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Grand challenges and entrepreneurship: Emerging issues, research streams, and theoretical landscape

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Abstract

This study discusses how the role of entrepreneurship in addressing the so-called "grand challenges" (e.g., poverty, inequality, pollution, climate change) is evolving and could further evolve, based on the ongoing conversation in the scholarly community. To develop the discussion, we conducted the following steps: (1) a computer-aided semantic analysis; (2) an analysis of the evolution of literature streams; and (3) a network analysis of advocated theories and approaches. All three analyses were based on a selection of 358 publications retrieved via a keyword search and 27 further publications retrieved via an analysis of five recent and relevant special issues published by important scientific journals. Our results show that the call to address grand challenges, particularly after the publication of the United Nations' Sustainable Development Goals (SDGs), is radically transforming entrepreneurship research, with new issues emerging and replacing traditional issues as core to the discipline, marking a rapid and complex dynamics of research stream divergence and convergence. Similarly, the network of theories and approaches advocated by recent agenda-setting articles depicts an emerging theoretical landscape that is highly innovative. This new theoretical landscape revolves around systems thinking and Ostrom's theory of the commons as the two key poles, with the embeddedness, stakeholder, institutional, effectuation, processual, and design-oriented approaches being the cross-fertilizing forces linking these two poles. In the final section, we present the nine articles included in the special issue titled "Grand Challenges and Entrepreneurship: Emerging Issues and Research Streams" and briefly synthesize these in the light of the ongoing evolution of the literature.

Keywords SDGs · Grand challenges · Sustainable entrepreneurship · Impact entrepreneurship · Commons · Systemic approach

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Introduction

Grand challenges can be defined as the social and/or environmental challenges that are so formidable and global that they transcend the problem-solving capacities of individual firms, communities, industries, and even governments and nations (Markman et al., 2019). They include challenges such as climate change, pollution, poverty, inequality, disruption of conventional economies due to digitization, and pandemics (George et al., 2016). Grand challenges are also defined as system-level wicked problems, that is, problems that cannot be solved once forever, meaning that each solution that is implemented, even if successful, tends to result in unintended consequences, which, in turn, must then be understood and addressed. For example, solar panels may be very good in decreasing carbon emissions, but their lifecycle and diffusion raises new environmental and employability issues (Ferraro et al., 2015). In fact, grand challenges involve radical uncertainties about the consequences of each decision made to resolve the challenge, and then multiple and conflicting evaluations among stakeholders (Grimes & Vogus, 2021).

Because of their wicked nature, grand challenges can be addressed only through never-ending, highly distributed experimentation and savvy selection and recombination of possible solutions (Martí, 2018). It is no wonder then that entrepreneurship, as a unique force for multiplying innovation capacities, has been increasingly called into action to address these wicked problems (Foucrier & Wiek, 2019; Masdeu Yélamos et al., 2019). Many entrepreneurship scholars have framed the role of entrepreneurship in addressing grand challenges within a traditional theoretical view, rooted in classical economics. When considered from this perspective, grand challenges translate into market failures (Dean & McMullen, 2007) that attract entrepreneurial action because transforming market failures into business opportunities is exactly what entrepreneurship is all about in classical economics (Villar & Miralles, 2019). This is actually an elegant, straightforward, and pleasantly optimistic explanation of the relationship between entrepreneurship and grand challenges.

However, dissatisfaction has grown around this classical view of the entrepreneurship – grand challenges nexus. In fact, the idea that market failures, which by definition are problems resulting from market actors prioritizing rent-seeking, should be solved by entrepreneurs, who are classically conceived as market actors that prioritize rent-seeking, seems uncomfortably likely to reinforce vicious cycles in wicked problems. Thus, an alternative idea is gaining traction: that real-world entrepreneurs who effectively contribute to addressing grand challenges actually prioritize something other than mere rent-seeking, and behave differently from what classical economics defines as "rational" market actors (George et al., 2020; Grimes & Vogus, 2021).

The push to rethink the very foundations of entrepreneurship research and practice has been dramatically boosted by the approval in 2015 of the 17 Sustainable Development Goals (SDGs) by the United Nations (2015). The SDGs were immediately acknowledged by scholars and practitioners alike as the translation of grand

challenges into concrete objectives to be collectively pursued by 2030. The business and management scholarly literature has increasingly begun to refer to the SDGs as the new logic that will shape the behaviors of decision makers, entrepreneurs, and managers (Crecente et al., 2021). A sense of urgency has spread among all scholarly communities: the clock is ticking, and unless the rate of progress in achieving the SDGs accelerates dramatically, once unthinkable systemic collapses are now perceived as concretely impending (Apostolopoulos et al., 2018). The pandemic crisis that began in 2020, and the tragic climate events hitting different parts of the planet in 2021, are intensifying this sense of urgency.

There is a lot of work to do. Despite some visionary statements that entrepreneurship is part of the solution, rather than part of the problem (Muñoz & Cohen, 2018), most real-world entrepreneurial actions still deplete more environmental and social resources than are (re)generated through such actions, thus contributing negatively to the achievement of the SDGs (Venâncio & Pinto, 2020). Many entrepreneurship scholars are taking responsibility for this, and are striving to develop new views and approaches that will concretely help change the role of entrepreneurship from being the engine of (system-threatening) economic growth to being the engine of sustainable development (Doh et al., 2019). These new views are greatly needed to provide the world of practice with innovative and effective models (Wiklund et al., 2019) in a scenario in which completely new organizational and juridical forms are emerging to respond to grand challenges, for example, B Corporations (Stubbs, 2017).

However, shifting the entrepreneurship research field toward a new view in the face of grand challenges is no easy task. Completely new themes must be identified to catalyze a new generation of scholarly work; the research community must self-organize in new cross-fertilizing streams and substreams; and, perhaps even more importantly, new theories on the actual and expected roles of entrepreneurship in the face of grand challenges must be developed and tested to allow for the accumulation of sound scientific knowledge.

How is the scholarly community responding to this call? What paths are being collectively created for the future of entrepreneurship as a field of research? To address these questions, this study focuses on three specific objectives:

investigation of how the key themes addressed by the literature on entrepreneurship and grand challenges have changed in recent years, particularly after 2015, the year in which the 17 SDGs were approved and made public;
analysis of the evolution of the key research streams that have focused on the role of entrepreneurship in addressing grand challenges;
discovery of the new theoretical landscape as it emerges from the literature addressing the need for new views and new approaches to understand how entrepreneurship does, and could and should contribute to addressing grand challenges.

To pursue these objectives, we conduct the following steps: (1) a computer-aided semantic analysis of a selection publications; (2) a taxonomic analysis of literature streams; and (3) a network analysis of advocated theories and approaches.

Our results reveal three principal conclusions. First, in recent years, new themes have emerged as key to the entrepreneurship – grand challenges nexus, for example, digitalization and the organizational implications of sustainability-oriented venturing, while themes that were traditionally linked to classical development and business research, such as innovation, have become semantic satellites of the sustainability concept. Second, after a divergent phase, with numerous parallel substreams around green, social, and institutional entrepreneurship, the scholarly community is now making relevant efforts to converge on a new integrated view of entrepreneurship by advancing the new concepts of sustainable and collective entrepreneurship and, somehow more radically, of impact- or purpose-driven entrepreneurship. Third, the network of theories and approaches advocated by recent agenda-setting articles depicts an emerging theoretical landscape that is highly innovative. This new theoretical landscape revolves around systems thinking (Meadows, 2009) and Ostrom's theory of the commons (Ostrom, 1990) as the two key theoretical poles, with the social embeddedness, institutional, stakeholder, effectuation, processual, and design-oriented approaches being cross-fertilizing forces linking these two poles (which are strongly complementary and intertwined, e.g. Ostrom, 2009).

We also find widespread dissatisfaction in the recent literature with mainstream approaches, such as the triple bottom line (3BL) (Muñoz et al., 2018) or conventional, firm-centric stakeholder analyses (Lumpkin & Bacq, 2019). This dissatisfaction revolves around the idea that both 3BL and traditional stakeholder analyses are too firm-centric and thus fail to grasp the role played by a specific enterprise at the level of the social-ecological system. Institutional approaches are also increasingly emphasized as possibly leading to simplistic views of how entrepreneurship could contribute to addressing grand challenges. In fact, even full compliance with (socially co-created) rules may trigger sustainability-threatening consequences, and when this happens, institutional work and the pursuit of legitimacy are likely insufficient mechanisms to address the wicked nature of grand challenges (Jones et al., 2019).

