

Article

Entrepreneurship as Catalyst for Sustainable Development: Opening the Black Box

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Abstract: In the last decades, sustainable development has become an important topic of discussion for scholars and practitioners concerned with environmental issues. Since the publication of the Brundtland Report, which represents a milestone in triggering awareness for sustainability issues, sustainable development has steadily gained popularity to become one of the most important environmental discourses today. Together with innovation, the United Nations identified entrepreneurship as a key element for addressing sustainable development challenges. Due to its growing recognition as a driver of sustainable development, entrepreneurship is subject to research across many scientific disciplines. To systemize the current state of knowledge, the purpose of this paper is to systematically review recent literature and to outline how sustainable development influences entrepreneurial activities and vice versa. In addition, it investigates whether and under what circumstances entrepreneurship can contribute to the economic, environmental and social dimension of sustainable development. The systematic literature review shows that several research areas, such as opportunities, motivations, competencies, strategies and business models of sustainability-oriented entrepreneurs, have already received wide coverage by academic literature. However, our knowledge about how entrepreneurial activities contribute to the achievement of the United Nations sustainable development goals is still limited and should be addressed by further research.

Keywords: entrepreneurship; sustainable development; literature review

1. Introduction

In the last decades, sustainable development (SD) has become an important topic of discussion, especially after a definition of the concept was introduced by the “Brundtland Report” in 1987. According to this document, SD is a “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” [1]. The Brundtland Report represents a milestone in triggering awareness for sustainability issues and provides a basis for scholars and practitioners concerned with environmental issues [2]. Since its publication, the issue of SD has steadily gained popularity to become one of the most important environmental discourses today.

In 2015, the United Nations General assembly adopted “The 2030 Agenda for Sustainable Development” and defined 17 sustainable development goals (SDGs) with 169 related targets that address the major economic, social and environmental concerns our society is currently facing [3]. Together with innovation, entrepreneurship has been identified by the UN as a key element for

addressing SD challenges. It is expected to contribute to all three pillars of SD by driving economic growth, promoting sustainable agriculture and innovation, increasing social cohesion, reducing inequalities, introducing climate change mitigation technologies, and establishing environmentally sustainable practices and consumption patterns [4].

Due to its growing recognition as a driver of SD [5] (p. 441), the subdomain of responsible entrepreneurship [6] is subject to research across many scientific disciplines. In the past decades, different concepts have emerged, including social entrepreneurship, ecopreneurship, and sustainable entrepreneurship. The latter constitutes the most comprehensive approach to sustainability problems. Sustainable entrepreneurs aim at achieving multiple objectives and therefore integrate economic, social and environmental goals in their organizations. However, ecopreneurs, who are rather focused on the economic and environmental dimensions, as well as social entrepreneurs, have also received considerable attention by academic researchers.

The purpose of this paper is to summarize by means of a systematic literature review (SLR) the developments in the recent literature and to outline how SD influences entrepreneurial activities and vice versa. In addition, it investigates whether and under what circumstances entrepreneurship can contribute to the economic, environmental and social dimension of SD. The literature review shows that several research areas, such as opportunities, motivations, competencies, strategies and business models of sustainability-oriented entrepreneurs have already received wide coverage by academic literature. However, our knowledge about how entrepreneurial activities contribute to the achievement of the SDGs is still limited and should be addressed by further research.

In sum, our research addresses the following research question: How do entrepreneurial activities influence sustainable development and vice versa, and under what circumstances can entrepreneurship contribute to the economic, environmental and social dimension of SD?

2. Theoretical Foundations

2.1. Sustainable Development

The principle of SD was introduced in 1972 by the United Nations Conference on the Human Environment, which was the first global environmental conference where industrialized and developing nations came together to discuss environmental issues. In 1987, the Brundtland Report established the fundamental definition of SD. According to this document, SD is a “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” [1]. The publication of the Brundtland Report triggered public awareness of environmental issues and provided a widely acknowledged basis for discussing sustainability topics. Hence, the issue of SD has gained wide popularity and attention by academics, policymakers and practitioners [2].

In 2015, the United Nations General Assembly defined 17 SDGs comprising 169 related targets which should be achieved by 2030. These goals and targets are an essential part of the 2030 Agenda for SD and build on the Millennium Development Goals of 2000 that have not been fully achieved by 2015 [3]. Corresponding to the three-pillar model of sustainability, the UN SDGs address three central aspects of sustainability: economic prosperity, social equity and environmental protection. They call for a balance between economic, social, and environmental needs and goals, a so-called “triple bottom line” or TBL [7]. A related concept, the “concentric circles approach”, depicts these aspects in three concentric circles with the economic sphere being in the inner circle, the social sphere in the middle, and the environmental sphere in the outer circle [2,8]. This approach implies that economic entrepreneurial action both shapes and is shaped by the social and environmental sphere. Therefore, the starting point of this research is the economic domain, i.e., individual entrepreneurs, startups and small or medium-sized enterprises (SMEs) and their nexus to social and environmental development.

2.2. Entrepreneurship for Sustainable Development

Entrepreneurship is increasingly recognized as a solution to various economic, social and environmental challenges. It is therefore subject to research across many scientific disciplines, including business, management, economics, social sciences and psychology [9–12]. Already in 1999, Hart and Milstein [13] emphasized the potential of the interplay between entrepreneurship and SD. They based their work on Schumpeter's concept of "creative destruction" [14], which essentially states that long-standing business models, organizations and structures must be destroyed to open opportunities for innovation and new businesses. Accordingly, Hart and Milstein [13] (p. 25) argue that "Overall, innovators and entrepreneurs will view SD as one of the biggest business opportunities in the history of commerce". In the authors' view, entrepreneurs have the chance to reposition themselves in their business environment by enhancing their competencies and to finally redesign their industries toward sustainability. Several researchers share this view, which sees market imperfections not only as a source of environmental degradation but also as an engine for innovation and sustainable and/or social entrepreneurial opportunities [9,15,16].

In line with this, the UN General Assembly [4] has identified entrepreneurship, together with innovation, as a key element for addressing SD challenges. Under resolution 71/221 on entrepreneurship and SD, the role of entrepreneurship in achieving sustainability in all three dimensions of SD is emphasized (see Table 1).

Table 1. The role of entrepreneurship in achieving sustainable development (SD).

