ecosystems and communities (Parrish, 2008). They often follow a hybrid organisation model to manage the inherent tensions in pursuing 3BL goals. Unlike other forms of entrepreneurship, creating social and environmental values is closely linked or even integral to achieving financial goals in sustainable entrepreneurship (Wilson & Post, 2013). Recent research suggested that the simultaneous development of 3BL solutions is possible and may be imperative for pursuing sustainable entrepreneurship (Kumar, 2020). Sustainable entrepreneurs' actions can improve environmental quality and social well-being and significantly impact larger-scale structural shifts towards a more sustainable society (Parrish & Foxon, 2006).

2.4. Overlaps and Differences

Some scholars view social entrepreneurship as pursuing economic, social, and environmental goals (Haugh, 2007). However, social entrepreneurs focus more on addressing social exclusion problems rather than environmental ones. In contrast, sustainable entrepreneurs are notable for balancing and simultaneously achieving competing objectives in the ecological, social-ethical, and economic domains (Schlange, 2006). Their business models are built at the intersection of social equity, environmental integrity and economic prosperity. For example, an India-based sustainable entrepreneurial venture, Under The Mango Tree (UTMT), marketed single-origin honey sourced from marginalised farmers trained and assisted in beekeeping activities by the firm. The firm chose indigenous bee variety to protect bio-diversity, creating positive environmental consequences. Hence, UTMT's actions sustained nature (bio-diversity), ecosystem services (bee pollination), communities (culture and group identity of marginalised small farmers who lived on sustenance farming in remote locations) and developed economic and non-economic gains for the farmers (Kumar, 2020). The categorisation of entrepreneurial ventures based on the mission focus is shown in Table 1.

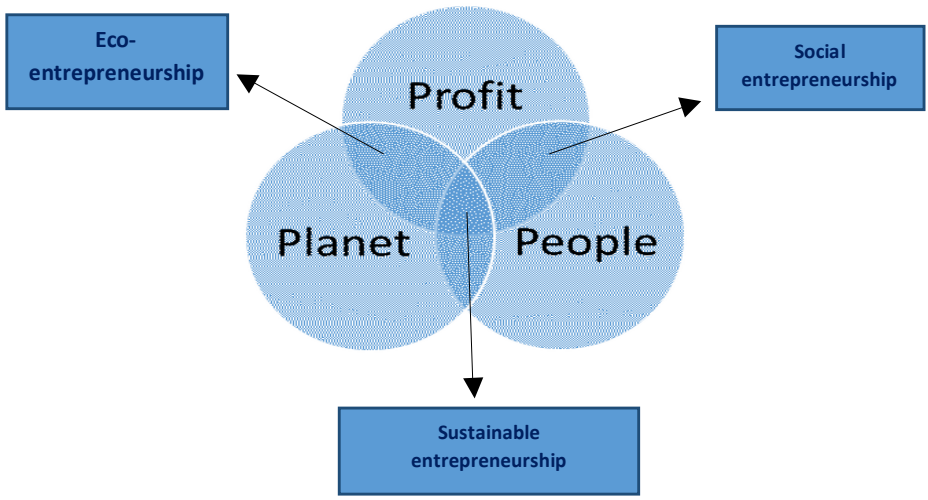
Table 1: Categorisation of entrepreneurial ventures using the 3Ps framework

Serial Number	Name of the Venture	Focus Area Planet and People	Social Entrepreneur/Eco-Entrepreneur/Sustainable Entrepreneur	Primary mission/Reasons for being categorised as Eco-entrepreneur
1	Trashcon Labs	Municipal Solid Waste (Planet)	Eco-Entrepreneur	Automated segregation of mixed waste into biodegradable and non-biodegradable components with over 90% efficiency. Recycle biodegradable waste into bio-fuel and non-biodegradables into recycled boards that replace plywood.
2	GPS Renewables	Bio-degradable Waste (Planet)	Eco-Entrepreneur	Uses bio-methanation technologies to address the issue of managing organic waste. Contributes to the transition from fossil fuel to bioenergy, thus significantly mitigating climate change.
3	Banyan Nation	Plastic Waste (Planet)	Eco-Entrepreneur	Banyan Nation helps international brands use more recycled plastic rather than raw plastic. Their unique plastic cleaning technology transforms post-consumer and post-industrial plastic waste into high-quality recycled granules that are on par with virgin plastic in terms of performance and quality.
4	Kanpur Flower Recycling/Phool	Floral waste (Planet)	Eco-Entrepreneur	Floral wastes are recycled into charcoal-free incense products.
5	Ecokaari	Plastic Waste (Planet)	Eco-Entrepreneur	Plastic wastes are upcycled into bags.
6	Strawcture Eco	Agri waste (Planet)	Eco-Entrepreneur	Agriwaste is recycled into panels

7	Greenway Appliances	Agri Waste (Planet)	Eco-Entrepreneur	Agriwaste is used as fuel in the stove
8	Aravind Eye Hospital	Marginalised Communities (People)	Social Entrepreneur	The mission is to eliminate needless blindness by providing high-quality, affordable, and compassionate eye care to all. Revenue generated from paying patients is used to subsidise treatment for those who cannot afford it.
9	Under The Mango Tree	Poor Farmers and Bio-diversity (People and Planet)	Sustainable Entrepreneurship	Sustained nature (bio-diversity), ecosystem services (bee pollination), communities (culture and group identity of marginalised small farmers who lived on sustenance farming in remote locations) and developed economic and non-economic gains for the farmers.

Since environmental and social issues are inextricably linked in many situations, eco-entrepreneurial solutions address both (Schaltegger & Wagner, 2011). Hence, several authors treat eco-entrepreneurship as a subcategory of sustainable entrepreneurship (Dean & McMullen, 2007; Schaper, 2002; Shepherd & Patzelt, 2011; Jolink & Niesten, 2015). For example, tackling the food wastage issue may provide the necessary means to solve the social hunger problem (Melikoglu et al., 2013). Although eco-entrepreneurs may operate with some social values, ecological sustainability principles guide their actions. Their primary focus is not on sustaining communities or creating non-economic gains for individuals and societies but on blending market and ecoactivist logic. Cohen, Smith, and Mitchell (2008) referred to the overlap between social and economic domains as socio-efficiency, environmental and economic domains as eco-efficiency, social and ecological as stewardship, and the overlap of all three domains as sustainability. They argued that the three forms of entrepreneurship differ in their primary value creation strategies and focal positioning, with sustainability entrepreneurs motivated by all three value spheres. Social entrepreneurship focuses on socio-efficiency, eco-entrepreneurship focuses on eco-efficiency, and sustainable entrepreneurship strives to sustain ecological systems and communities (see Figure 1).