Several interesting proposals are being advanced in the literature to update and cross-fertilize these mainstream approaches with each other and with systems and commons-oriented thinking, with the aim of overcoming the traditional limitations of these approaches. An overview of 19 recent and particularly interesting articles advancing such proposals is provided in the section dedicated to the new emerging theories and approaches, particularly in the tables complementing that section. We model and discuss this complex and networked emerging theoretical scenario; we argue that it is promising and might, if its potential is fully realized, rise to the challenge of grand challenges.

The results of our three analyses converge to demonstrate that the entrepreneurship field is highly dynamic: a strong urge to change is widely shared in our scholarly community, which is duly responding to this urgent need for change with new, inspiring research streams and a new, highly innovative theoretical landscape.

The *International Entrepreneurship and Management Journal* has contributed to this lively debate by launching a special issue on the theme "Grand Challenges and Entrepreneurship: Emerging Issues and Research Streams". In the final section, we

present the nine articles included in this special issue, and briefly synthesize them in light of the ongoing evolution of the literature, as analyzed throughout the article.

Entrepreneurship and grand challenges: New emerging issues and themes

The first phase of our exploration focuses on how scholarly perceptions are evolving and on which issues and topics are key to understand the role of entrepreneurship in the face of grand challenges. To investigate this evolution, we conducted a text analysis aided by Leximancer software on a basket of 358 scientific articles selected in June 2021. Leximancer provides a powerful Bayesian machine-learning algorithm for deciphering and visualizing complex text data (Campbell et al., 2011) through both conceptual (thematic) and relational (semantic) analyses of text data (Wilden et al., 2016).

The articles were selected via a keyword search on the Scopus database, followed by title and abstract analysis to exclude duplicates and nonrelevant publications. Only journal articles in English were included. The words searched in the title, abstract and keywords were "entrepreneurship" AND "grand challenges" OR "SDG" (54 articles were selected); "sustainable entrepreneurship" AND "literature review" (13 articles were selected); "entrepreneurship" AND "climate change" (60 articles were selected); "entrepreneurship" AND "digital society" (41 articles were selected); "entrepreneurship" AND "food" AND "sustainability" (61 articles were selected); "entrepreneurship" AND "poverty" (73 articles were selected); "entrepreneurship" AND "social inclusion" (56 articles were selected).

Then, we separated the articles into two groups: those published pre-2016, that is, before and during 2015 (the year in which the United Nations SDGs were approved, which boosted the debate on the role of business in the face of grand challenges) and those published post-2015, that is, in and after 2016. Subsequently, Leximancer was used to analyze and compare the conceptual–semantic maps emerging from the two groups of articles. Leximancer represents the words that play the role of core concepts in the analyzed texts as colored circles, possibly overlapping with other circles that represent other associated concepts if recurrent semantic overlapping is present in the text; each circle includes some second-level related concepts.

The results (Figs. 1 and 2) highlight a dramatic change in the landscape of issues and topics that are at the core of the scholarly attention in the literature on the entrepreneurship – grand challenges nexus. After the publication of the SDGs by the United Nations, only a minority of the concepts that were key in the previous years (Fig. 1) remained key in the new semantic landscape (Fig. 2) around entrepreneurship. These are the concepts of change, people, and production. These concepts effectively depict the enduring backbone of the scholarly reflection on the role of entrepreneurship: it is about people that address change (e.g., climate change) by making changes in value production patterns.

Conversely, some "classical" entrepreneurship themes lost traction after 2015, for example, policy, institutional, development, business, enterprise, education, and

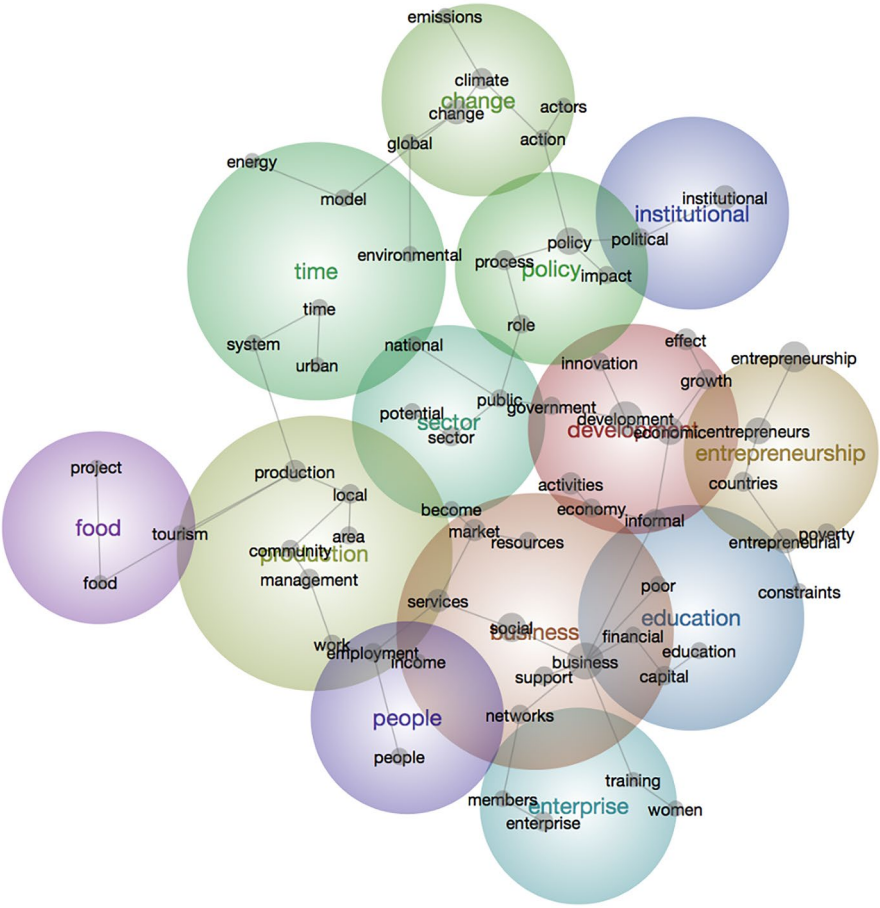

Fig. 1 The semantic map of a selection of scientific literature published before and during 2015 on entrepreneurship and grand challenges (elaboration aided by Leximancer)

some new concepts have emerged forcefully, for example, digital, poverty, social, sustainable. Importantly, as clearly visible in Fig. 2, the concept of sustainable has "incorporated" that of development, which in the previous semantic scenario (Fig. 1) had a major circle in its own right. The concept of innovation, which was also included in the development semantic circle before 2015, has shifted into the sustainable semantic circle in the last years. Also very interestingly, the concept of impact left the policy circle to move into the market circle: this change powerfully highlights that the responsibility of generating impact, which was previously "delegated" (according to classical economics) to policymaking, is today considered a purpose that directly challenges market actors.

In addition, some further emerging themes suggest the growing importance of organizational challenges in the most recent debate on the responsibilities of