SD Dimension	Entrepreneurship Contribution
Economic	"(. . .) entrepreneurship drives economic growth by creating jobs, promoting decent work and sustainable agriculture and fostering innovation"
Social	Entrepreneurship can make a positive contribution to "promoting social cohesion, reducing inequalities and expanding opportunities for all, including women, young people, persons with disabilities and the most vulnerable people"
Environmental	"(. . .) entrepreneurship can help to address environmental challenges through the introduction of new climate change mitigation and adaptation technologies and resilience measures, as well as by promoting environmentally sustainable practices and consumption patterns"

Source: UN General Assembly [4] (p. 3).

Entrepreneurship is directly referred to in targets of the SDGs 4 and 8 (see Table 2) and is associated with education, job creation, creativity and innovation [17]. However, goals that do not explicitly address entrepreneurship also provide opportunities for entrepreneurs, e.g., SDG 7 (affordable and clean energy), SDG 9 (industry, innovation and infrastructure), SDG 11 (sustainable cities and communities), SDG 12 (responsible consumption and production), and SDG 13 (climate action) [17,18].

Table 2. SDG 4 and SDG 8.

SDGs and Targets Addressing Entrepreneurship	
SDG 4	"Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. Target 4.4: By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship."
SDG 8	"Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all. Target 8.3: Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro-, small and medium-sized enterprises, including through access to financial services."

Source: UN General Assembly [4] (p. 21, 23).

2.3. Entrepreneurship and Innovation

Venkataraman [19] describes entrepreneurship as a process of opportunity recognition, the creation of goods and the exploitation of opportunities. Innovation is inseparable from this process [16,20,21]. Innovation can be defined as “the generation, acceptance and implementation of new ideas, processes, products or services” [22] (p. 2) and is considered as a key mechanism to achieve SDGs [23]. Zhao [20] investigated the synergies between innovation and entrepreneurship and found that the two concepts are complementary, positively related to each other and vital to an organization’s success. Additionally, innovation and entrepreneurship are affected by organizational culture and management style and are not limited to the initial stages of a new venture but also appear in established entrepreneurial and innovative organizations.

Hockerts and Wüstenhagen [24] highlight that the roles of new entrants (“Emerging Davids”) and incumbent organizations (“Greening Goliaths”) differ in terms of their contribution to an industry’s transformation towards SD. They argue that new entrants are more likely than incumbent firms to engage in sustainability-related entrepreneurial actions. According to Hockerts and Wüstenhagen [24], “Emerging Davids” tend to be more flexible and innovative, but they often get stuck in a niche because they usually lack resources to address a broader range of sustainability issues and a greater number of customers. Market incumbents, on the other side, are challenged by the innovations of newcomers. However, as incumbent firms usually possess more financial resources and process innovation capabilities, they can copy some of the Davids’ initiatives and place them on their market. Hockerts and Wüstenhagen [24] conclude that an interaction of newcomers and incumbents is necessary for sustainable innovations to transform industries. In fact, companies contribute most to SD if they have integrated the solution of environmental and social problems into the core aim of their business, if they provide environmentally and socially superior products, and if their innovations have a significant influence on the mass market and society [21]. To put it simply, entrepreneurs are good at recognizing sustainable business opportunities and creating new markets rather than changing existing structures. In mature markets, where supply, processes, technologies and policies are already in place, established companies are often more successful in driving innovation. This highlights the importance of the interplay between innovations, entrepreneurial start-ups and established organizations.

2.4. Sustainability-Oriented Concepts of Entrepreneurship

In the context of SD, several related but different concepts of entrepreneurship are currently receiving much attention in the academic literature, e.g., ecopreneurship, sustainable entrepreneurship, institutional entrepreneurship, social entrepreneurship or corporate entrepreneurship. Schaltegger and Wagner [21] outline the characteristics of different kinds of sustainability-oriented entrepreneurship and provide a framework to place sustainable entrepreneurship in relation to sustainability innovation. Their classification of sustainability-oriented entrepreneurship is based on core motivations, aims, and the role of economic and non-market goals. According to this classification, the term “ecopreneurship” refers to entrepreneurs whose goal is to earn money by integrating environmental issues in their businesses. Although they are concerned with solving environmental problems, the creation of economic value is still at the forefront of the ecopreneurs’ actions. They aim at large market shares and high turnover in mass markets and their focus is more on environmental than on social issues. Contrary to ecopreneurship, social entrepreneurship focuses on value creation for society, whereas economic value creation is regarded as less important. It is rather seen as a means to achieve societal goals. Institutional entrepreneurship aims at changing regulatory, societal and market institutions. Finally, sustainable entrepreneurship takes a comprehensive approach and contributes to solving environmental and societal problems by using economic gains as both means and ends.

Schaltegger and Wagner define sustainable entrepreneurship as “an innovative, market-oriented and personality driven form of creating economic and societal value by means of break-through environmentally or socially beneficial market or institutional innovations” [21] (p. 226). This definition differs to some respect from other definitions provided by sustainable entrepreneurship literature.

First, it does not imply that sustainable entrepreneurs must follow a TBL-approach. Although the authors state that “sustainable development requires the integrative achievement of environmental, social and economic goals now and for future generations” [21] (p. 227), they define sustainable entrepreneurship as a form of economic and societal value creation through environmentally or socially beneficial innovations. Second, the definition does not include the notion of opportunity recognition and exploitation. Other authors explicitly include these elements in their definitions of sustainable entrepreneurship (see Table 3). Belz and Binder [25] provide a process model of sustainable entrepreneurship that is largely in line with these definitions. According to this model, the sustainable entrepreneurship process starts with problem and opportunity recognition, continues with the development of double or triple bottom line solutions, and is accomplished with the creation of an enterprise and a corresponding market.

Table 3. Definitions of sustainable entrepreneurship.

Authors	Definition of Sustainable Entrepreneurship
Cohen and Winn [21] (p. 35)	The examination of “how opportunities to bring into existence future goods and services are discovered, created, and exploited, by whom, and with what economic, psychological, social, and environmental consequences”
Katsikis and Kyrgidou [26] (p. 218)	“the teleological process aiming at the achievement of development, by discovering, evaluating and exploiting opportunities and creating value at multiple levels”
Hockerts and Wüstenhagen [24] (p. 482)	“the discovery and exploitation of economic opportunities through the generation of market disequilibria that initiate the transformation of a sector towards an environmentally and socially more sustainable state”

For this paper, all the above-mentioned types of entrepreneurship and innovation are regarded as relevant for SD and thus included in the literature review. Moreover, the research is not limited to new ventures but also includes innovative and sustainable entrepreneurial actions of small- and medium-sized enterprises (SMEs). In fact, sustainable entrepreneurs can be drivers of SD within established companies, as their personal goals and their innovativeness can potentially influence the company’s sustainability orientation and even transform markets and society [21].

