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Eco-entrepreneurship as a Response to Sustainability and Climate Challenges: What Have We Learnt and Where Do We Go from Here?

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Abstract. Through this review, our key intention is to capture interest and advance research on ecoentrepreneurship. We examine the literature on eco-entrepreneurship and highlight that research on eco-entrepreneurship has received limited attention, and thus, several areas remain underexplored. Therefore, scholarly contributions were invited to interrogate, challenge, and debate current understanding of the topic in an effort to develop solutions to unanswered questions. The contributions chosen for this issue comprise of three studies on eco-entrepreneurship, that complement each other in terms of the topic of investigation and the context of the study. The studies share an understanding of how eco-entrepreneurship is stimulated, how decision-making in such hybrid ventures could be triggered and what alternative financing strategies could be adopted by eco-ventures. In addition, our review contributes by emphasizing areas in eco-entrepreneurship that need research attention.

Keywords: eco-entrepreneurship, stakeholder, crowdfunding, India, South Africa, Europe.

1. Introduction

We are currently facing a global ecological, sustainability and climate crisis. A rapid response to counter climate emergency and reduce environmental degradation is important to ensure a safer, healthier and sustainable future. Meanwhile, an increasing number of individuals, institutions and government bodies worldwide are convinced of the need to reduce the negative impact of economic activity on the climate, ecology and the environment. Indicative of this,

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more than 500,00 organizations in over 180 countries have attained ISO 14001 certification (ISO Standards, 2024), over 195 parties are among the signatories of the Paris Agreement (United Nations COP21, 2024), and 'Fridays for future' protests have spread across the globe. These are important initiatives in which governments, meta-organisations, large corporations, SMEs, entrepreneurial ventures, and concerned citizens are taking part. For instance, through EU's initiative, the Corporate Sustainability Reporting Directive (CSRD) has been modernised and strengthened (European Commission, 2023). The directive has entered into force since 5th January 2023. Large companies and listed SMEs shall be coerced to share detailed information regarding their social and environmental impact with investors and stakeholders, though the latter can report using simplified standards. This aims to allow better access to risks and opportunities arising from climate change, ecological degradation, or other sustainability issues. Furthermore, countries like France have been criticizing the EU and some of its member countries for not following up on its environmental laws. At the same time, through the *ecologique* and green transition plan, France, like some other countries, has pledged to invest €7 billion to meet climate goals, biodiversity strategies and reduce carbon emissions by 2030 (French Ministry for Europe and Foreign Affairs, 2023). The French president has specifically mentioned that the *ecologique* and green transition plan should offer incentives instead of sanctions, obligations or burden to corporations, small businesses or to the citizens of the country (Politico Europe, 2023).

To address such concerns, social entrepreneurs, sustainable entrepreneurs and most importantly, eco-entrepreneurs are playing an active role, all over the world, in solving climate, ecological and environmental challenges while educating the public and creating new customer bases for eco-friendly products and services. Moreover, as we marked the 7th anniversary of the United Nation's17Sustainable Development Goals (SDGs) on 25th September 2023, it is important to note that SDGs have often been adopted as an effective umbrella, especially the ones that focus on ecological or environmental issues, in appreciating the importance of eco-entrepreneurship today. Finally, eco-entrepreneurship is also gaining importance in light of emergencies like the bio-diversity crisis (e.g. David Attenborough's recent movie: A Life on Our Planet) or the COVID-19 crisis.

Therefore, this special issue raised a call to capture interest and advance research on eco-entrepreneurship. The first article of this issue is a conceptual paper that charts an understanding of eco-entrepreneurship, including the challenges and opportunities created within the geographic context of India. The second article is a qualitative study that explores mechanisms developed by eco-entrepreneurs in South Africa to integrate stakeholders in order to overcome the ecological versus economic trade-offs. The third article of this issue is a quantitative study that investigates the financing patterns through equity crowdfunding and debt financing of clean tech firms: categorised under eco-

ventures as they aim to create solutions to address environmental and ecological problems.

This article is structured as follows. First, our understanding of ecoentrepreneurship is emphasized, and a working definition of the term is presented. This is followed by a review on the current state of research in this area. Third, a brief discussion of the three scholarly contributions selected for this issue is developed. Fourth, our review contributes by emphasizing a non-exhaustive list of research topics that need attention. Finally, we wrap up this article with a discussion and conclusion.