Figure 1: Social, Eco-, and Sustainable Entrepreneurship – Overlaps and differences



2.5. Eco-entrepreneurship in Solid Waste Management (SWM)

Since the entrepreneurial actions in the space of SWM mainly involve the circular economy principles of reducing, recovering, reusing, recycling, redesigning, and remanufacturing in the production/distribution and consumption processes, they can be categorised and studied under eco-entrepreneurship. The entrepreneurs operating in the domain of SWM are primarily driven by ecological sustainability principles and not for sustaining communities or creating non-economic gains for individuals and societies. Hence, they cannot be categorised as sustainable entrepreneurs but as eco-entrepreneurs.

3. Solid Waste Management in India: Issues and Challenges

This section discusses a non-exhaustive list of some issues and challenges faced by India in the solid waste management sector, thus setting the context for analysing the growth of eco-entrepreneurship in addressing the inefficiencies in the sector.

a) Inefficient Waste Processing by Government Bodies

According to Worldometer elaboration of the latest United Nations data (2021), India has the second-largest population after China, with more than 1.39 billion, contributing 17.7% of the world's total population. Nearly 35% of the total population lives in urban areas. The per capita waste generation is about 0.85 kg

per day. The estimated waste generation in 2015 was 1,41,064 tons per day, out of which only 127,531 tons (90%) were collected and 34,752 tons (27%) were processed (CPCB India, 2018). The remaining waste was dumped in landfill sites/ dumping grounds. It is estimated that approximately 80% to 90% of solid waste is disposed of in landfills without proper waste processing, resulting in severe air, water, and soil pollution (Ahluwalia & Patel, 2018; Joshi & Ahmed, 2016).

The poor management of solid waste generated in the country is highlighted by the following observations made by *The Central Pollution Control Board of India*, a statutory organisation under the *Ministry of Environment, Forest and Climate Change* in a document titled "The National Action Plan for Municipal Solid Waste Management – 2019 (CPCB India, 2018)". "The fact is that Indian cities and towns are found littered with garbage and represent an ugly look at many places within the city/town. In most towns/cities, only important locations maintain cleanliness, leaving other places choking uncollected waste. The collected wastes are disposed in un-attended landfills, and it is a long way to see that the entire waste collected by a city or town is processed and only remnants disposed of in the landfill." (CPCB India, 2018, p. 1). Since most landfill sites are not scientifically maintained, they potentially threaten groundwater pollution and reduce ambient air quality.

Non-segregation of waste at source, irregular waste collection from community dust bins, dumping the waste without any processing, scarcity of land for waste dumping, and absence of capped scientifically managed sanitary landfill sites are significant factors contributing to inefficient solid waste management systems in India (Annepu, 2012; Kumar & Agrawal, 2020). The urban local bodies, popularly known as municipal corporations/councils, are responsible for collection, segregation, transportation, and process. However, these government bodies lack adequate financial, people, and technical resources to manage solid waste sustainably (Ahluwalia & Patel, 2018). Since door-to-door collection is yet to be implemented in most places, most urban-dwelling residents dispose of their waste by simply dumping it together in nearby community dustbins or dumping areas. The waste collection and transportation system is so inefficient that many public places in urban India are perennially littered. In India, solid waste management practices were often reduced to mere waste transportation from the point of generation to distantly located dumping grounds or landfill sites for discarding without segregation and processing. Although many cities/towns have waste processing plants, many are not functional due to financial and other operational issues.

b) Lack of Awareness Among the People

The absence of widespread awareness about segregation and safe disposal, combined with the prevailing social-cultural taboo towards waste, resulted in a callous attitude towards waste management issues. Most people exhibit unsafe behaviour of indiscriminate waste dumping (Ghose et al., 2006). When people

dispose of waste in India, they show little concern for those handling it later. Segregation of solid waste at the source is rarely done in most households. Industrial wastes such as bio-medical and slaughterhouse wastes are mixed with other solid wastes and dumped together.

The composition of waste in India is different from the composition of waste generated in developed countries. The share of biodegradable waste, such as food waste and garden trimming, was about 40-50%, against 21% in developed countries. On the other hand, the percentage of non-biodegradable waste such as inert silt and construction waste, cloths, glass, metal, paper, and plastic was about 50%. In contrast, they constitute nearly 79% of the total waste generated in developed countries (Kaza & Yao, 2018; Ahluwalia & Patel, 2018).

c) The Marginalisation of Rag Pickers

The informal sector workers – rag pickers – estimated between 1.5 million and 4 million – collect anything of resale value from open drains, bins, garbage dumps, and landfill sites for a living. They complement the work of municipal corporations and play an essential role in the solid waste management chain of activities. These workers mostly belonged to the economically and socially weaker classes and were marginalised and socially excluded due to social and cultural norms prevailing. Despite their massive contribution, they were never recognised, and the government did not formalise their work. Nearly 15-20% of the solid waste, including hazardous, was collected and segregated by these workers in the most unhygienic conditions. Very often, other members of society looked them down with suspicion and disdain. Since most of them work in an unsafe environment with little or no access to protective gear, they suffer from many occupation-related health problems (Ray et al., 2004).

Government agencies responsible for waste management have failed to achieve the intended results. However, eco-entrepreneurs, sensing business opportunities, are increasingly collaborating with government agencies to better manage waste in the country. They provide technology, management systems and business processes to tackle unique challenges. They leverage the existing network of informal workers involved in the waste management supply chain, thus leading to better efficiency, safety and improved livelihood.