3. Method

The methodology used to systematically search and structure the literature on entrepreneurship and SD is that of a systematic, evidence-informed literature review. Initially applied in medical research, systematic reviews have gained considerable attention in economics and management due to their ability to improve the quality of the review process by using explicit, systematized and replicable search methods [27]. The database used to conduct the search was the Web of Science. The Web of Science was chosen as it represents one of the major academic search engines in social science and facilitates a wide-ranging identification of relevant publications.

The selection of the research focus and the corresponding keywords was based on the introduction to the 2010 special issue of the Journal of Business Venturing on entrepreneurship and SD. In their introduction, Hall et al. [5] state that although entrepreneurship is being increasingly recognized as a path towards SD, it is unclear whether and how the process of entrepreneurship for SD will unfold. As the topic has experienced considerable growth in academic research in the past years, the aim of this SLR is to analyse what progress has been made since 2010 in answering the questions addressed by Hall et al. [5]. Therefore, the focus of this paper is on the outcomes of entrepreneurship for SD and on the different factors that influence these outcomes and the process of entrepreneurship for SD in general.

The procedure of identifying relevant articles began with a search for English articles published between 2010 and 2019 in academic, peer-reviewed journals. The search was limited to papers published after 2010 because a comprehensive review of contributions published before 2010 is already provided by Hall et al. [5]. To identify relevant publications we searched for works with “entrepren*” (to cover entrepreneurship, entrepreneur, entrepreneurial, etc.), “ecopren*” (to cover ecopreneurship, ecopreneur, etc.) or “vent*” (to cover venture, venturing etc.) in the title AND “sustainable development” in the title, text, abstract, or keywords. The exact search strings were: ALL = “sustainable development” AND TI = (entrepren* OR ecopren* OR vent*). Due to the multidisciplinary nature of the topic, the search was not limited to business journals, but also included sources related to sustainability and development policy. As a result of the search, a total of 115 articles were identified. To ensure the quality of the selected publications, only articles that are published in higher ranked journals were included in the analysis. The minimum quality threshold that had to be fulfilled in order to be included in the analysis were publications in journals that are ranked at least in the category “C” of the German journal ranking VHB-JOURQUAL3 (where A is highest and D is lowest), and/or in category “2” in the UK-ABS Journal List (where 4 is the highest and 1 is the lowest) and/or in journals that have a JCR impact factor of at least 0,7 (see comparable studies that use similar thresholds such as [28–31]). After excluding the articles that did not fulfil the quality threshold, the 71 remaining articles were screened for a topic fit. In doing this, each author individually examined the 71 articles in terms of study subject, research question and findings, and made sure that the following criteria are met:

1. The papers investigate the relationship between SD and entrepreneurship and/or innovation.
2. The terms SD and entrepreneurship/innovation are defined or used within a context corresponding to the definitions or concepts described in Section 2 of this paper.

The results of all authors were then compared. In the cases where assignments showed inconsistencies, the disparities were discussed among all authors to arrive at a consensual decision. In consequence of the screening, 30 articles were selected for the SLR. Table 4 provides an overview of the selected studies, their publication outlet, the applied research method, the research focus and the findings.

Table 4. Overview of articles included in the literature review.

Author	Year	Journal	Method	Research Focus and Findings
Hall, Daneke & Lenox	2010 [5]	Journal of Business Venturing	Theoretical/ Conceptual	Introduction of special issue on SD and entrepreneurship, review of the field of sustainable entrepreneurship (SLR)
Shepherd & Patzelt	2011 [32]	Entrepreneurship Theory and Practice	Theoretical/ Conceptual	Review of the field of sustainable entrepreneurship, research agenda and framework for sustainable entrepreneurship research
Rahdari, Sepasi & Moradi	2016 [16]	Journal of Cleaner Production	Theoretical/ Conceptual	Paper highlights the role that social entrepreneurship can play in achieving the SDGs
Gast, Gundolf, & Cesinger	2017 [2]	Journal of Cleaner Production	Theoretical/ Conceptual	Review of the field of sustainable entrepreneurship (SLR), integrative framework for categorizing research on ecological sustainable entrepreneurship
Kraus, Burtscher, Vallaster & Angerer	2018 [33]	Sustainability	Theoretical/ Conceptual	Paper consolidates entrepreneurial and financial research, outlines three levels of responsible managerial practices (individual, firm and contextual level)
Muñoz & Cohen	2018 [34]	Business Strategy and the Environment	Theoretical/ Conceptual	Review of the field of sustainable entrepreneurship (SLR), research agenda for sustainable entrepreneurship research

Table 4. Cont.

