



Sustainable development and entrepreneurship: Past contributions and future directions

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ARTICLE INFO

Article history:

Received 15 January 2010

Accepted 18 January 2010

Keywords:

Entrepreneurship

Sustainable development

Economic transformation

ABSTRACT

This article discusses the emerging research concerned with sustainable development and entrepreneurship, which is the focus of this special issue of the *Journal of Business Venturing*. Entrepreneurship has been recognized as a major conduit for sustainable products and processes, and new ventures are being held up as a panacea for many social and environmental concerns. However, there remains considerable uncertainty regarding the nature of entrepreneurship's role and how it may unfold. We begin with an overview of sustainable development and the role of entrepreneurship and outline recent contributions exploring this role. We then summarize the papers presented in this special issue and conclude with suggestions for further research.

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1. Executive summary

This article outlines the emerging research and potential future research directions concerned with sustainable development and entrepreneurship, the focus of this special issue of the *Journal of Business Venturing*. Sustainable development has emerged as an influential, albeit controversial, concept for business and policy, and there is growing recognition that a fundamental transformation is needed to reduce detrimental environmental and societal impacts created by our currently unsustainable business practices.

Within this context, entrepreneurship is increasingly being recognized as a significant conduit for bringing about a transformation to sustainable products and processes, with numerous high-profile thinkers advocating entrepreneurship as a panacea for many social and environmental concerns. Yet, despite the promise entrepreneurship holds for fostering sustainable development, there remains considerable uncertainty regarding the nature of entrepreneurship's role in the area, and the academic discourse on sustainable development within the mainstream entrepreneurship literature has to date been sparse. While entrepreneurs have long been recognized as a vehicle for exploiting emerging opportunities associated with societal need, we have little understanding of how entrepreneurs will discover and develop those opportunities that lie beyond the pull of existing markets. Thus, while the case for entrepreneurship as a panacea for transitioning towards a more sustainable society is alluring, there remain major gaps in our knowledge of whether and how this process will actually unfold.

The purpose of this special issue is to begin to address this gap. We begin this paper with an overview of studies exploring the role of entrepreneurship for sustainable development. We then summarize the papers presented in this special issue and conclude with suggestions for further research in this increasingly important area. While this special issue offers considerable insights, there remain ample opportunities for further research in this emerging area. For example, the potential for societal transformation

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through entrepreneurship – the Panacea Hypothesis – remains an active undercurrent in the discourse, while the relationship between sustainable development and entrepreneurship is often more prescriptive than descriptive and, perhaps, overly optimistic. Hence, it remains an open question as to what extent entrepreneurs have the potential for creating sustainable economies, how they motivated and incentivized, if there are structural barriers to the capture of economic rents for sustainable ventures and if sustainability-oriented entrepreneurs differ from traditional entrepreneurs. Further research is also needed to explore the role of public policy and how it may positively influence the incidence of sustainable entrepreneurship.

Another rich area for further research could explore conditions where entrepreneurial ventures rather than incumbent firms provide sustainable products and services. The legitimization of sustainable development within business and policy circles changes the "rules of the game", but also adds additional complexities, with implications for both incumbents and new entrants. Conversely, further research could explore entrepreneurship as welfare-creating versus welfare-destroying, once all externalities are factored in, or the downside to entrepreneurship such as "unsustainable" rent-seeking by entrepreneurs that chose to enter "dirty" industries vacated by incumbents.

Finally, what are the conditions where entrepreneurship simultaneously creates economic growth, while advancing environmental objectives and improving social conditions? Absent within this special issue is the role of entrepreneurs within impoverished communities from developing economies. A key foundation of sustainable development is the recognition that social pressures, especially those within impoverished communities, are a major hindrance to environmental improvement, yet few studies have empirically explored this relationship.