2. Our understanding of Eco-entrepreneurship

We understand eco-entrepreneurship as a contraction of the concepts of 'ecology' and 'entrepreneurship'. 'Ecology' refers to dealing with the relations and interactions between organisms and their physical environment while we conceptualize 'entrepreneurship' as 'the creation, discovery, and exploitation of value-adding opportunities' (Masurel, 2019, p. 16). Therefore, we define 'eco-entrepreneurship as a multi-level process that deals with the discovery, creation and exploitation of entrepreneurial opportunities that arise from ecologically relevant institutional voids, market failures or market opportunities'.

This notion of providing entrepreneurial solutions to ecological problems focuses on economic and environmental value creation, which in turn creates economic and non-economic gains for the society and the environment. We can also say that eco-entrepreneurs operate in the realm of prosperity, social good, and environmental protection.

Even though we see eco-entrepreneurship, social entrepreneurship, and sustainable entrepreneurship as closely related concepts, we note some key differences and overlaps. Eco-entrepreneurship is different from social entrepreneurship where the latter has been defined as "a process of identifying, evaluating and exploiting opportunities aiming at social value creationby means of commercial, market-based activities and of the use of a wide range of resources" (Bacq and Janssen, 2011, p. 388). Furthermore, most definitions of social entrepreneurship highlight the hybrid nature of these ventures that combine a primary social mission with a secondary mission achieved through commercial activities (Mitra et al., 2017, 2019; Saebi et al., 2019). Sustainable entrepreneurship is defined as "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 gain is broadly construed to include economic and non-economic gains to individuals, the economy, and society" (Shepherd and Patzelt, 2011, p. 137). In the process, sustainable entrepreneurs pursue a triple embedded view by holistically integrating social, environmental and economic goals with the aim to develop a sustainable world for future generations (Muñoz and Cohen, 2018; Tilley and Young, 2006). The key difference between eco-entrepreneurship on the one hand, and social and sustainable entrepreneurship on the other hand, is that eco-entrepreneurship focuses deliberately (or exclusively) on environmental, green or ecological issues while social and sustainable entrepreneurship have a broader focus. Here, social entrepreneurship pursues social issues, which may or may not be directly related to the environment whereas sustainable entrepreneurship pursues a balance between profit, environmental issues and social or community impact against the backdrop of running a business. The key overlap between these three forms of entrepreneurship lies in the entrepreneurs' motivation that goes beyond self-oriented or pecuniary goals to cover other-regarding or other-oriented goals (Hoogendoorn et al., 2010, 2019, 2020; Vedula et al., 2022).

3. Current State of Research on Eco-entrepreneurship

Eco-entrepreneurship has been, in its modern form, on the agenda for about two decades now. Some academic papers and a few special issues (e.g. Demirel et al., 2019; Schaper, 2002) on eco-entrepreneurship have been published, both in existing journals and newly established journals. Even though eco-entrepreneurs find and create market opportunities in the current global context (Schaltegger, 2002) and the body of literature is growing, there is still a lack of understanding and consensus regarding the nature and definition of eco-entrepreneurship. The term eco-entrepreneurship is used interchangeably with social, sustainable, environmental, and green entrepreneurship to cover all things related to the environmental impact of economic activity and entrepreneurship. When this happens, the drivers, processes, and outcomes of eco-entrepreneurship and other forms of entrepreneurship become muddled. Therefore, there is a need to better understand eco-entrepreneurship at the micro-level, meso-level and macro-level.

Furthermore, much of the scholarly energy has concentrated around social and sustainable entrepreneurship. The studies that do exist in the area of ecoentrepreneurship have mainly focused on the challenges faced by start-ups and small businesses operating in the eco-sector. For instance, current scholarship highlights that eco-entrepreneurs face innovation challenges, especially when compared to large companies that receive financial backing (Demirel et al., 2019; Schick et al., 2002). Some empirical studies have pointed out the regulatory and policy challenges that they face at different phases of their business, which in turn pose a barrier to business growth (Ball and Kittler, 2019; Pastakia, 1998). A few other investigations have noted the market as a challenge, explaining that there is a lack of market awareness of eco, green and sustainable products and services. Moreover, consumer resistance results in consumers not being inclined to adopt a positive attitude towards such products (Linnanen, 2002; Pastakia, 2002). As a result, it is a challenge for the eco-entrepreneurs to remain motivated to pursue