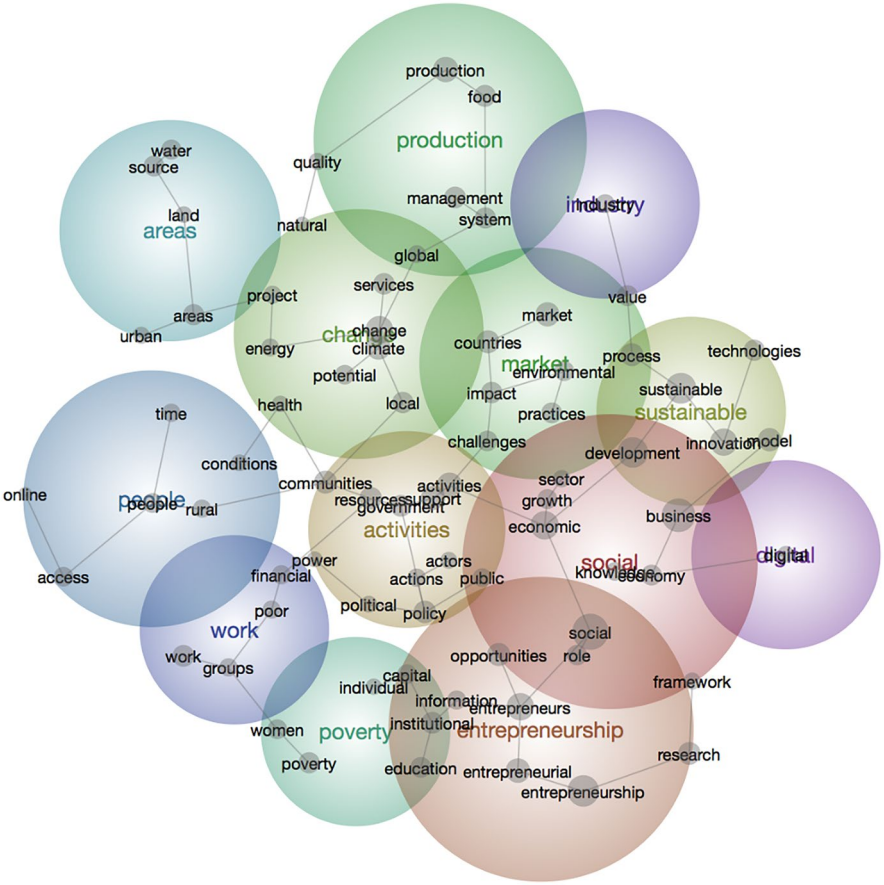

Fig. 2 The semantic map of a selection of scientific literature published from January 2016 to June 2021 on entrepreneurship and grand challenges (elaboration aided by Leximancer)

entrepreneurship: the concepts of work, and even more, that of activities, have become core to the scholarly conversation, with the activities concept strictly linked to relevant political concepts, that is, communities, resources, actors, power, policy, public.

The theme digital, which was completely absent in the pre-2016 semantic map (i.e., did not show up at all, even as a second-order keyword) is present as a first-order concept in the post-2015 semantic map. Perhaps even more interestingly, the digital theme strongly overlaps with the sustainable and social themes, thus confirming that the digital transition is increasingly perceived as converging with the sustainability transition (George et al., 2020): two challenges that must be addressed in an integrated fashion, and cannot be addressed without a quantum leap in entrepreneurial attitudes and capacities.

Entrepreneurship and grand challenges: The evolution of research streams

The semantic analysis described above suggests that the very scope of entrepreneurship research is shifting, along with the mindset and preoccupations of most researchers. Unsurprisingly, the research streams in the entrepreneurship field have multiplied and are challenging the very foundations of traditional entrepreneurship research, such as its rooting in classical economics, its view of the entrepreneur as a rent-seeker, and the clear distinction of the roles between market and state actors (Muñoz & Cohen, 2018).

Thus, to complement the semantic analysis presented, we conducted a manual mapping of the evolution of research streams in the literature to gain an idea of the trends associated with research on the role of entrepreneurship in the face of grand challenges. The idea was to discover how the research community is self-organizing into subcommunities to address the new emerging themes and challenges related to entrepreneurship and grand challenges.

To do so, we leveraged the literature reviews and state-of-the-art papers identified via the Scopus search described (particularly, Anand et al., 2021; Apostolopoulos et al., 2018; Fellnhofer et al., 2014; Kraus et al., 2018; Sarango-Lalangui et al., 2018; Sutter et al., 2019), along with five recent and relevant special issues published in the *Journal of Management Studies* (Markman et al., 2016); the *International Journal of Entrepreneurial Behavior and Research* (Muñoz et al., 2018); *Academy of Management Perspectives* (Markman et al., 2019); *Small Business Economics* (Volkmann et al., 2021); and *Business Strategy and the Environment* (Genus, 2021).

These sources suggest that there has been a huge flourishing of research streams dedicated to what is often labelled as "nonconventional entrepreneurship". These streams investigate how entrepreneurs, as uncertainty-handlers and opportunity-seizers, leverage their abilities and energies to pursue goals that can also differ from rent-seeking and individual interest. This explosion of diverse streams can be viewed as a divergent phase in entrepreneurship research, with a polarization emerging between conventional and nonconventional entrepreneurship research and practice.

The numerous streams (Apostolopoulos et al., 2018; Crecente et al., 2021) that characterize this divergent phase can be clustered into three main groups of "nonconventional" research areas (Fig. 3, left), each with a specific disciplinary and theoretical background.

The first group is "green entrepreneurship", also called "environmental entrepreneurship" or "ecopreneurship", which deals with the possible contributions of entrepreneurial action to improved environmental impact (Doh et al., 2019). Scholars engaged in this research area may have an interdisciplinary background including competences in engineering or life sciences, sometimes with a scientific mindset based on systems thinking.

The second group is social entrepreneurship, which deals with the possible contributions of entrepreneurial action to social inclusion and justice (Gupta et al., 2020). Scholars engaged in this research area may have an interdisciplinary

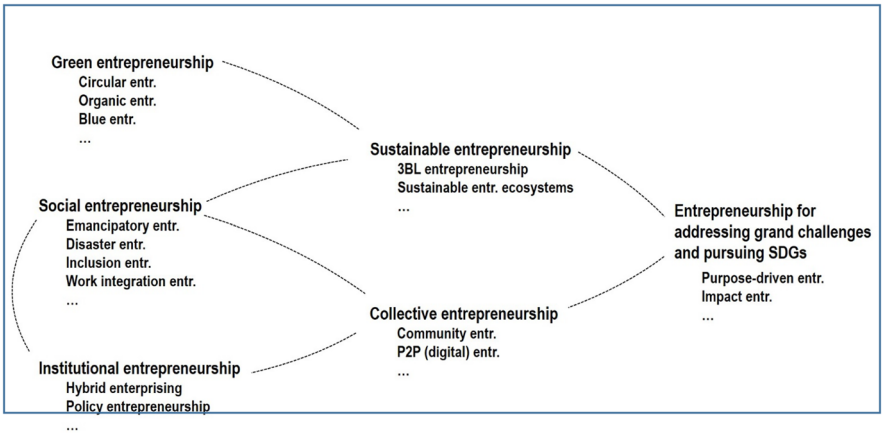

Fig. 3 The evolution of research streams from nonconventional entrepreneurship toward grand challenges entrepreneurship (source: Authors' elaboration)

background including competences in social sciences, sometimes with a scientific mindset based on community and regional development studies.

The third group is institutional entrepreneurship, which deals with the possible contributions of entrepreneurial action to the co-creation of an institutional environment (e.g., laws, norms, technological standards, social expectations) that is favorable to sustainable development (Pacheco et al., 2010). Scholars engaged in this research area may have an interdisciplinary background including competences in governance and organizational sciences, sometimes with a scientific mindset based on social embeddedness studies.

The three aforementioned research streams have developed independently, in parallel lanes, for some years. However, after this divergent phase, marked by flourishing idea multiplication, a convergent phase of this research area has begun. As depicted in the central part of Fig. 3, a first, key convergence movement has occurred in the literature between green and social entrepreneurship, with "sustainable entrepreneurship" as a label that usually identifies entrepreneurship that pursues both social and environmental sustainability (Markman et al., 2019; Muñoz & Cohen, 2018; Pacheco et al., 2010; Schaltegger & Wagner, 2011). However, both social and institutional entrepreneurship are rooted in the literature dealing with institutional logics and hybrid organizing (Anand et al., 2021). Therefore, while some scholars understand sustainable entrepreneurship to refer to a merge between green and social entrepreneurship, others also include institutional entrepreneurship in the concept of sustainable entrepreneurship (Schaltegger & Wagner, 2011).

Sustainable entrepreneurship scholars often adopt the 3BL approach to investigate entrepreneurial action and performance (Belz & Binder, 2017). 3BL is an approach to sustainability based on recent developments in accounting studies, focusing on the firm as the level of analysis. This approach is based on the idea that organizations should balance their actions to pursue not only financial performance, but also (measurable) social and environmental impact. However, an increasing number of

scholars is focusing on a wider level of analysis, including the contextual factors of sustainable entrepreneurship, and leverages the literature on entrepreneurial ecosystems (Cavallo et al., 2018) to further develop the idea into the concept of sustainable entrepreneurial ecosystems (Volkmann et al., 2021).