4. Factors Affecting the Growth of Eco-entrepreneurship in SWM

The growth of eco-entrepreneurship in a country is shaped by a) stricter environmental regulations, b) greening practices of businesses, c) discerning consumers and investors, d) stakeholder activism, and e) the ideological orientation of society (Pacheco et al., 2010; Pastakia, 2016). Formal institutions, policy interventions, government-led knowledge transfer initiatives, and incentive policies such as tax exemptions, subsidies, grants, seed funds and

reward systems create a supportive environment for eco-entrepreneurship growth. These factors allow eco-entrepreneurs to evolve by experimenting and learning with promising technologies while adopting suitable organisational forms. The following section analyses how the development of eco-entrepreneurship in India's SWM sector is shaped by a) stricter eco-laws and government support, b) the adoption of ecological sustainability principles by mainstream business organisations, c) investors' preference to invest in eco-responsible businesses, d) activists who voice their concerns against those who disregard the environment and push the government to enact the appropriate laws and judicial activism aimed to provide remedies to the ecological violations, and e) cultural values and practices adopted by society at large (see Figure 2). A few of the eco-ventures operating in the solid waste management sector is chosen for the analyses. The analyses were done based on the published materials (Refer to Table 2 for the data sources). The analyses lead to a set of propositions which contribute to the growth of eco-entrepreneurship literature. The implications for eco-entrepreneurship practice are also drawn from the insights.

Figure 2: Factors affecting the growth of eco-entrepreneurship

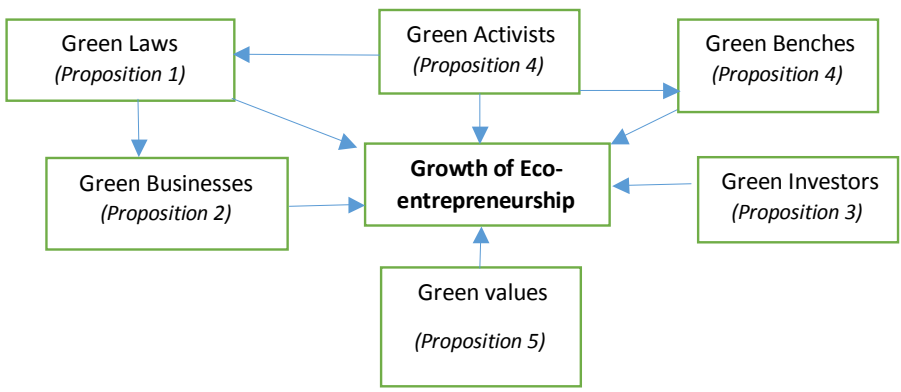


Table 2: Factors affecting the growth of eco-entrepreneurship in India – Data sources

Factors affecting the growth of eco-entrepre-neurship in India	**Policies/laws/efforts adopted by the Indian government, companies and other stakeholders**	**Supporting data from the descriptive cases**	**Descriptive cases that support or are supported by the factor**	**Data Source**
Recognition and support from the government	Fifty most relevant technologies to smart cities, Ministry of Housing and Urban Affairs, Government of India.	*"When you are bootstrapped or do not have a marketing budget… awards from national and international organisations/government bodies help…"*	GPS Renewables	https:// www.youtube.com/ watch?v=5dJDbmdI ArA&t=3643s http:// gpsrenewables.com/
Green laws/ Support from the government	Seed money was given by the Biotechnology Industry Research Assistance Council (BIRAC), formed by the Government of India under the Department of Biotechnology.	*BIRAC supported 100s of crazy ideas which no other venture capitalists would have supported… we were given INR 50 Lakhs of R&D grant-in-aid in 2013 (2nd year of operations)*	GPS Renewables	https:// www.youtube.com/ watch?v=5dJDbmdI ArA&t=3643s
Green businesses	Greening initiatives by mainstream commercial organisations	*In collaboration with Unilever, we provide toilets (made from recycled waste) at one-tenth the cost of conventional toilets.*	Trashcon Labs	https:// www.youtube.com/ watch?v=zAuSM4t nEF8&t=219s
Green laws/Green values	Recognition from municipal agencies and other government bodies.	*During Covid, the waste pickers were risk-free because they did not touch the waste. Our clients (municipal agencies) spoke (recognised) how we helped their workers during COVID.*	Trashcon Labs	https:// www.youtube.com/ watch?v=zAuSM4t nEF8&t=219s https://trashcon.in/ about.html#awards
Green laws/Green values	Recognition from municipal agencies and other government bodies.	*We got a certificate of appreciation from one of our municipalities because we saved hundreds of (waste pickers') lives during COVID-19. We were awarded by the Prime Minister of India and the United Nations Deputy Secretary General.*	Trashcon Labs	https:// www.youtube.com/ watch?v=zAuSM4t nEF8&t=219s
Green laws	Stricter implementation of environmental rules and regulations.	*Every citizen must be aware of the E-waste (Management) Rules. The rules assign the responsibility to the producers to collect e-waste for which they engage with CPCB-authorised PROs like Karo Sambhav, who collect e-waste from the states through its collection centres and ensure its safe disposal.*	Karo Sambhav	https:// www.karosambhav. com/government
Green laws	Stricter implementation of green laws	*The law mandates that by 2025, all companies must use no less than 25% recycled polymer, and by 2027, no less than 50% recycled polymer (for packaging)*	Banyan Nation	https:// www.youtube.com/ watch?v=Sb8GRFi Xth8
Green businesses	Mainstream organisations' green initiatives	*We help top brands such as Unilever use more recycled plastic than virgin plastic for packaging and product requirements.*	Banyan Nation	https:// www.youtube.com/ watch?v=Sb8GRFi Xth8
Green values	We are changing habits due to green values.	*I have seen people putting flowers in the water all my life. However, never before had anyone questioned temple waste as a source of pollution. The seed was sown.* *This line in the Hindu Arti (puja ritual) says that what belongs to the gods goes back to the gods. So this is how I convinced them these flowers do not belong to you or me. They belong to the gods.*	Phool	https:// www.youtube.com/ watch?v=7DR-NG5H-9Q

a) Green Laws - Stricter Environmental Regulations

According to the market imperfections theory, environmental problems occur since the markets do not adequately price or value ecological externalities (Rennings, 2000). Since markets do not punish environmentally harmful impacts, the growth of environmental innovation is affected compared to non-environmental innovation. Stricter environmental regulations and sustained government support can stimulate eco-entrepreneurship growth. One may view stricter environmental regulations as the product of political entrepreneurship in proposing new "rules of the game" or leading the drive to codification. Environmental problems offer political opportunities for entrepreneurial politicians or lawmakers. They respond to those opportunities with political solutions such as fiscal or regulatory measures. Hence, ecological issues can be solved politically through new laws, treaties, and agreements (Potts et al., 2010). Government-led knowledge transfers, policy interventions such as grants, subsidies, tax exemptions, network formation activities, and regulatory adaptions lead to eco-venture development (De Palma & Dobes, 2010; Schot & Geels, 2008). Recent research supported Porter and Van der Linde's (1995) proposal that strict environmental regulations can stimulate innovation that may partially or wholly offset compliance costs (Li et al., 2020; Chakraborty & Chatterjee, 2017).