Author	Year	Journal	Method	Research Focus and Findings
Vallaster, Kraus, Kailer & Baldwin	2018 [6]	Int. Journal of Entrepreneurial Behavior & Research	Theoretical/ Conceptual	Review of the field of sustainable entrepreneurship, paper outlines contingencies that responsible entrepreneurs face
Bansal, Garg & Sharma	2019 [35]	Sustainability	Theoretical/ Conceptual	Review of the field of social entrepreneurship (SLR)
Pansera & Sarkar	2016 [36]	Sustainability	Qualitative	Paper shows how grassroots entrepreneurs can contribute to SD
Dhahri & Omri	2018 [37]	World Development	Quantitative	Study shows that entrepreneurship in developing countries positively contributes to the economic and social dimensions of SD, while its contribution to the environmental dimension is negative
Youssef & Boubaker	2018 [38]	Technological Forecasting and Social Change	Quantitative	Study suggests that under certain circumstances entrepreneurship can contribute to SD, highlights the role of innovation and institutional quality
Kuckertz & Wagner	2010 [39]	Journal of Business Venturing	Quantitative	Paper examines the link between sustainability orientation, entrepreneurial intention and business experience, provides implications for education
Belz & Binder	2017 [25]	Business Strategy and the Environment	Qualitative	Paper discusses the process of sustainable entrepreneurship, focuses on how entrepreneurs recognize, develop and exploit opportunities in the context of SD
Fischer, Mauer & Brettel	2018 [40]	Int. Journal of Entrepreneurial Behavior & Research	Qualitative	Paper studies individual factors of entrepreneurial behavior in the context of SD, finds that self-regulatory focus of sustainable entrepreneurs changes from prevention focus to promotion focus during the entrepreneurial process
Hanohov & Baldacchino	2018 [41]	Int. Journal of Entrepreneurial Behavior & Research	Qualitative	Study explores Patzelt and Shepherd's (2011) model of opportunity and finds that the process of opportunity recognition for sustainable entrepreneurship is based on the interplay between the components described in the model
Ploum, Blok, Lans & Omta	2018 [18]	Journal of Cleaner Production	Quantitative	Study tests and refines Patzelt and Sheperd's (2011) model of opportunity recognition
Ploum, Blok, Lans & Omta	2018 [42]	Organization & Environment	Quantitative	Study explores key competences of entrepreneurs in the context of sustainable development from a business perspective by empirically testing existing key competence frameworks; provides implications for education
St-Jean & Labelle	2018 [43]	Int. Journal of Entrepreneurial Behavior & Research	Quantitative	Paper examines triggers of sustainable entrepreneurship in individuals and highlights the impact of sustainability orientation on entrepreneurial action
Pacheco, Dean & Payne	2010 [44]	Journal of Business Venturing	Theoretical/ Conceptual	Describes how entrepreneurs can change institutions, norms, legislation and property rights through networking and partnerships
Parrish	2010 [45]	Journal of Business Venturing	Qualitative	Explores how sustainability-oriented entrepreneurs can successfully sustain their own activities while contributing to SD
Jolink & Niesten	2015 [46]	Business Strategy and the Environment	Qualitative	Explains different business models of firms that contribute to a more sustainable future

Table 4. Cont.

Author	Year	Journal	Method	Research Focus and Findings
Criado-Gomis, Cervera-Taulet & Inieta-Bonillo	2017 [47]	Sustainability	Theoretical/Conceptual	Paper proposes a categorization/measurement of sustainable entrepreneurial orientation; highlights the importance of sustainable entrepreneurial orientation as a strategic resource
Gasbarro, Annunziata, Rizzi & Frey	2017 [48]	Organization & Environment	Qualitative	Study explores the interplay of sustainable entrepreneurs and public institutions in the context of sustainable transformations
Provasnek, Schmid, Geissler & Steiner	2017 [49]	Business Strategy and the Environment	Qualitative	Study examines corporate entrepreneurship processes and their impact on the innovativeness and performance of companies
Stubbs	2017 [50]	Business Strategy and the Environment	Qualitative	Paper provides insights into one specific business model (B Corps) for sustainable entrepreneurship
Ayuso & Navarrete-Báez	2018 [51]	Corporate Social Responsibility and Environmental Management	Quantitative	Study examines the interplay between the entrepreneurial orientation and internationalization of SME's on their commitment to SD
Lotfi, Yousefi & Jafari	2018 [52]	Sustainability	Quantitative	Paper elaborates on the impact of the green market on the creation of green enterprises
Lourenço & Jayawarna	2013 [53]	International Small Business Journal	Quantitative	Investigates the influence of SD-related university curricula and learning attitudes, intentions and actions of potential entrepreneurs
Lans, Blok & Wesseling	2014 [54]	Journal of Cleaner Production	Qualitative & Quantitative	Identifies key competencies for entrepreneurship and SD within the context of higher education
Fleacă, Fleacă & Maiduc	2018 [55]	Sustainability	Theoretical/Conceptual	Paper explores the link between education, entrepreneurship/innovation and SD

4. Literature Review

4.1. Descriptive Findings

This section provides an overview of the main characteristics of the selected articles that are analysed in the literature review. Figure 1 presents the number of publications published per year. It shows an increasing trend in publications since 2015, with a peak in 2018 when 12 scientific articles were published. This reflects the growing interest of academic research in this area, which may have seen an increase due to the announcement of the SDGs in 2015.

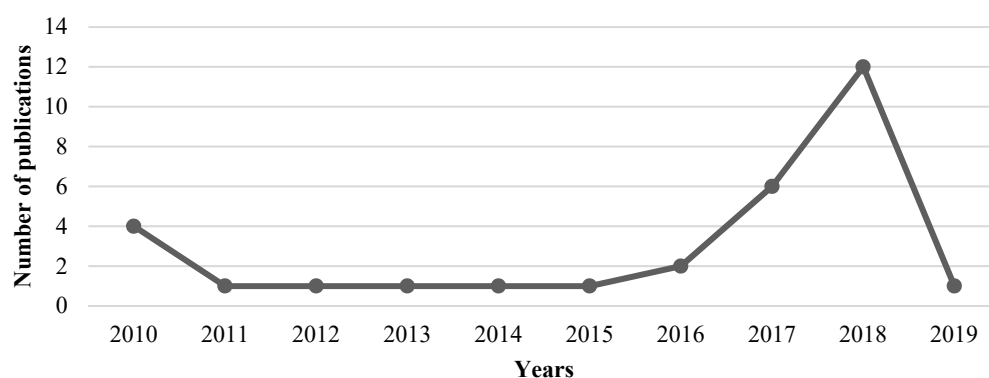


Figure 1. Publications per year.

The journals with the highest number of publications between 2010 and 2019 were Sustainability, Business Strategy and the Environment, International Journal of Entrepreneurial Behavior & Research, and Journal of Cleaner Production (see Figure 2).