Besides the convergence of social and green entrepreneurship into sustainable entrepreneurship, the strongly overlapping background and scope of social and institutional entrepreneurship has resulted in a second, specific convergent movement. Scholars from both subcommunities have developed a growing interest in collectives supporting entrepreneurs (Markman et al., 2019; Soderstrom & Heinze, 2021) and collective entrepreneurship (Wijen & Ansari, 2007a, b), as opposed to the traditional, individualistic and "hero" view of the entrepreneur. This new area includes streams such as community entrepreneurship, and focuses on the relationship between entrepreneurship and the development and protection of the common good (Peredo & Chrisman, 2006) and peer-to-peer entrepreneurship, and includes a growing stream on the role of digitization and the digital commons (Kostakis et al., 2018) in the just transition toward a sustainable future.

However, despite the literature on sustainable entrepreneurship being quite young, dissatisfaction around the concept of sustainable entrepreneurship is already growing because this very concept conveys the idea that entrepreneurship, per se, is a burden for the planet and society that can be reduced only to the point of becoming, to some extent, more bearable (Markman et al., 2016). This idea is implicitly but powerfully implied by the 3BL approach (Muñoz & Cohen, 2018), which instills a firm-centric view based on rent-seeking and/or legitimacy-seeking as key driving forces (de Clercq & Voronov, 2011). Conversely, according to the critics, a sort of Copernican revolution is needed to understand the role of entrepreneurship (Klapper et al., 2021; Markman et al., 2016). In Copernicus's scientific revolution, the Sun replaces the Earth as the celestial body around which the other celestial bodies revolve; similarly, entrepreneurship should become a central regenerative force that does not limit itself to becoming less unsustainable, but strives to develop new opportunities to make the social-ecological system resilient and thriving (Schaefer et al., 2015).

However, criticism is also emerging against the rhetoric of collective entrepreneurship. Such criticism argues that entrepreneurial decisions and actions being collective or community based does not necessarily mean that these decisions and actions will not have negative consequences at the system level (Jones et al., 2019).

For all these reasons, a further wave of research streams is emerging that seeks to integrate the most interesting and innovative ideas emerging from the nonconventional entrepreneurship debate and to take the role of entrepreneurship to another level (Fig. 3, right). Some labels have been proposed to indicate this innovative view of entrepreneurship as a proactive, systemic force designed to address grand challenges. Labels such as "impact entrepreneurship" (Markman et al., 2019) and "purpose-driven entrepreneurship" (Muñoz & Cohen, 2018) have gained traction, but other labels have also been proposed, such as "sustainability-as-flourishing entrepreneurship" (Schaefer et al., 2015).

This evolution suggests that nonconventional entrepreneurship as a field of studies is evolving from a peripheral to a transformative research area, with the ambition

of overcoming the divide between conventional and nonconventional entrepreneurship and of rethinking the very assumptions and normative frameworks (Grimes & Vogus, 2021) that have guided entrepreneurship research thus far (Muñoz & Cohen, 2018).

Entrepreneurship and grand challenges: New emerging theories and approaches

As the two previous sections have demonstrated, a huge shift is occurring in the core themes, values, and research streams of entrepreneurship studies. This shift is so dramatic that the traditional theories, rooted in classical economics, that were commonly used to explain entrepreneurship before the nonconventional entrepreneurship revolution are no longer sufficient (Muñoz & Cohen, 2018). New views and approaches are needed to effectively explain how and why entrepreneurship can contribute to grand challenges. This section describes the ongoing efforts to identify, integrate, and consolidate these new views.

The vivacity of the ongoing theoretical debate is mirrored by the high-quality special issues that have been recently published (Anand et al., 2021). Therefore, we leveraged the following five special issues, published in the *Journal of Management Studies* (Markman et al., 2016); *International Journal of Entrepreneurial Behavior and Research* (Muñoz et al., 2018); *Academy of Management Perspectives* (Markman et al., 2019); *Small Business Economics* (Volkmann et al., 2021); and *Business Strategy and the Environment* (Genus, 2021).

The articles published in these special issues are a rich and up-to-date source for a backward literature search, thus allowing us to identify several further interesting publications, including agenda-setting articles. In addition, some articles in these special issues are important agenda-setting publications in their own right.

This literature analysis led us to identify several publications that provide very interesting overviews of real-world cases in which entrepreneurship contributes to addressing grand challenges and pursuing the SDGs (Günzel-Jensen et al., 2020; Horne et al., 2020; Littlewood & Holt, 2018; Moon, 2018). Other recent publications provide accurate overviews of the literature focusing on the entrepreneurship – grand challenges nexus (Kraus et al., 2018; Sarango-Lalangui et al., 2018). While acknowledging the relevance of these review studies, we concentrated on publications that explicitly propose an agenda for future research. These publications provide a map of key research streams and/or discuss which theoretical lens(es) could best contribute to improved understanding of the role of entrepreneurship in addressing grand challenges. We focused on agenda-setting studies published since 2015, the year in which the SDGs were approved by the United Nations.

Our goal was to identify a highly focused selection of recent and authoritative articles with a strong agenda-setting purpose, explicitly advocating at least one theory or approach, with the authors justifying their choice of specific theories or approaches in light of the evolution of the entrepreneurship research field toward a new role of entrepreneurship in addressing grand challenges and/or the SDGs.

After in-depth discussion, we selected 19 articles. We analyzed these articles carefully to understand the theoretical views or approaches advocated in the studies, and the reasons why the authors of each article deem that a certain theory or approach is best suited to shape a new generation of studies on entrepreneurship as key to addressing grand challenges. In some cases, we found that the article under analysis advocated a single theory or approach (e.g., stakeholder theory). In other cases, we found that the article under analysis advocated the joint use of two, or even more, complementary theories or approaches (e.g., stakeholder theory and Ostrom's theory of the governance and management of the commons). This allowed us to conduct a network analysis (Fig. 4) to gain a synthetic overview of which theories and approaches are advocated by the literature under analysis, and how these theories and approaches are viewed as (at least potentially) usefully collaborating with each other for building a meta-theory of entrepreneurship with stronger explanatory and normative power in the face of grand challenges.

As synthesized in Fig. 4, we found that a very interesting new theoretical landscape is emerging. In this landscape, rather than a proliferation of rival theories, a meta-theory or grand theory of entrepreneurship is emerging, that consists of a network of strongly complementary theories from both within and without the boundaries of traditional business research. This emerging integration across

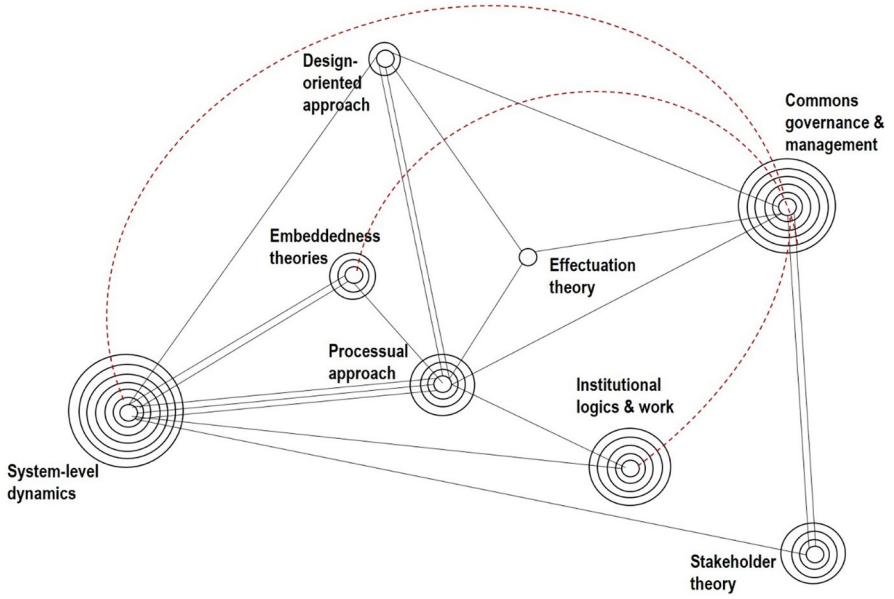

Fig. 4 Network analysis of the theories and approaches advocated in the 19 recent agenda-setting articles listed in Tables 1, 2 and 3. The number of circles corresponds to the number of articles in which a theory or approach is explicitly advocated. The number of lines corresponds to the number of articles in which the two linked theories or approaches are explicitly co-advocated. Red dotted lines represent cross-fertilizations that are already strongly present in the literature (even if not explicitly advocated by the articles under analysis)

complementary theories is consistent with the convergent phase observed in the previous section and depicted in Fig. 3.