India faces enormous challenges balancing higher economic growth objectives and enacting stringent environmental regulations as a developing country. Developing economies prioritise economic growth and development to alleviate poverty, so they cannot afford stricter environmental rules and invest in technologies and management systems that optimise environmental harm (Bhanumurthy & Mitra, 2004). Nevertheless, the government of India has often reiterated its commitment to improving the country's environmental performance at local and global levels. As a result, the country had some of the best environmental laws in place, but a poor to moderate implementation did not produce the intended effects till 2010 (Pastakia, 2016). The gap between principle and practice was also widened due to the reasons specific to India's socio-economic and cultural aspects.

Since 2010, the government of India has been very proactive in pushing through various green policy measures in the domains of water, energy, and waste management that have been progressive and impactful. The National Green Tribunal (NGT) was founded in 2010 by the National Green Tribunal Act of 2010 to improve the environmental rule of law. The Indian Parliament passed the Act following Article 21 of the Indian Constitution, emphasising the right to live in a clean and healthy environment. NGT provides access to justice and environmental dispute resolution in civil matters involving environmental protection, the preservation of forests and other natural resources, and enforcing any environmental legal rights. The NGT can always penalise organisations for noncompliance with their orders. Suppose an organisation fails to obey any of its orders or awards. In that case, it is liable for up to Indian Rupees (INR) 25 million

and an extra fine of up to INR 0.1 million daily. The NGT has handed down a rising number of environmental judgements since it was established, which is a sign of the expanding environmental concerns in a developing country like India. According to an examination of NGT decisions made thus far, the NGT (including zonal benches) handed down 2051 decisions for diverse environmental disputes spanning the country from its establishment in 2011 to 2016 (Rengarajan et al., 2018). NGT imposed an environmental penalty of INR 460 million on the state governments for allegedly not managing solid waste, thus causing environmental harm. Many business organisations in India increasingly comply with environmental laws as a form of corporate self-regulation. This would help them improve their brand image and reduce legal risk arising out of noncompliance, thus creating business opportunities for eco-entrepreneurs.

The Solid Waste Management Rules enacted in 2016, the Swachh Bharat (translated into "Clean India") Mission (SBM) in 2014, and an annual survey of cleanliness, hygiene and sanitation in cities and towns across India launched as a part of the SBM under the Ministry of Housing and Urban Affairs (MoHUA) created considerable pressure on the stakeholders to identify innovative solutions in the collection, segregation, storage, transportation, processing and disposal of municipal solid wastes in India. In India, government agencies are responsible for keeping cities and towns clean. However, most lack adequate infrastructure, financial incentives and technical capabilities to collect, process and dispose of solid waste. Eco-entrepreneurs who developed technical capabilities and innovative business models increasingly partner with government agencies to process solid waste. India's 'Smart Cities' program launched in 2015 to develop 100 smart cities by 2024 with a planned investment of INR 98000 crore (US$14 billion) to address urban challenges offers numerous opportunities for eco-entrepreneurs.

Trashcon Labs

Trashcon Labs, founded in 2017, provides technical solutions to government and private organisations worldwide to segregate mixed solid waste and recycle it responsibly. Trashcon addresses some of the solid waste management issues unique to India, i.e., non-segregation of solid waste at source and dumping the same in unsustainable landfills and the inhuman practice of manual waste segregation in the most unsafe environment. The founders spent two years developing the world's first fully automated mixed-waste segregation machine – Trashbot – that can sort mixed waste into biodegradable and non-biodegradable components with a 90% efficiency level. The machine can sort one ton of solid waste in an hour. The firm also provides technological solutions to recycle biodegradable waste into biofuel. The non-biodegradables such as single-use, multilayered plastics and other components are sterilised and recycled into rigid boards that can replace plywood and particleboards. TrashCon provides these technology-enabled solutions to government bodies and public and private

organisations looking to dispose of solid waste responsibly. The Solid Waste Management Rules, 2016, require government bodies responsible for waste management to facilitate the construction, operation and maintenance of solid waste processing facilities independently or with private sector participation. These rules encouraged private sector players such as Trashcon Labs to partner with government bodies to enable them to manage waste efficiently. Trashcon Labs, operating from five states in 2021, processed 25,000 tons of waste.

GPS Renewables

GPS Renewables, founded in 2017, provides innovative technological solutions to recycle biodegradable waste into biogas. Since the traditional biogas technology was inefficient in making a solid business case for recycling biodegradable waste, it gets dumped without processing. The firm has reinvented biogas technology to produce efficient results in the urban context. The technology uses bio-methanation processes to create clean bio-gas energy from biodegradable waste. GPS Renewables' core products are BioUrja, a state-of-the-art modular biogas plant, and the BiogasBot, an Artificial Intelligence solution for remote bioprocess management. The venture has installed nearly 100 BioUrja units across India, Bangladesh, and Sri Lanka. The firm's clients include some Fortune 500 companies, prominent educational institutions, non-profit organisations, and government bodies responsible for waste management. These biogas plants help client organisations to convert organic waste into clean energy for captive usage, thereby reducing their carbon footprint. Eco-entrepreneurs such as Trashcon Labs and GPS Renewables have collaborated under a public-private partnership program with Urban Local Bodies to provide technical solutions in waste segregation, recycling, and reuse.