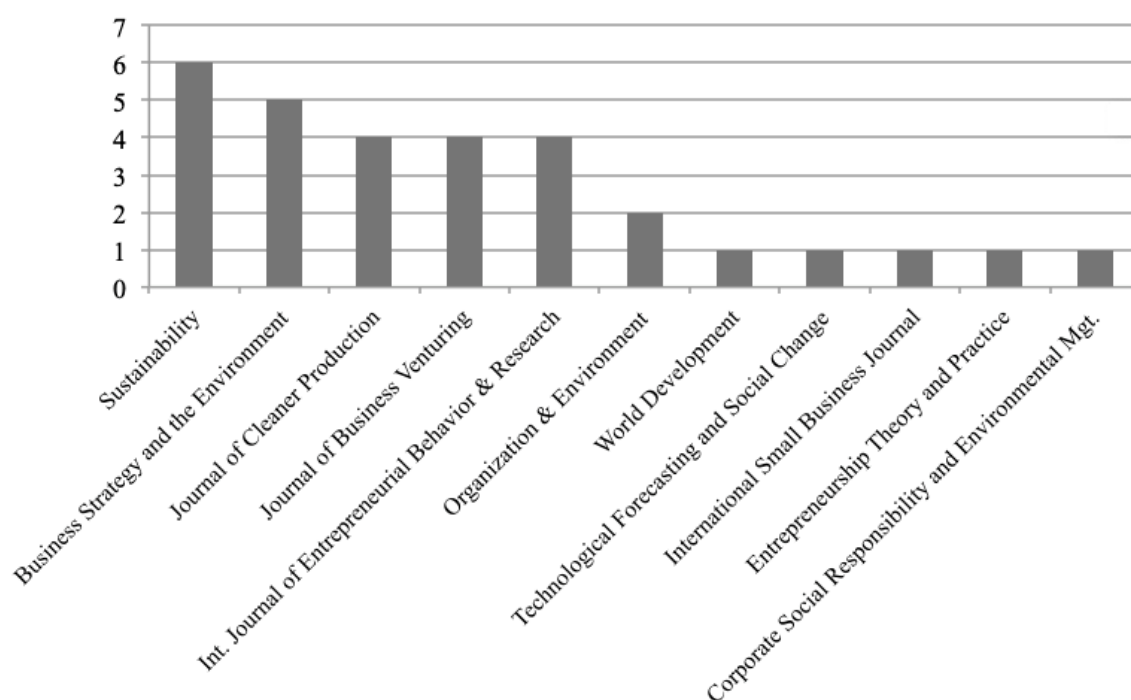


Figure 2. Number of publications per journal.

To structure the findings within the selected literature, the papers were grouped into five categories according to their research focus. These categories, as well as the research methods used in the respective articles, are displayed in Table 5. In sum, 11 articles are theoretical/conceptual, 9 apply qualitative methods, 9 use a quantitative approach and 1 study was carried out with a mixed methods design. The relatively high number of quantitative studies among the newest contributions (7 out of 10 quantitative studies were published in 2018) may be an indicator that sustainability-related entrepreneurship research has experienced considerable development in the past years [2].

Table 5. Categories and research methods.

Category	Method			
	Theoretical/Conceptual	Qualitative	Quantitative	Mixed (Qual. + Quant.)
Review/Overview articles	8			
Empirical support for entrepreneurship contribution to SD		1	2	
Role of SD in shaping entrepreneurial intentions and motivations (individual-level analysis)		3	4	
Role of SD in shaping organizational practices, strategies and business models (organizational-level analysis)	2	5	2	
Role of SD in entrepreneurship education	1		1	1

4.2. Thematic Discussion

In the introduction to the special issue on entrepreneurship and SD published by the Journal of Business Venturing, Hall et al. [5] state that although entrepreneurship is being increasingly recognized as a driver of SD, there is little knowledge about the extent to which and under what conditions

entrepreneurs have the potential to simultaneously promote economic growth, advance environmental goals, and improve social conditions. They argue that further research is needed to explore what differentiates sustainability-oriented entrepreneurs from traditional entrepreneurs, how entrepreneurs can be motivated to pursue sustainable ventures, if there are structural barriers to the capture of economic rents for sustainable ventures and how policies may positively influence entrepreneurship for SD. In addition, Hall et al. [5] criticize that the proposition of a sustainability transformation through entrepreneurship (the “Panacea Hypothesis”) is rather prescriptive than descriptive and overly optimistic.

The literature search provided several articles that discuss the field of sustainability-oriented entrepreneurship on a theoretical or conceptual basis. They highlight the role of social entrepreneurship in attaining SD [16,35], aim at improving our understanding of the field of sustainable entrepreneurship [2,5,32,34], identify different levels of responsible managerial practices [33], and outline contingencies that responsible entrepreneurs face [6]. All these papers mention the potential role of entrepreneurship for SD, but also conclude that more (empirical) research is needed to test existing theories. They call for studies that investigate interrelationships between individual- and organizational-level factors, processes, outcomes, or opportunities of entrepreneurship for SD.

This literature review synthesizes recent contributions to the topic and, focusing on empirical studies, tries to give an idea of whether and under what circumstances entrepreneurship contributes to SD and how SD influences entrepreneurship at the individual, organizational and educational level.

4.2.1. Empirical Support for the Contribution of Entrepreneurship to Sustainable Development

This section focuses on studies that empirically examine whether and how entrepreneurship can foster SD. The sample of articles considered in this literature review contains only three empirical studies on this issue, one of which is qualitative and two are quantitative. The qualitative study was conducted by Pansera and Sarkar [36]. It explores four cases of grassroots frugal innovators in the energy sector on the Indian subcontinent. According to this study, resource scarce entrepreneurs who develop environmentally friendly solutions at low cost and with regionally available material might play a critical role in the achievement of the SDGs. The authors argue that frugal innovations are more energy and material efficient because they derive maximum value from limited resources. In addition, they promote horizontal mechanisms of managing technology and delivering products and services. Hence, by creating frugal innovations, grassroots innovators improve the living conditions of their local communities and empower social minorities [36].

In contrast to these promising findings, the two quantitative studies offer important warnings. Using human development index (HDI) data and considering 17 African low income, middle income, and emergent countries, Youssef et al. [38] explore the conditions where entrepreneurship can simultaneously achieve economic growth and advance social and environmental objectives. They find that both formal and informal entrepreneurship add to environmental degradation, whereas the negative impact of informal entrepreneurship is stronger than that of formal entrepreneurship. When based on innovations and high institutional quality, the effects of both forms of entrepreneurship turn positive. This highlights the importance of policies to foster innovation, improve governance and strengthen law enforcement. Dhahri and Omri [37] investigated the relationship between entrepreneurship and the three pillars of SD for 20 developing countries over the period 2001–2012. Their results also confirm a negative contribution of entrepreneurship to the environmental dimension of SD but reveal a positive effect on the economic and social dimensions. In line with Youssef et al. [38], Dhahri and Omri [37] emphasize the need for policies and actions to promote innovation and the exploitation of SD opportunities. However, it is important to note that the samples of entrepreneurs in the quantitative studies were not limited to sustainable entrepreneurs. They included all types of entrepreneurship, as the variable was measured by the total number of newly registered and/or unregistered businesses. Therefore, the effect of sustainability-oriented entrepreneurship on SD is not measured in these studies.