The new emerging theoretical landscape revolves around two poles: systems thinking (and specifically a call to prioritizing the analysis of system-level dynamics) (Meadows, 2009) and Ostrom's work on the governance and management of the commons (Ostrom, 1990). Both approaches are not native to business studies, but as Fig. 4 demonstrates (see the number of circles representing the number of articles in which a theory is advocated), they may have strong potential in the eyes of the scholarly community to reshape entrepreneurship in the face of grand challenges. Other theories and approaches from the business and management literature emerge as a connecting tissue between these two major poles in the network analysis depicted in Fig. 4. These are embeddedness theories; stakeholder theory (especially in its newest, less firm-centric forms); the theories on institutional logics and institutional work; the processual approach; effectuation theory; and the design-oriented approaches.

In the following subsection, we synthesize the role played in the emerging theoretical landscape by the two major poles (system-level dynamics and commons governance and management) and the other theories and approaches bridging these two major poles.

System-level dynamics

The basic idea of systems thinking is that human action cannot be effective (especially in the middle and long term) unless it is based on a good understanding of systems (Isaksson, 2019; Meadows, 2009). A system can be conceptualized as a loop (or set of interconnected loops) of cause–effect dynamics between factors and/or events that, by recurring over and over in cycles, structurally influence a certain configuration and/or resource level (e.g., see Abdelkafi & Täuscher, 2016). Systems are particularly valuable if their functioning stabilizes a desirable configuration and/or optimizes the level of a certain resource for collective benefit (Fanning et al., 2020). For example, a healthy natural ecosystem regenerates a configuration in which biodiversity is maximized; similarly, a successful value chain is composed of dynamic loops that keep employment and profits at high levels. However, systems may also destroy resources or lose their capacity to keep a configuration stable for the collective benefit. For example, this is what is happening to our food system, which contributes to jeopardizing the global climate due to the methane emissions of breeding farms. In contrast, the mafia is an example of a system that stabilizes an extractive configuration of the society in which it operates and generates resources for the few by destroying resources for the many.

Systems have a circular nature, that is, they are composed of sequences of processes that, through feedback loops, reinforce or weaken the repetition of those very same processes and/or their consequences in ways that may be very complex and highly counterintuitive. Further, many relevant systems are nonlinear: changes in outputs may be (even dramatically) not proportional to changes in inputs (Meadows, 2009).

In this light, entrepreneurship should contribute to developing and/or protecting "good" systems that stabilize flourishing configurations and regenerate resources for the collective benefit (Lüdeke-Freund, 2020; Schaefer et al., 2015). This idea is not alien to the mainstream entrepreneurship literature. For example, the Schumpeterian entrepreneur is called to contribute to the loop that generates economic growth by continuously triggering the creative destruction of old business models (Schumpeter, 1934). However, the Schumpeterian view is considered insufficient in the face of grand challenges for at least two reasons. First, entrepreneurs should contribute to the system that generates sustainable development, and not merely economic growth. That is, the system for which entrepreneurs should consider themselves co-responsible is the entire social-ecological system, rather than the mere economic system, which should not be artificially separated from the social-ecological system in which it is embedded (Muñoz & Cohen, 2018). Second, as opposed to Schumpeter's optimistic view that the entrepreneurs' fervid distributed experimentation has, per se, positive consequences for the system's performance, we should acknowledge that social-ecological systems have many possibly hidden and nonlinear fragilities and therefore that any "creatively destructive" entrepreneurial action may have disruptive system-level consequences, particularly in the middle and long term (Nyström et al., 2019).

Besides being expected to contribute to (good) systems, entrepreneurs also depend on systems. For example, tourism entrepreneurship may depend on a certain place's clean seaside and welcoming atmosphere. Digital entrepreneurship may depend on the support of incubators and venture capitalists. Again, the mainstream entrepreneurship literature has already begun to explore these interdependencies, and has developed the concept of a (sustainable) entrepreneurial ecosystem as the system that makes entrepreneurial action possible and maximizes its potential (O'Shea et al., 2021). However, scholars who are attentive to complain that studies on entrepreneurial ecosystems have so far often limited themselves to identifying "laundry lists" of the entrepreneurial ecosystem's key actors and with what these actors are expected to provide entrepreneurs, thus paradoxically failing to understand the systemic nature of entrepreneurial ecosystems (Cavallo et al., 2018). Such scholars urge the research community to investigate the key dynamics (Anand et al., 2021), that is, the possible expected and unexpected cause–effect loops, of entrepreneurial ecosystems, and the long-term effects of these dynamics on entrepreneurial action and the larger social-ecological system.

In the basket of 19 recent and representative agenda-setting articles that we selected for analysis of the emerging theoretical landscape around the entrepreneurship – grand challenges nexus, seven advocate the analysis of system-level dynamics as a key approach. These seven articles are listed and synthesized in Table 1.

Commons governance and management

The basic idea of the theory of the commons, as it has evolved after Ostrom's Nobel Prize winning research (Dietz et al., 2003; Ostrom, 1990, 2010; Ostrom et al., 1999), is that human fate strongly depends on resources that are (or could be) available for a certain community's collective benefit, but whose availability is vulnerable to the behaviors of that very community's members (Hardin, 1968; Hess, 2008). Examples

Table 1 Recent agenda-setting articles that advocate the analysis of system-level dynamics as a key approach to advancing the role of entrepreneurship in addressing grand challenges

Source	Journal	Key findings/claims	Advocated approach
Anand et al. (2021)	*Journal of Business Venturing*	Research into the outcomes and system-level dynamics of sustainable entrepreneurship remains sparse but is much needed. The environmental legacy of **sustainable entrepreneurship** makes increased interaction with the **social entrepreneurship** literature a promising avenue for future research, with one important reason being that the social entrepreneurship literature has addressed the issue of hybrid tensions in much greater depth than other literature streams in the entrepreneurship research field	System-level dynamics; institutional logics and work
Cavallo et al., 2018	*International Entrepreneurship and Management Journal*	An **entrepreneurial ecosystem** should be understood as a set of interdependent actors and factors coordinated in such a way that they enable productive entrepreneurship within a particular territory. Too much attention has been spent on the elements of the system (modeled into long "laundry lists") without proper importance being given to the connections between these elements and their **dynamics of evolution**	System-level dynamics
Lüdeke-Freund, 2020	*Business Strategy and the Environment*	Sustainable entrepreneurs can be viewed as agents who align their new or existing business models with sustainability innovations, while they influence environmental contingencies, barriers, and stakeholders from the sociotechnical context to create value with and for stakeholders. Therefore, sustainable entrepreneurs develop **business models for sustainability innovation**, and then **business cases for sustainability** (which are based on a positive relationship between business success and social-ecological performance)	Stakeholder theory; system-level dynamics

Table 1 (continued)

Source	Journal	Key findings/claims	Advocated approach
O'Shea et al., 2021	*Small Business Economics*	A **sustainable entrepreneurial ecosystem** can be seen **as a design artifact** that evolves by ecosystem actors collectively engaging in new venture ideation and developing opportunity confidence. The development of opportunities evolves in three stages: co-intuiting, co-interpreting, and co-integrating. The development is enabled by an emotional climate and a shared sustainability intention of the different actors	System-level dynamics; processual approach; design-oriented approach
Muñoz & Cohen, 2018	*Business Strategy and the Environment*	A **meta-theory of purpose-driven entrepreneurship** is needed to explain the development of sustainability opportunities. Such a meta-theory needs to recognize that all entrepreneurs are embedded in economies, society, and ultimately, natural systems. This **triple embedded view** reframes the sustainability challenge from balancing the supposedly competing interests of the 3BL toward optimizing aggregate outcomes by managing the complex, long-term interdependence of ecological, social, and economic systems	System-level dynamics; embeddedness theories; processual approach
Schaefer et al., 2015	*Organization & Environment*	Most existing research portrays sustainability and sustainable development as business-as-usual augmented by incremental environmental or social initiatives that reduce risk/costs or increase reputation and revenues. Conversely, sustainable entrepreneurship scholars should target **sustainability-as-flourishing**, which results in resilient social-ecological systems with self-actualized individuals, radiant health, prospering enterprises, humming communities, and a thriving natural environment. The development of entrepreneurship as a process for achieving sustainability-as-flourishing requires systems thinking and a reflective attitude	System-level dynamics; processual approach

Table 1 (continued)

Source	Journal	Key findings/claims	Advocated approach
Vlasov et al., 2018	*Journal of Enterprising Communities*	To develop **entrepreneurship for resilience**, which is key to sustainability, a triple embedding process is necessary. Having sociocultural embeddedness in place facilitates access to local resources and legitimacy. Having ecological embeddedness in place facilitates the leveraging of environmental feedbacks. Embeddedness in translocal grassroots networks of bottom-up social and ecological innovations provides entrepreneurs with globally transferable knowledge about sustainability challenges and practical solutions to these challenges	System-level dynamics; embeddedness theories

include the attractiveness of a tourist destination, the reputation of an industrial district, the fish in a marine area, the quality of the contents in a wiki, a health care system's capacity during a pandemic, and the stability of the global climate.