In 2018, the Ministry of Petroleum & Natural Gas launched the Sustainable Alternative Towards Affordable Transportation (SATAT) project to set up bio-CNG plants, whose output is sold in the market for use in automotive fuels. GPS Renewables bagged the contract for Asia's largest bio CNG plant in Central India under the SATAT project. In 2020, the firm executed India's largest Source Segregated Organics-based bio-CNG plant with 500 tons per day capacity for Indore, a city in Central India. This project was being executed on the Build-Own-Operate Transfer model and envisaged 16-18 tons of bio-CNG output daily that could be used to operate city buses. Government organisations supported budding eco-entrepreneurs such as GPS Renewables to stimulate innovation. For example, the Department of Biotechnology, a unit of the government of India's established Biotechnology Industry Research Assistance Council (BIRAC), is a not-for-profit Public Sector Enterprise that supports the emerging Biotech enterprises involved in strategic research and innovation. In its initial growth phase, GPS Renewables got INR 5 million from BIRAC as an R&D grant in 2015. This grant helped the firm develop its indigenous biogas technology that

proved efficient, reliable, and innovative. The firm could raise USD 3 million in Series A funding from the impact investors in 2020.

The E-waste management rules implemented in 2016 made producers of electrical and electronic products responsible for the targeted amount of collection of e-waste and its exchange under the Extended Producer Responsibility (EPR) clause. As a result, the producers can avail of separate Producer Responsibility Organisation (PRO) services and ensure E-waste collection and disposal in an environmentally sound manner. According to the sections, noncompliance is a sentence of up to five years in prison or a fine of up to Rs. 1,00,000 (US$1200). The Plastic Waste Management Rules (PWM), 2016 banned using plastic carry bags below 50 microns' thickness nationwide. Strict implementation of this rule resulted in numerous eco-entrepreneurial ventures, such as Ecoware, producing a range of biodegradable and compostable products, including plates, bowls, cups, and cutlery. The products are made from plant-based materials like sugarcane fibre, corn starch, and bamboo and are designed to decompose within 90 days.

Karo Sambhav

The strict rules in the e-waste domain have opened up many opportunities for eco-entrepreneurs such as Karo Sambhav (translated into “Make Possible”). India generated more than 10 lakh tonnes of e-waste in 2019-20. The informal sector players recycle most e-waste through unscientific burning or dissolving it in acids. Karo Sambhav, founded in 2016, is an e-waste management firm offering services and solutions to electronics and electrical equipment producers such as Apple, Dell, HP, and Lenovo (Green Businesses) in fulfilling their needs Extended Producer Responsibility (EPR) obligations. The firm’s operations include setting up collection channels, collecting e-waste through a dedicated network of collection centres and sending it for responsible recycling, and conducting awareness campaigns among the stakeholders, thus ensuring EPR compliance requirements for global brands. The firm developed an inclusive, sustainable, scalable, and transparent system for e-waste handling in India. Such a system played an instrumental role in creating equitable opportunity and fair value for all the stakeholders in the value chain. In 2018, Karo Sambhav integrated and formalised the operations of 2274 waste pickers, 1528 waste aggregators, 1107 repair shops, and 520 bulk consumers through a data-backed technology platform and organisational network, conducting awareness campaigns in 1214 schools.

It is clear from the cases of Trashcon Labs, GPS Renewables and Karo Sambhav that stricter implementation of green laws and establishment of supportive institutions can create a more favourable environment for eco-entrepreneurship to grow. When formal institutions such as legal, regulatory, and governance structures are underdeveloped or absent, it can create barriers to eco-entrepreneurship. For example, by creating clear and stable regulatory

frameworks, eco-entrepreneurs can have more certainty about the rules of the game, reducing the risks associated with investing in eco-responsible businesses. The government's support in terms of access to financing through grants, subsidies, or other funding mechanisms can help the growth of eco-entrepreneurship.

Proposition 1: Stricter implementation of green laws, enforcement of penalties and government support in incentives and subsidies lead to eco-entrepreneurship growth.

b) Green Businesses

Green businesses are conventional enterprises with no ecological values in their initial business idea (Isaak, 2016). However, later, they adopt environmental business practices systems due to market demands, consumer preferences, or compliance with industry regulations if not for ethical arguments (McKeiver & Gadenne, 2005). These companies generally integrate environmental values into strategic planning, offer products and services, and practice business processes that reduce environmental degradation. For example, after the Paris Climate Agreement 2015, many global firms such as IKEA and Apple set new ecological goals to achieve "climate positive" and "carbon neutral" status by 2030. Management scholars focused on the financial implications of green practices have found a positive relationship between greening practices and firm financial performance. Greening practices help companies to insure against litigations, meet the obligations of environmental regulations, and even stay ahead of the rules (Ramanathan, 2018).

In India, the top 24 companies, including Tata and Reliance, voluntarily pledged to move towards 'carbon neutrality' by focusing on industry-specific measures such as promoting renewable energy, enhanced energy efficiency, efficient water processes, green mobility, water management, and recycling. The second-largest Information Technology Company – Infosys – achieved 'carbon neutrality' in 2020 through energy efficiency measures, green buildings, and renewable energy. These firms typically do not operate in the environmental marketplace, but their ecological sustainability focus generates demand for eco-friendly products and services. Hence, eco-entrepreneurship growth depends on green businesses' commitment to conduct their operations based on circular economy principles. Since eco-entrepreneurial startups focus on environmental issues, they often develop innovative technological solutions that remove major hindrances in achieving ecological sustainability. As part of their corporate social responsibility, mainstream commercial organisations involve themselves in eco-entrepreneurial activities or collaborate with eco-entrepreneurs to reduce their environmental impacts in transforming material and energy into salable products and services.