4.2.2. The Role of Sustainable Development in Shaping Entrepreneurial Intentions and Motivations

Academic literature on entrepreneurship and SD suggests that sustainable entrepreneurs, i.e., entrepreneurs who aim at balancing economic wealth, environmental preservation and social equity, are important drivers of SD. As outlined earlier in this paper, sustainable entrepreneurship can be regarded as a process composed of six phases: The first two phases refer to the recognition of social or environmental problems and opportunities. Phase three and four include the development of a double or triple bottom line solution. Finally, phase five and six describe the foundation of a sustainable enterprise and the creation or entry of a sustainable market [25]. Several papers focus on the first two phases and address the question of why individuals intend to become sustainable entrepreneurs, how they recognize opportunities for sustainable ventures and how they pursue their goals.

Kuckertz and Wagner [39] explore whether individuals who are concerned by sustainability issues also exhibit stronger entrepreneurial intentions. Based on earlier findings from research on organizational legitimacy and business ethics, they hypothesize a positive relationship between individuals' sustainability orientation and entrepreneurial intentions. Kuckertz and Wagner [39] expect this relation to be stronger for individuals who are not experienced in business topics than for experienced individuals. By analysing large-scale survey data collected from alumni and students from engineering and business programs at three European universities, they find that a stronger sustainability orientation indeed leads to a higher intention among engineering students to become self-employed. However, there is no positive effect of sustainability orientation on the entrepreneurial intentions of business students and experienced alumni. Hence, Kuckertz and Wagner [39] conclude that sustainability orientation has a positive impact on entrepreneurial intentions, which declines under the influence of business experience.

Based on Kuckertz and Wagner's [39] findings and other related literature, St-Jean and Labelle [43] hypothesize that a person's sustainability orientation, i.e., a person's pro-social and pro-environmental values, increases the likelihood of engaging in sustainable entrepreneurship. Yet, their empirical study does not confirm this hypothesis. Contrarily to what Kuckertz and Wagner [39] suggest, it shows a negative and significant relationship between sustainability orientation and entrepreneurial action. At this point it is important to mention that Kuckertz and Wagner's [39] study was conducted in France and Germany, whereas St-Jean and Labelle's [43] study was carried out in Canada. Therefore, St-Jean and Labelle [43] explain the diverging findings by the possible influence of culture and different perceptions of entrepreneurship's role in fostering SD. Probably the most significant contribution of St-Jean and Labelle's [43] work is the finding that the belief in entrepreneurship's potential to promote SD has a positive effect on the relationship between sustainability orientation and entrepreneurial action. In this regard, both St-Jean and Labelle [43] and Kuckertz and Wagner [39] highlight the role of entrepreneurial education in encouraging would-be entrepreneurs to engage in sustainable entrepreneurship.

One of the core features of entrepreneurship is the identification and exploitation of opportunities. Whereas the definition of opportunity recognition in traditional entrepreneurship only considers the discovery and exploitation of opportunities that bring economic benefits, the process of opportunity recognition for SD differs in terms of scope and focus [41]. The conceptual model of sustainable opportunity recognition shows that the recognition of sustainable opportunities is based on knowledge and moral values (altruism) [41,56]. According to the model, opportunity recognition is determined by individuals' prior knowledge of the natural and communal environment, as well as by their motivation to develop gains for themselves and others. The relationship between these factors is strengthened by entrepreneurial knowledge. Hanohov and Baldacchino [41] empirically test Patzelt and Shepherd's [56] model by using a qualitative method and find that the process of opportunity recognition for sustainable entrepreneurship is indeed based on the interplay between the components described in the model. In addition, they identify aspects that enhance entrepreneurial knowledge (i.e., prior jobs or projects) and the knowledge of the natural and communal environment (i.e., spending time abroad and socialization).

Patzelt and Shepherd's [56] model provides a starting point for analysing the process of opportunity recognition for SD. However, it leaves the question open as to how exactly this process is influenced by individual ethical values and norms. Ploum et al. [18] identify three individual moral antecedents that are potential determinants of opportunity recognition for SD: self-transcendence values (i.e., altruism toward others), pro-environmental behaviour values, and moral competencies (normative and strategic action). To explore the relationship between individual moral antecedents and sustainable idea generation, Ploum et al. [18] applied a quantitative research method. Their findings suggest that pro-environmental behaviour values and moral competencies have a positive influence on sustainable opportunity recognition, whereas self-transcendence seems to play a minor role. Therefore, Ploum et al. [18] present a refined version of Patzelt and Shepherd's [56] model of opportunity recognition in which the factor of altruism is replaced by pro-environmental behaviour values and moral competencies.

Fischer et al. [40] examine the motivations of sustainable entrepreneurs. By conducting a two-stage qualitative study, they explore cognitive changes during the different stages of a sustainable venture to explain the role that motivation plays in early stages of development compared to later stages. The paper shows that the self-regulatory system of sustainable entrepreneurship is not stable but changes over time. Initially, sustainable entrepreneurs show a strong prevention focus. They tend to target the fulfilment of SDGs, because they feel responsible for solving social or ecological problems. Later, they begin to realize that only a successful venture can have an impact on SD. Therefore, they engage in a stronger promotion focus to achieve at least a partly profitable business [40]. The question of which organizational practices, strategies and business models sustainability-oriented entrepreneurs and SME's may apply to run successful businesses is addressed in the following section of this paper.

4.2.3. The Role of Sustainable Development in Shaping Organizational Practices, Strategies and Business Models

One important question that arises when examining sustainability-oriented entrepreneurship at the organizational level is how sustainable enterprises differ from traditional businesses. Jolink and Niesten [46] examine business models of ecopreneurs in the Dutch organic food market and find that ecopreneurs differ from traditional entrepreneurs in the following respects: First, they may transform disvalue of non-eco products into value by eliminating or reducing externalities of conventional products. Second, ecopreneurs show a continuous and personal commitment to sustainability goals, which can be regarded as an internal source of advantage. Jolink and Niesten [46] propose an entrepreneurial business framework where ecological sustainable enterprises are grouped in a four-category matrix according to their goals and the role that money plays in achieving these goals. In this framework, the first distinction is made between entrepreneurs who aim at creating a new, more sustainable world and those who aim at improving the sustainability of the existing world. The second distinction is made between entrepreneurs who consider money as a means to achieve sustainable changes and those who see money as an end. Based on these distinctions, Jolink and Niesten [46] formulated four "business cases", which differ in terms of the emphasis they place on environmental concerns and economic profit and their approach to value creation.