In each of the examples listed above, there is a community (ranging from small to global) that directly benefits form a resource, but whose misbehaviors may result in that resource becoming unavailable. For the resource to remain available for the collective benefit, a sufficient rate of beneficiaries must voluntarily refrain from overexploitation and/or carelessness, and take responsibility for the commons at stake. The debate on the commons began in economics and political sciences (Standing, 2019), but has recently gained significant traction in business and management studies (Ansari et al., 2013; Fjeldstad et al., 2012; Peredo et al., 2020), and particularly in organization studies (Ricciardi et al., 2020a, b; Rossignoli et al., 2018), sometimes by cross-fertilizing the theory of the commons (Albareda & Jose, 2020) with the theory of the common good of the firm (Higgins et al., 2014).

When a commons is at stake, then, a social dilemma is presented to beneficiaries: they might choose short-term, individual benefit (e.g., by saving the time and money that best-practice waste management would require), thus increasing the risk that the long-term, collective benefit will be lost (e.g., because of urban decay, or waste taxes increase), or they might choose to contribute to the long-term, collective benefit at the price of short-term individual benefit. As game theory experiments reveal, people hate the idea of engaging in pointless sacrifices, and may hate even more the idea that others, particularly the cheaters, might unfairly benefit from the sacrifices of others (Abele et al., 2010; Frischmann et al., 2019). Therefore, commons beneficiaries will likely contribute to the commons only if they have reason to believe that a high number of other beneficiaries will do the same, thus making the sacrifice useful and the reward (sufficiently) fair. For example, even when tourists begin abandoning a destination because it is dirty, the individual hotel owner is not likely to adopt best-practice waste management behaviors if most businesses in that tourist destination have so far cheated waste management regulations to save money. Thus, unfortunately, each individual misbehavior reinforces misbehaviors on the part of the others. In such scenarios, the role of organization and management sciences is likely to become increasingly relevant given that there is growing awareness that real-world commons do not merely raise social dilemmas, but pose sense-making, business and coordination challenges nested in social dilemmas (Abele et al., 2010; Adams et al., 2003).

That is, when a commons is at stake, beneficiaries' behaviors influence each other in vicious or virtuous cycles, depending on a set of boundary conditions that Ostrom (Ostrom, 2009, 2010), and other scholars after her, have begun to identify. The presence of these loops highlights the systemic nature of the commons. Indeed, the so-called "tragedy of the commons" (Hardin, 1968) is a self-perpetuating vicious cycle that results in the destruction of the common resource. The tragedy of the commons is based on loops of "get it while you can" or "I won't be the only fool who contributes" individual choices, and has been clearly identified as a systemic archetype by the seminal work of Meadows (2009)—*Thinking in Systems*.

In addition, one of the most viable research streams stemming from Ostrom's work, that is, the stream on social-ecological system resilience and adaptive co-management

(Berkes, 2009; Bodin, 2017) explicitly conceptualizes environmental commons (e.g., marine areas) as complex social-ecological systems that need to be collaboratively understood, modeled, governed, and managed as such (Ricciardi, De Bernardi, et al., 2020). Therefore, even if systems thinking and the theory of the commons are not explicitly co-advocated for their joint explanatory power by the 19 articles selected for this analysis, the existing theoretical link between these two approaches is strong and loud, as is represented by one of the red dotted lines in Fig. 4.

Based on the synergies and complementarities of the systemic and commons approaches, we conceptualize their joint explanatory and normative power as follows. The development and protection of systems that are able to regenerate collective benefit are core to addressing grand challenges, as argued in the previous section, but almost all these collective benefit systems embed commons-related dynamics (Ansari et al., 2013; Hess, 2008). That is, the systems that are relevant to grand challenges are typically threatened by the tragedy of the commons (triggered by beneficiaries' loafing and/or overexploitation behaviors). In this light, we suggest that the role of entrepreneurship in the face of grand challenges is twofold.

First, entrepreneurs should not be among those who contribute to reinforcing a commons-related vicious cycle. This concretely translates into not only sustained compliance to state-of-the-art behaviors, but also into assurance of transparency, because when a commons is at stake even the suspicion that others are misbehaving reinforces the vicious cycle.

Second, and much more ambitiously, entrepreneurs should be among those who contribute to reinforcing a commons-related virtuous cycle. This implies viewing entrepreneurial action, and its continuous experimentation processes, as a means of participating in the never-ending effort to learn about the system's dynamics and adaptively develop ever-improving solutions that serve the system's health and resilience and that are economically sustainable (Sigmund et al., 2010). This "commons-activist entrepreneur" may play a way out of the so-called prison of social dilemmas (Pacheco et al., 2010) and shape the system for collective benefit.

In the basket of 19 recent and representative agenda-setting articles that we selected for the analysis of the emerging theoretical landscape around the entrepreneurship – grand challenges nexus, six advocate the analysis of system-level dynamics as a key approach. These six articles are listed and synthesized in Table 2.

Bridging approaches: Embeddedness, stakeholders, institutions, design, processes, and effectuation

As illustrated in the two previous sections, the two key theoretical poles identified in Fig. 4 jointly draw a high-level view of what the role of entrepreneurship in the face of grand challenges should be. That is, it should contribute to developing and/or protecting relevant systems for the collective benefit, and particularly to co-developing commons-related virtuous cycles (feedback loops) in these systems, or at least refraining from actions that are acknowledged as strengthening commons-related vicious cycles. In other words, entrepreneurship should actively contribute to benefit rather than simply passively not contribute to damage.

Table 2 Recent agenda-setting articles that advocate the analysis of solutions for commons governance and management as a key approach to advancing the role of entrepreneurship in addressing grand challenges

Source	Journal	Key findings/claims	Advocated approach
Doh et al., 2019	*Academy of Management Perspectives*	**Collective entrepreneurship** emerges from a partnership between government, private interests, and nonprofits and is essential in effectively addressing grand challenges. Nonprofits represent the interests of communities, so they often mobilize grassroots support for piloting new initiatives. Mechanisms for effective collective entrepreneurship include ecosystem valuation mechanisms (to resolve focus conflicts); polycentric governance mechanisms (to resolve scale conflicts); and risk-sharing contractual mechanisms (to resolve time horizon conflicts)	Commons governance & management
Esteves et al., 2021	*Business Strategy and the Environment*	Entrepreneurship can strongly contribute to achieving the SDGs through **commons ecologies** and **boundary communing**. Commons ecologies are local networks around common resources (commons), purposely interconnected to promote positive environmental and social outcomes. Boundary communing is a synergistic relationship between commons-based and profit-led enterprises, with the potential to reshape existing institutions from the ground up	Commons governance & management
Lumpkin & Bacq, 2019	*Academy of Management Perspectives*	**Civic wealth creation**, defined as the generation of community benefit, should be targeted as a key measure of societal impact. Civic wealth is created in local ecosystems when **citizenship and entrepreneurship coalesce** to achieve mutually beneficial goals. This process can be understood by overcoming traditional, firm-centric stakeholder theory, which concentrates on a focal organization and its constituencies, and adopting a more expansive and dynamic view in which stakeholders are conceived not just as beneficiaries but essential participants in problem solving and enterprise development because of their role in generating support and knowledge of local conditions. This view of stakeholders converges with Ostrom's work on the commons: self-organized and self-governing collective actions can generate feasible solutions to formidable social and environmental problems	Stakeholder theory; Commons governance & management

Table 2 (continued)