Banyan Nation

For example, Banyan Nation, a plastics recycling company founded in 2013, collaborates with multinational companies in greening their supply chain activities, thus maximising plastic recovery and reuse in India. In 2019, India generated approximately 9.46 million tonnes of plastic waste, of which only 60% was collected and recycled, while the rest stayed uncollected and littered in the environment (Chattopadhyay & Kumar, 2020). Since plastic waste can remain for centuries before decomposing, it poses an enormous environmental threat. Banyan Nation addresses the plastic waste issue by developing technology to recycle plastic waste into high-grade material. The technology can remove inks, coatings, and other contaminants from plastic waste using environment-friendly detergents and solvents for manufacturing near-pure quality granules. The firm designs and manufactures products with recycled plastic and custom grades of recycled compounds for mainstream and high-quality applications. The firm uses mobile, cloud, and IoT technologies to integrate and organise nearly 3000 waste collectors working in the informal sector. The data intelligence capabilities allow the firm to analyse waste generation patterns geographically and improve the effectiveness of the waste management process. The firm could demonstrate a business case for many mainstream organisations to adopt the principles of circular economy and resource conservation. It collaborates with mainstream corporates such as Hindustan Unilever, Reckitt, Shell, HPCL, Tata Motors and L'OREAL through closed-loop recycling initiatives to create products ranging from packaging containers to automotive bumpers from recycled plastics.

Under their corporate social responsibility initiatives, several companies invest in addressing climate change and reducing waste. Under the Companies Act of 2013, companies making a net profit of more than INR 50 million annually devote 2 per cent to corporate social responsibility (CSR) activities through community projects. Waste-related projects may satisfy CSR criteria. Hence, these companies often reach out to eco-entrepreneurs for products and services to reduce their carbon footprint or do good for the environment. For example, Trashcon Labs collaborates with Unilever to provide toilets made from recycled waste at a one-tenth cost of conventional toilets to needy people across India.

Proposition 2: Greening initiatives by mainstream business organisations can lead to eco-entrepreneurship growth.

c) Green Investors

Investors increasingly prioritise organisational performance in the environmental, social and governance (ESG) because of its effect on long-term success in a rapidly changing world. Research findings suggest that firms with good ratings on material sustainability issues significantly performed better than those with poor ratings (Khan et al., 2016). Mainstream investors and global asset owners include ESG considerations in their investment strategy. According to EY's Global Private Equity Survey 2021, over two-thirds of investors considered ESG risks

and opportunities while making investment decisions. Sustainability-themed investing has grown multifold in the last decade with a growing segment of investors. India is one of the founding members of the International Platform for Sustainable Finance (IPSF), formed in 2019 to channel private capital into environmentally sustainable businesses. Eco-entrepreneurs can now access environmentally sustainable private equity funds. These funds generally get invested in energy, food, water, agriculture, and nutrition technologies. Further, the COVID-19-led crisis has only accelerated the demand for sustainable investing. According to the International Finance Corporation (IFC), India will have a US$ 3.1 trillion climate investment opportunity by 2030.

Green investors can play an essential role in stimulating eco-entrepreneurs growth by providing financial resources, expertise and networks. For example, Villgro is an India-based social enterprise incubator founded in 2000. Villgro focuses primarily on providing seed funding and incubation support to early-stage eco-entrepreneurs. It incubated Strawcture Eco, an eco-entrepreneurial venture that converts agricultural residue into highly compressed bio-panels in the construction and furniture industry. These bio-panels are carbon-negative, durable, and affordable products (Villgro, 2022).

The Indian Angel Network, one of India's largest angel investor networks, has actively funded green startups. The organisation has supported startups like Greenway Appliances, which produces energy-efficient cooking stoves for rural households. These stoves are designed to replace traditional stoves that use solid fuels like wood, charcoal, or dung, which are inefficient and contribute to indoor air pollution and deforestation. The Greenway stove is a clean-burning stove that uses biomass pellets from agricultural waste as fuel. Biomass pellets are considered a renewable energy source because they are made from waste materials that would otherwise be discarded or burned in open fields, causing air pollution and greenhouse gas emissions.

Proposition 3: The rise of green investors prioritising environmental performance leads to eco-entrepreneurship growth.

d) Green Activism and Green Benches

Civil Society Organizations and concerned individuals play a crucial role in increasing environmental awareness among the public, influencing the regulating agencies and legislators to implement new policies and rules to protect the environment and pressure polluters to comply with those rules. They played a catalyst role in creating new markets for products and services within environmental management. Since environmental management is dynamic and continuously evolving, legislation may not quickly implement stringent rules in sync with the demands of the industry. In such cases, civil society organisations intervene to create awareness and compel industrial organisations to respond positively (Pastakia, 2016).

For example, Chintan Environmental Research and Action Group, an NGO based in Delhi, has been instrumental in developing Phool. This start-up upcycles

flower waste from temples into incense sticks and organic fertilisers. The market research conducted by Development Alternatives, a Delhi-based non-governmental organisation (NGO) on construction and demolition waste utilisation in the western Indian city of Ahmedabad in 2016 showed a range of untapped eco-entrepreneurial opportunities. This NGO is also instrumental in introducing low-cost and sustainable technological solutions in water, energy, and housing. In 1985, M.C. Mehta, an activist advocate and social worker, filed the first Ganges river pollution case as a writ petition which asked the court to give directions to government agencies and tanneries in Uttar Pradesh state to prevent polluting the river with trade effluents. The court ordered more than 5,000 industries in the Ganges Basin to install effluent treatment plants and air pollution control devices (Mehta, 1999).

The provisions in the Indian Constitution, the enactment of environmental legislation, and the general rise in public interest litigation have collectively affected the environmental movement in India (Siddiqui, 2009). The rise of judicial activism in India resulted in the formulation of stringent environmental legislation, doctrines, and principles that enable the protection and preservation of the environment. Public Interest Litigation (PIL) results from judicial activism, which can bring public issues before the courts, seeking justice within the legal and constitutional frameworks. The judiciary system has evolved to bring justice to the victims by providing the right to sue the polluters to persons and civil society organisations in the public interest. Citizens can challenge environmentally unsound practices on behalf of others. PILs are a powerful tool in India that allows individuals and organisations to take legal action for the public interest. Green activists in India have used PILs to challenge businesses or governments harming the environment. PILs can force organisations to comply with existing environmental regulations or create new rules if none exist. Green activists have long advocated for a ban on single-use plastics, which significantly contribute to environmental pollution. In 2018, the government of India announced a nationwide ban on single-use plastics, which came into effect in 2019.