Parrish [45] criticizes the strong occupation of entrepreneurship research with "business cases" for SD. He states that the business case approach limits the scope of research to entrepreneurial actions which are inspired by profit-seeking motives. This excludes cases where the contribution to SD is a primary purpose of the enterprise and income is regarded as a means to achieve this purpose. Focusing on cases in which entrepreneurs are motivated by pro-environmental values and objectives rather than profit-seeking behaviour, Parrish [45] identifies five principles of organization design which diverge from conventional principles of entrepreneurship. He refers to those principles as the "skilful use of perpetual reasoning" [45] (p. 511). This includes resource perpetuation (enhancing and maintaining quality of resources for as long as possible), benefit stacking (accumulating as many benefits as possible onto each operational activity), strategic satisficing (identifying satisfactory outcomes of

multiple objectives), qualitative management (deciding based on quality rather than quantity) and worthy contribution (allocating benefits based on worthy contributions instead of power) [45] (p. 517). One specific business model which treats profit as a means to achieve positive societal ends is the so-called B Corp model. B Corporations are certified by the non-profit organization B Lab after an extensive assessment of their social and environmental impacts and standards. The main goal of these corporations is to create positive outcomes for their stakeholders by aligning their profit with societal impacts [50].

The need for entrepreneurs to “reconcile their sustainability-driven values and motives with the organizational imperatives for an enterprise to survive and thrive in the competitive marketplace” [45] (p. 511) raises the issue of effective organizational strategies. When applied at the organizational level, SD implies the adoption of strategies and actions that fulfil the TBL principles [52]. Sustainable entrepreneurial orientation, i.e., the combination of entrepreneurial and sustainability orientation, is a strategic resource that enables companies to integrate their sustainability goals into their organizational mindset [47]. Thus, it seems that sustainability-oriented organizations with innovative, proactive, and risk-taking capabilities can develop unique and difficult to imitate resources [47,51]. When high sustainability performance is established in corporate settings, the performance of corporate entrepreneurial processes increases and fosters the creation of innovative and sustainable products, processes, or services [49]. By introducing innovative, sustainable products and technologies, entrepreneurs may even shift the market towards greener consumption, which provides the ground for entrepreneurs to discover and explore sustainable opportunities [52].

Not only the corporate setting, but also institutional structures can and should be aligned with SDGs. Pacheco et al. [44] argue that entrepreneurs have the ability to improve their institutional context. They may collectively approve rules of conduct and certification schemes, assign property rights or promote legislation to improve their competitiveness. In addition, they could create valuable networks by building inter- and intra-industry alliances or partnerships with civil organizations [44]. Gasbarro et al. [48] analysed 13 cases of European sustainable enterprises in new energy niche markets to explore the interplay between public authorities and businesses in sustainable transitions. Their study suggests a distinction between a bottom-up and a top-down approach to sustainable transitions. It shows that sustainable entrepreneurs can either be triggers of sustainable transitions or enablers and implementers of sustainability-oriented public policies [44]. Several actors in the firm’s business environment, such as trade associations, universities and research centres could facilitate the transition process.

4.2.4. The Role of Sustainable Development in Entrepreneurship Education

Education plays an important role in laying the foundations for (sustainability-driven) entrepreneurship [54]. The importance of education for SD is also reflected in the fourth SDG, which calls for inclusive and equitable education and lifelong learning opportunities for all people (see Table 2). In the last decades, universities have responded to the need for environmental education by the creation of sustainability institutes, faculties and study programs [5]. However, higher education institutions often lack the capacity to integrate the principles and practices of SD into all aspects of education and learning [55].

Sustainability and entrepreneurship are usually taught separately rather than interdisciplinarily [54]. Moreover, business schools often teach entrepreneurship students a “profit-first mentality”, which negatively influences their intentions to engage in sustainable entrepreneurship. Therefore, business schools should promote SD from an entrepreneurial and “opportunity-identification perspective” to improve the students’ understanding of the benefits of sustainable entrepreneurship [53] (pp. 854–856). This is somewhat in line with Kuckerts and Wagner’s [39] and St-Jean and Labelle’s [43] findings, which show that business knowledge has a negative impact on sustainable entrepreneurial intentions, but that the perceived ability of entrepreneurship to promote SD is an important motivator for potential sustainable entrepreneurs.

Literature suggests that sustainable entrepreneurs need specific traits and competencies to simultaneously create economic value while advancing environmental and social objectives. Lans et al. [54] developed a framework for sustainable entrepreneurship competencies and identified seven skills which enable future change agents to deal with the complex issues of entrepreneurship and SD. Ploum et al. [42] provide empirical support for this model and, after merging two competencies of the model into one, identify six competencies that support future sustainable entrepreneurs in their efforts: strategic management and action, embracing diversity and interdisciplinary, systems thinking, normative competence, foresighted thinking, and interpersonal competence. Ploum et al. [42] point out that knowledge about these competencies helps higher education institutes to adjust and reframe their education programs accordingly.

5. Discussion

The present paper provides an overview of extant scholarly work studying the relationship between entrepreneurship and SD. The literature review shows that during the past decade, a considerable amount of literature has examined the topic from various perspectives. According to Reichers and Schneider [57], concepts and theories typically progress through three stages of development. These stages are: (1) concept introduction and elaboration, (2) concept evaluation and augmentation and (3) concept consolidation and augmentation. During the first stage, definitions and significance of the concept are discussed. The second stage includes first critical reviews of the construct. The third stage is characterized by the emergence of accepted definitions and analytic studies. To date, some research areas in the context of entrepreneurship and SD have received wide coverage, e.g., sustainable entrepreneurs and their intentions, motivations, competencies, skills, and opportunities. In these areas, researchers have already started to empirically investigate the topic and test existing models or frameworks. In addition, there are a considerable number of literature reviews which critically examine the existing research and provide a thorough analysis of the state of the field (see Table 4). This indicates that the research field has already moved from the first stage to the second stage of its development.

Although research on entrepreneurship and SD has experienced some progress during the last decade, many studies remain conceptual and focus on individual- or organizational-level factors. In addition, as pointed out by Hall et al. [5], they are rather prescriptive and seem to be overly optimistic. Therefore, studies which empirically investigate the outcomes of entrepreneurship for SD are needed. For example, although promoted by the UN as a path towards SD [17], our understanding of how entrepreneurship contributes to the achievement of the SDGs is still limited. Despite the increasing trend in sustainability-related entrepreneurship literature, only six of the 21 reviewed papers published after 2015 address the SDGs. In these papers, the SDGs are rather mentioned as an introductory example and not examined in detail.