their case, which could further harm the reputation of the eco-venture (Dixon and Clifford, 2007). Furthermore, some studies have also highlighted the difficulty to obtain capital from investors that might not share the same objectives and values of the entrepreneur. Investors are often doubtful of the eco-entrepreneurs' knowledge of finance, which makes it difficult for the entrepreneur to pitch novel business ideas based on environmental arguments (Bergset, 2015). Moreover, studies have highlighted that social, sustainable or eco-entrepreneurs' motivation to make the world a better place often exceeds their desire to make money (Bergset, 2018; Hoogendoorn et al., 2019; Linnanen, 2002). Some other articles spotlight the innovative nature of this sector or the consequences induced by environmental measures and regulations (Hoogendoorn et al., 2020).

Building on the above, we argue that there is opportunity to conduct research on eco-entrepreneurship. Therefore, this special issue aims to deepen our knowledge of eco-entrepreneurshipand chart a path for the future of eco-entrepreneurship theory and practice. While selecting the contributions for this issue, we viewed the term eco-entrepreneurship as broadly synonymous with the terms green entrepreneurship and environmental entrepreneurship, but we preferred to emphasize the use of the term 'eco-entrepreneurship' to cover the vastness and the fragmented nature of this topic. It must also be mentioned that we perceive eco-entrepreneurship as a narrower area than that of social or sustainable entrepreneurship. However, papers on these types of entrepreneurship that have a link with dealing with ecological, green, bio-diversity, environmental or climate-challenges, both as the venture's main or side activity, have been carefully considered for inclusion in this issue.

4. Overview of Special Issue Articles

Entrepreneurship does not only contribute to economic development and job creation, but it also plays an important role in reducing and in some cases, reversing the negative impact of economic activity on climate and the environment. Social entrepreneurs, sustainable entrepreneurs, and ecoentrepreneurs play a pivotal role in efforts to reduce and reverse this negative impact. However, this relatively young literature struggles with defining the boundaries of these interconnected concepts.

Consequently, the first paper chosen for this issue by Kumar, uses the People-Planet-Profit framework and circular economy principles to explain the overlap and distinction between eco-entrepreneurship, social entrepreneurship, and sustainable entrepreneurship. The intersection of Profit-Planet is where purely profit seeking economic activities fail and where eco-entrepreneurs create value. At the same time, this intersection creates unique challenges for eco-entrepreneurs. Kumar (2024) attributes the creation of market opportunities for Indian eco-entrepreneurs to inefficient government institutions and cultural

norms surrounding the notion of waste and rag pickers (informal solid waste workers). Using examples, the author illustrates how both governmental agencies and non-governmental actors contribute to fostering an environment for ecoentrepreneurs to thrive in. Specifically, support from the Indian government including a division of high court that deals with environmental cases as well as practices of green businesses, investors, activists, and preferences of consumers resulted in the growth of eco-entrepreneurship in India's solid waste management sector.

The second paper of this issue emphasizes that opportunities and barriers coexist for eco-entrepreneurship in the South African context. As in India, South African eco-entrepreneurs are affected by the institutional context, including government policies, alongside the actions of non-governmental actors. The authors, Mhlonyane and Mamabolo, propose that eco-entrepreneurs can leverage these stakeholders to balance economic logic (profitability) and ecological logic (the need to address ecological issues) for the success of their ventures. Drawing from stakeholder theory, the authors outline interrelated mechanisms that are influenced by the African specific cultural norm of *ubuntu* (being humane). In fact, it is ubuntu that facilitates the mechanisms of appealing to common interests across stakeholders, seeking input from stakeholders, and focusing on value co-creations framed by the ecological protection regulations (Mhlonyane and Mamabolo, 2024).

The third study by O'Reilly and Mac an Bhaird (2024) investigates the role of investors, a significant stakeholder for cleantech companies, through equity crowdfunding and debt financing. Cleantech companies can be perceived as companies that develop and adopt innovative technologies and that are aware of their environmental and ecological impact. Positioned at the intersection of Profits-Planet, cleantech companies require robust financial support from investors due to the long horizontal R&D timeline and high capital intensity. Using signalling theory, the authors argue that early-stage small and medium-sized cleantech companies in the energy efficiency, recycling and waste management, renewable energy, and transportation sectors rely on patents to signal their technological capabilities to attract financing. To counteract against the challenges of valley of death and liability of newness, patents are used to signal for quality, company's competitiveness and competitive advantage, and tangible assets.