Source	Journal	Key findings/claims	Advocated approach
Markman et al., 2019	*Academy of Management Perspectives*	While the deployment and practice of **impact entrepreneurship** are complex, the **paradigm** is not. This paradigm outlines clear steps and exigencies: remove trade-offs (e.g., planet/people, community/ individuals, liberty/ security, freedom/safety), prioritize sustainability, develop a dashboard of measurable data and indicators to guide impact entrepreneurship scholarship and purpose-driven practice to advance public policies, protect the common good—and adjust as we learn more	Stakeholder theory; Commons governance & management
Ridley-Duff & Bull, 2021	*Business Strategy and the Environment*	The social solidarity economy should overcome the neoliberal agenda by hybridizing redistribution, reciprocity, and market as three complementary strategies of social organizations for achieving their primary purposes The emergence of internet platforms contributes to new ways of working. **Social enterprises** can develop internet platforms that **use commons-based peer production to build and support the social solidarity economy**	Commons governance & management
Sarasvathy & Ramesh, 2019	*Academy of Management Perspectives*	Individuals **self-select to create sustainable entrepreneurial solutions** to different parts of large-scale common-pool resource problems using nonpredictive processes and collective-action principles. The former (nonpredictive decision processes) can be understood by leveraging effectuation theory, while the latter (collective-action design principles) can be understood by leveraging Ostrom's institutional analysis and development framework on the conditions for effectively managing the commons. This integration of effectuation theory and commons theory explains how **entrepreneurial actors can kick-start collective-action solutions by creating selective incentives**, so that only those who contribute to the solution can obtain the benefits from the solution, and/or by creating opportunities to make the common-pool resource sustainable and productive	Commons governance & management; effectuation theory; processual approach; design-oriented approach

However, how can entrepreneurs concretely play this role in an effective way? Systems and commons thinking provide us with a new generation of clear and measurable general objectives, but they provide little, if any, concrete detail on how to achieve these objectives, and particularly on which entrepreneurial actions on the ground might really contribute to shifting from vicious to virtuous cycles at the system level.

The literature, and particularly the 19 recent agenda-setting articles that we review in this section, has already provided an interesting set of possible answers by identifying theories and approaches whose explanatory and normative power has been widely tested in the business and management literature, and that have proved sound and effective in translating goals into concrete working organizations and/or solutions that are also economically self-sustaining. As Fig. 4 demonstrates, these approaches overall draw a theoretical network linking the systemic and the commons approaches with a connective tissue that is hard-wired in today's ongoing debate in the business and management disciplines.

The first group of approaches that play this bridging role in Fig. 4 is related to the social behaviors of the entrepreneur and includes the embeddedness, stakeholder, and institutional approaches. Social embeddedness theories have a long tradition in entrepreneurship research, dating back to the Austrian school and particularly Lachmann's (1976) research. The entrepreneur is viewed as strongly embedded in its context, acting as a catalyst of social learning (Cantino et al., 2017). Embeddedness occurs at several levels. For example, sociocultural local embeddedness enables attaining help to develop the initiative; ecological embeddedness enables the granular collection and understanding of environmental feedback; community of practice embeddedness enables knowledge exchange and open innovation (Vlasov et al., 2018). As in the case of the link between system-level analyses and the governance and management of the commons, the link between social embeddedness and the commons approach is soundly present in the literature, although not explicitly advocated in the 19 articles under analysis. Self-organizing and participatory architectures for commons-related learning have been acknowledged as key to the governance and management of the commons (Ricciardi et al., 2020a, b). Again, this meta-theoretic link is represented by one of the red dotted lines in Fig. 4.

Further, entrepreneurs play a specific role in embedding their initiatives in a dynamic network of stakeholders. The stakeholder theory has significantly contributed to translating the embeddedness idea into concrete practices and performance measurement criteria. However, the time is ripe to develop a sounder theory of stakeholder governance and management (Amis et al., 2020). Scholars increasingly suggest overcoming the traditional, firm-centric versions of the stakeholder theory, and adopting a more systemic, commons-like view where stakeholders are not just beneficiaries but essential participants in problem solving and enterprise development because of their knowledge of local conditions and the role they can play in generating support (Lumpkin & Bacq, 2019). Unsurprisingly, the stakeholder approach is strongly linked with both the commons and the systems approaches, as presented in Fig. 4.

Table 3 Recent agenda-setting articles that advocate theories and approaches other than system-level dynamics and commons governance and management to advance the role of entrepreneurship in addressing grand challenges

Source	Journal	Key findings/claims	Advocated approach
Bischoff & Volkmann, 2018	International Journal of Entrepreneurial Venturing	The contribution of entrepreneurship to tackling grand challenges cannot be understood by examining entrepreneurs as isolated actors. Extensive, tailored, and collaborative **stakeholder support is key to creating strong sustainable entrepreneurial ecosystems**. Nine key stakeholder groups can be identified in sustainable entrepreneurial ecosystems: employees, customers, business partners, financial institutions, incubators and accelerators, educational institutions, governmental organizations, nongovernmental organizations, the local community	Stakeholder theory
Genus, 2021	Business Strategy and the Environment	**Regenerative principles** of enterprise, ecology, and society **guide sustainability actors**, rather than traditional conceptions of extractive entrepreneurship through which opportunities are exploited. Trade-offs may not be made between "sustainability" and "profitability". Institutional work plays a key role in building and consolidating sustainability-oriented niches (or "subfields") that small and medium-sized enterprises might occupy	Institutional logics & work
Jones et al., 2019	Academy of Management Perspectives	Four phases can be identified in an industry transition toward sustainability: initiating, adopting, legitimating, and/or commercializing a new practice. Different forms of entrepreneurial action are needed at these four different evolutionary stages. Such transitions may occur through collective action by multiple, diverse actors rather than individual powerful actors. **Co-evolutionary forms of institutional work** are well suited to **explain** such **transitions**, even if it is still unclear how institutional work may prevent or deflect possible unintended consequences of such transitions	Institutional logics and work; processual approach
Klapper et al., 2021	Business Strategy and the Environment	The dichotomous **distinctions between sustainable and conventional entrepreneurship should be overcome**. Conventional entrepreneurs develop holistic perspectives on growth that extend beyond the economic to incorporate personal commitments to norms of collectivity and wellbeing for themselves and others. Policymakers should leverage entrepreneurs' social embeddedness to boost sustainability transitions	Embeddedness theories

Table 3 (continued)

Source	Journal	Key findings/claims	Advocated approach
Mintrom & Thomas, 2018	International Journal of Entrepreneurial Venturing	The catalytic power of **policy entrepreneurship** depends on some key characteristics of entrepreneurs: an attitude to address problems through risk taking, alertness, and innovation; a boundary-spanning collaboration instinct; social acuity (understanding how people are thinking about problems); credibility (both personal and coalition based); tenacity (keep working on the purpose even when it seems very difficult to achieve)	Institutional logics & work
Tiba et al., 2020	Journal of Cleaner Production	Particularly successful start-ups in an entrepreneurial ecosystem, so-called **entrepreneurial lighthouses**, play an important role in shaping the ecosystem. This means that the sustainability orientation of these lighthouses is instrumental in creating environments in which more sustainability start-ups can flourish. Policymakers can strengthen this effect by providing access to extra resources and opportunities to promising start-ups and by showcasing their success	Institutional logics & work

While stakeholder views focus on actor-to-actor embeddedness, the approaches based on institutional entrepreneurship and institutional work focus on actors' embeddedness in social rules and values. Institutional theories view the context in which ventures are embedded as organizational fields (de Clercq & Voronov, 2011) in which different institutional logics (e.g., market logic or environment protection logic) are created, interact, clash, and evolve (Ansari et al., 2013). Continuous institutional work is needed to create and recreate the conditions for sustainability transitions, which is why the idea of institutional entrepreneurship has gained great traction in SDG-related studies (Wijen & Ansari, 2007a, b). Institutional work and entrepreneurship are explicitly co-advocated with systemic approaches and commons approaches by the literature (see Fig. 4), starting from Ostrom (1990) herself.