The courts played a prominent role in developing India's environmental law, and its jurisprudence was characterised by its treatment of "environmental rights" as constitutional rights. They created a detailed doctrinal framework for resolving conflicts surrounding environmental matters in a series of rulings. Courts directed industrialists not to deny their responsibility towards society and the natural environment because it was not economically feasible for them to internalise their externalities. When the state of Uttar Pradesh in Northern India failed to regulate mining under the then-mining laws in 1983, the Supreme Court accepted a letter from a citizen as a form of PIL. The letter alleged that illegal and haphazard limestone mining affected the ecological balance in Mussorie Dehradoon regions. The court checked abuses of power by law-implementing agencies through appropriate orders. Judicial activism has forced many mainstream organisations

to examine their operations in search of alternative solutions to reduce, recover, reuse, recycle, redesign, and remanufacture the production/distribution and consumption processes.

A green bench is a high court division that deals with environmental cases. A green bench is a judicial bench that hears and adjudicates disputes about preserving forests and protecting the environment. In a lawsuit filed by Green activists – Vellore Citizens Welfare Forum against the pollution caused by the discharge of untreated effluent by the tanneries and other industries in the State of Tamil Nadu in 1996, the Green Bench awarded punitive measures against the polluters. The order further directed the tanneries to implement pollution control mechanisms in their factories, increasing the need for pollution control devices. When green activists push the government and private organisations to protect the environment, they increasingly turn to eco-entrepreneurs to provide products and services based on circular economy principles.

Proposition 4: Environmental activism and jurisprudence lead to the growth of eco-entrepreneurship.

e) Green Values

Consumers once selected products and services based on price or brand but now increasingly demand goods and services that were produced in an environmentally responsible manner. According to survey research conducted by the Confederation of Indian Industry and AT Kearney in 2019, Indian consumers preferred brands with higher ethical and eco-friendly practices. In addition, millennials and Gen Z were most notably willing to pay more for environmentally friendly brands. Further, Covid-19 has radically changed consumers' purchasing habits, and environmental concerns have become more critical. A pan-India survey conducted by the Mahindra Group in 2019 found that most respondents were aware of the impact of their actions on nature and climate change. Nearly 89% showed interest in adopting lifestyle changes, and 70% claimed they were aware of the environmental issues.

Economic, political, and cultural aspects such as values and beliefs, traditions, trust, family ties, and a social climate influence eco-entrepreneurship growth. Indian philosophy, rooted in the Vedas and Upanishads, edifies reverential regard for nature and its manifestations. The cultural values of respect for nature and non-violence shape people's attitudes and behaviour toward environmental protection (Dwivedi & Tiwari, 1999). In most households, durable products undergo many usage cycles before being discarded. Items such as old textbooks, used clothes, newspapers, metal, plastics, and bottles were neatly segregated and given to needy people or sold to local scrap dealers.

Phool

People across India follow the religious ritual of offering flowers to the deities in the places of worship, seeking their blessings for a prosperous life. The flowers,

estimated to be around 8 million metric tons annually, are considered sacred. They cannot be dumped anywhere but thrown into India's rivers, such as the Ganges or other water bodies near the places of worship. However, this religious ritual strongly associated with the core beliefs of worshippers leads to an unfortunate event of severe water pollution. The floral waste dumped in the water releases toxins such as arsenic, lead, and cadmium from the pesticides used to grow the flowering plants, thus causing water pollution and leading to water-borne diseases. Despite being wholly biodegradable and natural, the chemicals released from these decaying flowers can pose an environmental threat. Kanpur Flower Cycling, founded in 2017, operates under the brand name Phool (translated into flower) and addresses water pollution from waste discarded in the water bodies. Phool's business is modelled after the principles of a circular economy. The firm collects nearly 10 tons of discarded flowers daily from the temples before being dumped into the rivers. These sacred flowers are segregated, processed, and handcrafted into charcoal-free incense sticks. The remnants are turned into vermicompost, used as organic manure and florafoam, a biodegradable packaging material, through the firm's unique flower cycling methods. The products are packed in paper filled with holy basil seeds, which can be later sown to grow plants. The primary mission of Phool is to address water pollution arising from flower waste and convert the flower waste into eco-friendly products. In contrast, its secondary mission or a positive externality is the opportunity to recruit marginalised women to collect flowers, thus categorising it more under the eco-entrepreneurship case rather than sustainable entrepreneurship.

Phool's core product is eco-friendlier than the widely used charcoal-based incense sticks since burning charcoal releases poisonous sulfur dioxide and produces xylene chemicals. Using its R&D facility, the firm has developed florafoam, a first of its kind, which can be the biodegradable replacement for styrofoam, another widely used single-use packaging material. Florafoam is also 27% cheaper than styrofoam. Phool employed socially marginalised women who did waste collection jobs informally, thus ensuring sustainable livelihoods. The eco-entrepreneur could change the age-old practice of dumping floral waste into the water bodies and play an instrumental role in creating much-needed awareness among all the stakeholders. After observing the success of Phool, many eco-entrepreneurs have started their ventures using floral waste and come up with various innovative products such as natural dyes. The temple authorities at many other places are eager to collaborate with eco-entrepreneurs to recycle floral waste responsibly.

Ecokaari is another eco-entrepreneur focused on promoting sustainability and environmental awareness. The company upcycles plastic waste into bags and home décor items. It has grown steadily in recent years, driven by its commitment to sustainability and innovative approach to addressing environmental challenges.

The growth of eco-ventures such as Ecokaari and Phool is a testament to consumers' increasing adoption of green values.

Proposition 5: The adoption of green values by society leads to the growth of eco-entrepreneurship.

The following section analyses the current research's theoretical and conceptual contribution, implications for policy and practice, limitations of this research and avenues for future research.

5. Discussion

This paper's objectives are to a) distinguish between social entrepreneurship, eco-entrepreneurship, and sustainable entrepreneurship using the three Ps – People, Planet and Profit – or the triple bottom line model, b) review the specific challenges involved in the solid waste management industry in India and c) examine factors influencing the growth of eco-entrepreneurship in the solid waste management industry in India.

5.1. Theoretical Contribution

One of the major impediments to sustainable development is the widely prevalent mindset that ecology and economy are conflicting and mutually exclusive, and some inherent and fixed trade-off exists between the two. The trade-off is between the social benefit and the private cost of preventing and cleaning pollution. Since the components of our ecosystem, such as air, water, land, and living organisms, are public goods, valuing them is complex, and consumption leads to externalities. However, ecological and economic concerns are mutually constitutive and co-evolving in nature. The eco-entrepreneurial opportunities are abundant at the intersection of ecology and economics. Eco-entrepreneurs need to acknowledge the limits of ecology while developing innovative solutions. Such solutions are possible in the circular economy rather than linear economy principles.