5. Research Gaps to Explore and Recommendations for Future Research in Eco-entrepreneurship

The articles included in this Special Issue address important stimulating factors and barriers that eco-entrepreneurs face. The studies highlighted interesting examples, stories, and analyses that support effective eco-entrepreneurship in

India, South Africa, and Europe providing hope for the future of our planet. Even though the contributions of this issue have addressed important research questions around the following non-exhaustive list of themes, we believe that many areas still remain underexplored, and this needs more attention. We discuss those areas below.

5.1. Definitional Issues

- The first article of this issue attempted to addresses some of the
 confusion around the meaning of eco-entrepreneurship by drawing a
 conceptual boundary that helps in defining eco-entrepreneurship.
 However, we believe more work is needed in this area to advance our
 understanding in order to reach a consensus as to what ecoentrepreneurship essentially means as it still remains a contested
 concept.
- There are potential overlaps between social, sustainable, and ecoentrepreneurship, yet, there are some key differences that draw a conceptual boundary between these forms of entrepreneurship. Future contributions can help in solving the overlaps and differences through conceptual or empirical studies.
- A shared definition of environmental, green and eco-entrepreneurship seems to exist. However, there is no consensus on what is meant by these types of entrepreneurship, which further arrests the progress of this research avenue (Demirel et al., 2019; Shapira et al., 2014). This also leads to inconsistency in measuring their attributes. Submissions were invited to focus on resolving such confusions.

5.2. Taking Stock and Looking Ahead at the Field of Eco-entrepreneurship

- Scholars were also invited to conduct a systematic literature review and summarize the key articles and their findings (i.e. what have we learnt?). This is a rich space that needs attention in order to advance future scholarship.
- Conceptual studies could also contribute by commenting on the future research agenda of eco-entrepreneurship (i.e. where do we go from here?).

5.3. Eco-entrepreneurship as a Multi-level Process

- At the micro-level or individual level, studies could investigate the ecoentrepreneur's background, knowledge, skill-set, values and attitudes. Additionally, studies could examine motives for pursuing ecoentrepreneurship over other type of entrepreneurship such as social, sustainable or traditional entrepreneurship; the drivers, intentions and moral cognitions that trigger eco-entrepreneurship; the relationship between entrepreneurial self-efficacy and eco-entrepreneurship; and overcoming the trade-offs between ecological and economic goals at the individual level
- Furthermore, at the micro-level, which includes both individual and firm level issues, the issue of how eco-entrepreneurs or ecoentrepreneurial ventures identify ecological market failures as entrepreneurial opportunities could be explored. For example, studies can examine the link between individual characteristics and identification of market failure and eco-entrepreneurial opportunities.
- At the firm level, future studies can focus on ventures or SMEs that do not have a specific green mission ("not fully green"), yet contribute to cleaner production in their environment. During the COVID-19 health crisis we witnessed some traditional ventures step up and manufacture eco-friendly masks, shields and hand-sanitizers that resulted in cleaner, greener and eco-friendly activities. For example, a research question can examine the external factors that force a 'not fully green' company to pursue eco-entrepreneurship.
- At the macro level, studies could focus on the external barriers and dark-sides of eco-entrepreneurship. For example, studies can examine the conditions that stimulate eco-entrepreneurship as well as the negative impact of eco-entrepreneurship for the company and stakeholders or the impact of formal and/or informal institutional ecoentrepreneurship. At the meso-level, studies could examine combined efforts of actors. For example, studies can investigate the reasons for clusters of organisations utilizing eco-entrepreneurship, ecoeco-extrapreneurship corporate intrapreneurship, or ecoentrepreneurship as a tool to achieve their ecological, environmental, green, social or sustainability agendas.
- Studies must examine the effects of institutions, culture and investment
 patterns on decisions to launch, pursue or scale green ventures/ecoentrepreneurship since eco-entrepreneurship does not operate in a

vacuum. For example, studies can examine how formal and informal institutions effect the processes and developmental stages of ecoentrepreneurial ventures; the roles of other stakeholders such as lobby groups, non-governmental organizations (NGOs), venture capitalists, industry associations and local communities on companies that venture in an eco-friendly way.