Even though the SDGs may not be a panacea for a sustainable future, they provide at least a valuable point of reference for researchers who are concerned with SD. The fact that none of the papers investigates the interaction of entrepreneurship with specific SDGs is astonishing, especially when considering the popularity of the SDGs, the related controversies and the amount of academic literature available. For example, a search in the Science Direct database for articles with “sustainable development goals” or “SDG” in the title results in 295 articles published between 2015 and 2019. EBSCO Business Source Premier delivers 175 peer-reviewed articles for the same parameters and Web of Science provides 261 results. However, the literature review in this paper was limited to high-quality articles provided by the Web of Science database and is therefore not comprehensive enough to provide a full assessment of the extant literature on SD and entrepreneurship. Therefore, a broader search in different databases with a variety of search strings (including other relevant concepts, e.g., “innovation”) would be necessary to draw a complete picture of academics’ knowledge about the impact of entrepreneurship on SD.

Nevertheless, this literature review reveals some interesting insights and possible research directions. As the studies conducted by Dhahri and Omri [37] and Youssef and Boubaker [38] indicate, entrepreneurship does not necessarily contribute positively to all three dimensions of SD. Therefore, future research could investigate whether, how and which entrepreneurial activities contribute to all dimensions in a balanced manner and according to the expectations of the UN General Assembly (for SD dimensions see Table 1). With a focus on the UN SDGs, studies could examine trade-offs and synergies between different SDGs and targets to assess the effect of entrepreneurship not only for specific goals but for the whole SDG set. As illustrated in Figure 3, the promotion of education for entrepreneurship (SDG 4) could have positive effects on entrepreneurial activities and SMEs' growth, which may benefit economic development (SDG 8). This, in turn, may help to eradicate poverty (SDG 1). At the same time, economic growth and poverty eradication could have negative effects on climate change (SDG 13) because (more or less sustainable) production and consumption would probably increase. Therefore, it would be necessary to simultaneously establish sustainable consumption and production patterns (SDG12).

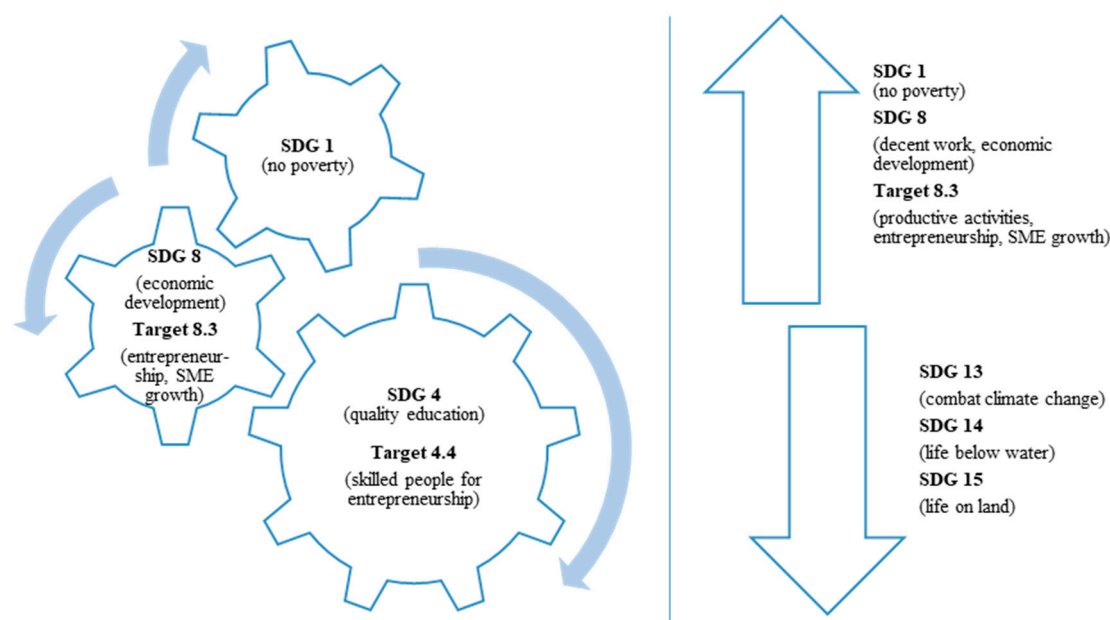


Figure 3. Possible synergies and trade-offs between SDGs and targets.

This example shows that a narrow perspective on SDGs and specific types of entrepreneurial activities for SD runs the risk of achieving one goal at the expense of another one. As it is not possible for individual actors to address the issue of SD from such a broad perspective, a holistic approach based on collaboration between different actors and disciplines is needed. Thus, collaborative entrepreneurship would also be an important field for future research [58]. Additionally, it would probably make sense to study the interactions of entrepreneurship with the SDGs in different contexts, e.g., in developed and developing countries. Finally, a better understanding of the conditions under which entrepreneurship can contribute to SD would be needed to adapt institutions, policies and education accordingly.

6. Conclusions and Limitations

To conclude, the research on entrepreneurship has experienced a considerable development during the last years. However, there seems to be a preoccupation with the features of sustainable entrepreneurs and their *potential* to act as catalysts for SD, whereas the actual outcomes of entrepreneurship for SD are largely unknown. Given the pressing need for a comprehensive sustainability transition, a more productive development of the research field is necessary. Therefore, (sustainable) entrepreneurship research should move away from its prescriptive and conceptual orientation towards an empirical

approach to examine impacts, trade-offs and synergies of the entrepreneurship-SD relationship. To avoid compromises between the dimensions of SD, a broad understanding of the complex interdependencies between different sustainability goals and cooperation of the different players for SD is essential.

Finally, as with every other study, this paper has its limitations. First, although being comprehensive in its kind, the literature review may not have included all work on “sustainable development” and “entrepreneurship” as well as related areas and therefore could be critiqued. However, by means of a thorough and clear search process, an as complete as possible literature sample was identified and analysed subsequently. Second, we acknowledge the issue of subjectivity in our research process. Although we aimed to increase objectivity through multiple assessments, the data collection, analysis and interpretation remains influenced by the subjective assessments of the researchers.

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