Eco-entrepreneurship is often used interchangeably with social, sustainable entrepreneurship to refer to the environmental impact of economic activity and entrepreneurship. Clear demarcation of eco-entrepreneurship boundaries helps researchers and practitioners identify the unique drivers, processes, and outcomes of eco-entrepreneurship. This paper contributes to our understanding of eco-entrepreneurship at the macro level by drawing boundaries of eco-entrepreneurship.

Stricter implementation of green laws and direct government support can create opportunities for eco-entrepreneurs. Greening practices of mainstream business organisations, green activism and environmental jurisprudence, a rise of

green investors, and society's adoption of green values can lead to eco-entrepreneurship growth.

5.2. Implications for Policymakers

Eco-entrepreneurship has become an increasingly promising field for addressing sustainable development challenges for policymakers. When formal institutions such as legal, regulatory and governance structures are stable and transparent, eco-entrepreneurs can have more certainty about the rules of the game and reduce the risk associated with eco-business. Implementing stricter eco-laws and monitoring mechanisms would increase polluters' risk and cost of operations, thus incentivising them to adopt eco-efficient methods, providing opportunities for eco-entrepreneurs. For example, the banning of single-use plastic packaging material resulted in the growth of the bio-degradable packaging materials industry.

Efficient, affordable and accessible technology plays a significant role in addressing solid waste management challenges. Eco-entrepreneurs offer superior technical expertise and business models based on circular economy principles to the government agencies responsible for solid-waste management. Government agencies responsible for waste management can benefit by collaborating with eco-entrepreneurs.

Government can support eco-entrepreneurship by providing access to financing through grants, subsidies, or other funding mechanisms. The eco-entrepreneurs passionate about creating a positive impact may not possess the financial means to develop the necessary technology in their initial growth phases. Government support mechanisms such as seed money grants, R&D grants, subsidies, and tax holidays will motivate them to innovate and commercialise their products and services.

The beliefs and rationales of eco-entrepreneurs often reflect the underlying influences of ecoactivist logic. The sources of their beliefs include experiences with family, local communities, education and broader sociopolitical environments. Since their firmly held values and beliefs drive eco-entrepreneurs, policymakers can significantly promote programs that aim to seed eco-conscious values among young learners by providing resources, creating partnerships, and incentivising educational institutions and teachers. By doing so, policymakers can help create a more environmentally conscious future generation better equipped to tackle the challenges of climate change and environmental degradation.

5.3. Implications for Practice

The potential for eco-entrepreneurs is significant and growing as more and more people become aware of the urgent need to address environmental challenges such as climate change, pollution, and resource depletion. The incentives for adopting the principles of a circular economy by all the stakeholders of the economy are higher in today's context. Mainstream commercial organisations can achieve a brand image and higher profitability and reduce environmental risk by greening their operations. Governments gain credibility by becoming resolute in addressing environmental issues. Consumers increasingly adopt circular economy principles to become eco-responsible. Hence, the context is conducive for those eco-entrepreneurs who can perform bricolage, use government support and market their products and services to the target consumers to achieve success in the long run.

Lobbying can be an effective way for eco-entrepreneurs to promote policies and regulations that support their businesses. Eco-entrepreneurs can engage with local and national policymakers to promote policies and regulations that support their businesses, including meeting with policymakers and providing input on proposed regulations. Eco-entrepreneurs can use social media to promote their businesses and advocate for policies and regulations that support eco-responsible practices. This can include creating social media campaigns, sharing news articles and research, and engaging with policymakers and other stakeholders on social media platforms. Eco-entrepreneurs can partner with non-governmental organisations focusing on environmental issues to leverage their resources and expertise in lobbying efforts, including collaborating on research, joint advocacy campaigns, and other initiatives promoting eco-responsible practices and policies.

5.4. Limitations

The research method adopted for this article has several limitations. The insights drawn in this article are based on the published material only. Interpretive research is subjective by nature, relying on the researcher's interpretations. The method can lead to bias and subjectivity in the analysis and interpretation of data, making it difficult to establish the reliability and validity of the findings. Only a few cases of eco-entrepreneurship were analysed to develop the research propositions presented above.

5.5. Avenues for Future Research

Although the current study attempts to understand better what eco-entrepreneurship is and what it is not, more exploration of this topic is needed for theory development. Future researchers can focus on inherently green ventures that meet the characteristics of eco-entrepreneurship outlined in this paper to examine motives, processes, and outcomes. They can use the propositions developed in this paper to conjecture specific hypotheses to explore eco-entrepreneurship characteristics in India and other developing countries. They can further draw comparisons between developed and developing countries. Some socio-economic and cultural factors affecting the effective functioning of the solid waste management industry are unique to India and may differ in other countries. For example, examining how judicial activism and stricter laws stimulate eco-entrepreneurship growth in different countries shall be interesting. Future research can use qualitative methods, such as process tracing, to examine how stringent environmental regulations, government support, and green activism lead to eco-entrepreneurship growth (Beach & Pedersen, 2013).

Although solid waste management is the government's responsibility, many eco-ventures have been started in the last decade, thus bringing in much-needed technological and organisational solutions and improving efficiency and transparency. Besides creating a positive environmental impact, these ventures also made a social impact by collaborating with the informal workers involved in the solid waste value chain. Since the government agencies lacked motivation, competencies, infrastructure and organisational systems, their performance in eco-conservation was poor. However, entrepreneurs passionate about eco-conservation identified opportunities in the solid waste management domain arising from market failures for economic gain and reduced ecological impact from mismanagement of solid waste. Eco-entrepreneurs offered government agencies the right technological and organisational solutions in solid waste management. They showed interest in broader social and environmental issues beyond profits. The eco-ventures outlined above have the potential to be the transformational force towards a more eco-responsible business paradigm in India. Their actions led to increased environmental awareness, reduction in pollution, and adoption of technologies by both government and mainstream commercial organisations, which would eventually help India embrace a circular economy.

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