The second group of approaches that play a bridging role in Fig. 4 is related to the concrete cognitive, creative, and decision-making tools that entrepreneurs can adopt to address grand challenges successfully. Design-oriented approaches highlight that systems (including systems shaped by possible social dilemmas) can and should be (re)designed, for example, through sociotechnical approaches (Venkataraman et al., 2012), to make them resilient and capable of regenerating resources for the common good. Entrepreneurs are in a position to play a pivotal role in this never-ending systemic design challenge (O'Shea et al., 2021). Processual approaches (Jones et al., 2019) highlight that business opportunities co-evolve with social-ecological systems and continuous entrepreneurial learning is required to build the contribution of entrepreneurship to the SDGs throughout time. The effectuation approach (Sarasvathy & Ramesh, 2019) highlights how the specific relationship between the entrepreneur and the world, based on the entrepreneur's capacity to embrace uncertainty and adaptively experiment around ideas and opportunities at hand, is key to the specific contribution of entrepreneurship to addressing grand challenges. The effectuation approach, which is means based (rather than ends based) is considered close to robust action and its dynamics of distributed experimentation (Ferraro et al., 2015). In a very recent article, Grimes and Vogus (2021) argue that the approach resulting from robust action and the effectuation framework may result in entrepreneurial action that, although necessary, is not sufficiently bold and systemic; therefore, entrepreneurs should be reoriented to possibilistic thinking, which prioritizes counterfactual reasoning and a strong focus on long-term and even on unlikely system-level consequences. This recent contribution confirms the emerging need to cross-fertilize the effectuation approach with systems thinking, alongside the theory of the commons.

In the basket of 19 recent agenda-setting articles that we selected for the analysis of the emerging theoretical landscape around the entrepreneurship – grand challenges nexus, six co-advocate at least one of the approaches mentioned in this section and the systemic approach (Table 1); three co-advocate at least one of the approaches mentioned in this section and the commons approach (Table 2); and six advocate at least one of the approaches mentioned in this section without explicitly co-advocating the systemic or commons approaches (Table 3). All of the approaches discussed in this section are co-advocated with the commons or systems approaches by at least one article, as demonstrated in Fig. 4.

Table 4 Articles in this special issue that contribute to the research streams synthesized revolving around systems thinking

Authors and title	Contribution
De Bernardi, Paola; Bertello, Alberto; Forliano, Canio; Bullini Orlandi, Federico. *Beyond the "ivory tower". Comparing academic and non-academic knowledge on social entrepreneurship*	This study conducts a comparative network analysis of social entrepreneurship's conceptual structure at both the academic and non-academic levels, considering scientific articles' keywords and Wikipedia webpages' co-occurrences. The results reveal similarities and discrepancies between these two different sources of knowledge, and outline avenues for future studies at the intersection between social entrepreneurship and the research domains of digital transformation, performance measurement, entrepreneurial ecosystems, and ethics
Callegari, Beniamino; Feder, Christophe. *Entrepreneurship and systemic consequences of epidemics: A literature review and emerging model*	This article shows that in the short term, epidemics trigger a wave of Kirznerian entrepreneurship aimed at reducing the uncertainty generated directly and indirectly by the medical emergency. Conversely, in the long term, as medical uncertainty abates, Schumpeterian entrepreneurship contributes to transforming the post-crisis environment, either supporting or undermining the public reaction to the crisis and determining the path of institutionalization, in the process of defining a new normal. Thus, epidemics could lead to unpredictable socioeconomic and technological improvements, but also to highly undesirable outcomes, depending on the effectiveness of the integration of entrepreneurial capabilities within the public sector
Le Loarne, Séverine; Razgallah, Meriam; Maalaoui, Adnane; Kraus, Sascha. *Becoming a green entrepreneur: An advanced entrepreneurial cognition model based on a practiced-based approach*	This article examines how entrepreneurs develop the intention to make their venture green, even when "being green" doesn't happen right from the start, or when the company does not operate in a business that is considered green. The study argues that "becoming green" is not a radical process, but is instead strongly influenced by the entrepreneurial praxis the entrepreneur progressively adopts. An illustrative case study reveals how this model works
Zucchella, Antonella; Previtali, Pietro; Strange, Roger. *Proactive and reactive views in the transition towards circular business models* *A grounded study in the plastic packaging industry*	This study analyzes the transition to circular business models in incumbent entrepreneurial firms in the plastic packaging industry. The results suggest that the circularity challenge raises dilemmas about how to interpret the transition to sustainability. That is, the transition may be interpreted in a reactive way, by prioritizing continuity and compliance with the law. However, the transition may be interpreted in a proactive way based on radical experimentation and openness to change. A multilevel proactive view of the circularity transition is key to transforming the three interconnected levels of analysis (network, entrepreneur, organization) into a proper, sustainability-oriented innovation ecosystem

Table 5 Articles in this special issue that contribute to the research on the link between entrepreneurial ecosystems and entrepreneurs' contribution to sustainable development

Authors and title	Contribution
Audretsch, David B.; Eichler, Georg M.; Schwarza, Erich J. *Emerging needs of social innovators and social innovation ecosystems*	By conducting an in-depth qualitative analysis of an exemplary territorial context, this exploratory study sheds light on the emerging needs of social innovators. Further, through an analysis of the identified needs of the entrepreneurs, the study explores similarities and differences between the social innovation ecosystem and the entrepreneurial ecosystem. Thus, Isenberg's entrepreneurial ecosystem model is leveraged for the development of a novel social innovation ecosystem model
Dos Santos, Lucas Inacio; Anholon, Rosley; Da Silva, Dirceu; Etulain, Carlos Raul; Sanchez Rodrigues, Vasco; Leal Filho, Walter. *Corporate social responsibility projects: Critical success factors for better performance of Brazilian companies and guidelines to qualify professionals and entrepreneurs*	This study analyzes the most impactful critical success factors for corporate social responsibility projects in the context of Brazilian companies' to propose guidelines to better qualify new professionals and entrepreneurs in the face of sustainability challenges. Thirteen critical success factors were identified in selected literature sources and, through a survey with experienced professionals, it was possible to identify the six most relevant for Brazilian companies. Based on these results, three guidelines are proposed to better qualify professionals and entrepreneurs in the Brazilian context. These outcomes shed light on the needs that need to be met in entrepreneurial ecosystems to help entrepreneurs contribute to sustainability transitions
Gil-Gomez, Hermenegildo; Oltra-Badenes, Raul; Guerola-Navarro, Vicente; Zegarra Saldaña, Pablo. *Crowdfunding: A Bibliometric Analysis*	This study presents a quantitative vision of the study of crowdfunding through a bibliometric analysis of the most relevant publications. The main goal is to determine whether crowdfunding is really a subject of increasing interest, and to identify the most productive and influential sources of its scientific research. This study forms a foundation for new studies to delve deeper into this theme
Khatami, Fahimeh; Scuotto, Veronica; Krueger, Norris; Cantino, Valter. *The influence of the entrepreneurial ecosystem model on sustainable innovation from a macro-level lens*	By analyzing secondary data on 14 European countries, this study investigates how an entrepreneurial ecosystem can support entrepreneurs in creating entrepreneurial sustainable innovations (ESIs). The results show that ESIs are positively correlated with three elements of Isenberg's model of the entrepreneurial ecosystem (policy, finance, and infrastructural and administrative support), whereas two other elements of the model (culture and human capital) do not significantly influence ESIs. The country-level capabilities of the ESIs are also measured

Table 5 (continued)

Authors and title	Contribution
Moggi, Sara; Pierce, Paul; Bernardi, Nicole. *From sustainability to thrivability: an inductive framework for entrepreneurial ecosystems*	This study proposes the thrivable entrepreneurial ecosystem as the goal of entrepreneurial action in the face of grand challenges. The proposed thrivability approach to entrepreneurship aims to create prosperity through ecosystemic resources (re)generation and transformation based on entrepreneurship-driven interorganizational collaboration around common long-term economic goals. The thrivability approach is illustrated and further developed with an in-depth qualitative analysis of an exemplary case (the transformation of a local wine ecosystem in Italy)

Articles in this special issue

The preceding sections highlight the dynamism of the research field focusing on the role of entrepreneurship in addressing grand challenges. The *International Entrepreneurship and Management Journal* is contributing to this viable and relevant debate and in 2019 launched the special issue "Grand Challenges and Entrepreneurship: Emerging Issues and Research Streams".

Overall, 23 papers were submitted. At the end of the review cycles, nine papers were accepted. Four of these studies contribute to the research streams that are synthesized in the left part of Fig. 3 and their contributions are synthesized in Table 4. The other five studies focus, from different standpoints, on the role of entrepreneurial ecosystems in pursuing sustainability and addressing the SDGs, thus contributing to research streams that are mapped in the central and right part of Fig. 3. The contributions of these five studies are synthesized in Table 5. Overall, we believe that these nine articles cover some of the most viable topics and approaches identified in our literature analyses. We hope that this special issue will make a significant contribution to the ongoing conversation on entrepreneurship and grand challenges.

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