5.4. The Context

• Additionally, we also encouraged submissions that could clarify the context of eco-entrepreneurship by examining the stream of issues that eco-entrepreneurs deal with. We had called for studies that could identify, compare and contrast the relevant antecedents, processes, outcomes, and measures essential to data collection in order to conduct largescale research drawn from both developed and developing countries. Such studies could draw from regional differences in eco-entrepreneurship. In addition, future investigations could also study the influence of urban versus rural settings on eco-entrepreneurship.

5.5. Integration of Research Fields

 Through this call, we also highlighted the need to integrate relevant and related fields of research such as innovation studies, organizational design, human resource management or finance to answer research questions thatare at the intersection of these fields. Thus, future submissions could question, inform, and enrichthe overall field of entrepreneurship and increase its applicability to not only other relevant disciplines, but also have implications for policy and practice.

5.6. Critical Perspectives on Eco-entrepreneurship

Studies taking a critical approach to unpack eco-entrepreneurship were
also invited to contribute to this Special Issue. For example, reducing
deforestation or preserving nature reserves can jeopardize the earnings
of an entire community that practice farming on that land; this could be
a valuable avenue to explore. Highlighting such cases could lead to
exploring the perils, dark-sides and challenges associated to ecoentrepreneurship.

5.7. Other Areas of Study Related to Eco-entrepreneurship Could also Include

- Finding/discovering versus creating opportunities for ecoentrepreneurship, such as persuading customers to change their views and buying behaviours,
- Measuring success or impact of eco-ventures,
- Critiquing or exploring suggestions on policy and practice,
- Discussing financing options, such as crowdfunding, bootstrapping or government subsidies available or unavailable to eco-entrepreneurs,
- Investigating pull versus push factors or self-oriented versus otherregarding factors in eco-entrepreneurship,
- Analysing value creation such as economic, social and environmental outcomes of eco-entrepreneurship,
- Studying the balance between environmental scope and mass marketability of eco-entrepreneurial ventures,
- Conceptual, theoretical, qualitative and quantitative papers covering the above key topics were also invited through this call.
- Last but not least, case studies on eco-entrepreneurship, for teaching and overall pedagogic development of students, which should also include a teaching note (see Caffrey et al., 2020, for a recent example) also needs research attention. In terms of impact, we consider these as important intellectual contributions as it helps get the topic into the classroom.

6. Discussion and Conclusion

Two papers included in this special issue specifically addressed ecoentrepreneurship in emerging countries, which are India and South Africa. The third paper examines eco-entrepreneurship in Europe. Each of the three papers emphasized the vital role of stakeholders and incentives in supporting and shaping eco-entrepreneurial ventures. The studies spotlighted that ecoentrepreneurs must actively manage multiple stakeholders including investors present on conventional and non-conventional platforms (e.g. crowdsourcing), customers, activists, non-governmental organizations, and regulatory bodies to balance the trade-offs between economic and ecological goals. Stakeholders' and alignment financial support, acceptance, engagement, significantly to the success and sustainability of eco-entrepreneurial ventures. Incentives can serve as a powerful tool for policy makers to address challenges of climate change, air, water, and land pollution, and resource depletion. For example, valuable insights from the success story of Indian eco-entrepreneurs in the solid waste industry can be used to create incentives in other emerging nations. Support programs in South Africa can be replicated in other emerging nations to create strong collaboration across stakeholders. The importance of crowdfunding, highlighted in the European context, can be expanded beyond Europe to encompass both developed countries and emerging nations. Policymakers must leverage crowdfunding by incentivizing programs such as cofinancing programs and/or public-private partnerships.

Consequently, the papers included in this special issue aimed at contributing to research on eco-entrepreneurship by providing valuable insights for examining key issues within the context of eco-entrepreneurship. Through this call and through the papers included in this issue, we hope to have enhanced not only our understanding of eco-entrepreneurship, but also to integrate the scholarly energy of this emergent area to enhance the richness of the broader domain of entrepreneurship. We believe that eco-entrepreneurship is still at its infancy with many challenges and opportunities ahead. It is our hope that this special issue will serve as a basis for further development of this promising area of research.

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