2. Introduction

Sustainable development has emerged as an influential, yet controversial, concept for business and policy. Awareness is growing that a fundamental transformation in the way society consumes natural resources and produces energy may be needed if we are to make progress on pressing environmental issues such as ecosystem degradation and global climate change. With this as context, entrepreneurship is increasingly being cited as a significant conduit for bringing about a transformation to sustainable products and processes. Numerous books that sound dire warnings of environmental disaster often end on an optimistic note, concluding that civilization's salvation rests upon the shoulders of heroic social and environmental entrepreneurs (Brown, 2006; Homer-Dixon, 2006; Lovins et al., 2004; Vaitheeswaran, 2003). Influential practitioner journals such as the *Harvard Business Review* and the *MIT Sloan Management Review* advance the idea that entrepreneurship may be a panacea for many social and environmental concerns (Brugmann and Prahalad, 2007; Handy, 2003; Senge et al., 2007; Hart and Milstein, 1999; Wheeler et al., 2005).

Yet, despite the promise entrepreneurship holds for fostering sustainable development, there remains considerable uncertainty regarding the nature of entrepreneurship's role in the area of sustainability and how it may unfold. While entrepreneurship has long been recognized as a vehicle for societal transformation, especially as an economy moves from one technological epoch to another (Schumpeter, 1934, 1942), we have little understanding of how entrepreneurs will discover and develop those opportunities that lie beyond the pull of existing markets. While the case for entrepreneurship having a central role in a transition to a more sustainable society has been proposed by many, there remain major gaps in our knowledge of whether and how this process will actually unfold.

To date, the academic discourse on sustainable development within the entrepreneurship literature has been sparse. Relatively few rigorous studies exploring the relationship between sustainable development and entrepreneurship have been published in mainstream entrepreneurship journals. The purpose of this special issue is to begin to address this gap. In this paper, we outline some of the recent contributions exploring the role of entrepreneurship in sustainable development. We also identify the gaps in our understanding of this emerging research, provide an overview of the papers in this special issue that bridge some of these gaps, and conclude with suggestions for further research in this increasingly important area.

3. The emergence and evolution of sustainable development

The term "sustainable development" was first coined at the United Nations Conference on the Human Environment in 1972 and later gained prominence by way of a report to the United Nations by the World Commission on Environment and Development (WCED, 1987), chaired by Norwegian Prime Minister Gro Harlem Brundtland (henceforth referred to as The Brundtland Report). The definition emerging from the report, "Sustainable development is development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs" (WCED, 1987: 43), emphasizes the dynamic aspect of sustainability. At its core is the notion that all natural systems have limits, and that human well-being requires living within those limits.

Sustainable development implies that renewable resources should be used wherever possible and that non-renewable resources should be husbanded (e.g., reduced and recycled) to extend their viability for generations to come. This intergenerational aspect of sustainable development suggests a confluence of diverse social, environment, and economic objectives and raises a number of important questions. How do we weigh the material needs of the present against those of the future? How do we balance environmental protection with poverty relief?

To many, sustainable development seeks to place social and environmental objectives on equal footing with economic objectives (the so-called "triple bottom line"). Heretofore, environment and economy were primarily conceptualized as separate and competing realms, with earnest scholars speaking of trade-offs between the competing objectives of growth and resource degradation. To the extent that these two distinct domains could be reconciled, it was through the elaborate pricing of previously unpriced values via elaborate cost-benefit analyses or by providing procedural protections via regulation (e.g., McAllister, 1984).

Sustainable development, on the other hand, implies that societies could somehow have their cake and eat it, too, and that the opportunities to develop in ways consistent with all three objectives (social, environment, and economic) are bountiful – the assumption being that firms and nations could utilize resources in such a way as to promote abundance for current generations without sacrificing opportunities for the future ones.

This assumption grew out of a desire to promote equitable distribution of the benefits of economic growth. This desire emerged from the realization that resources were growingly insufficient to allow the so-called developing world to develop along the same lines as the first world. Given current resource use patterns, a mere modicum of development would demand the resources of an additional planet Earth, even assuming that technological advances proceeded apace. Ultimately, this means that the pace of economic growth must be reduced dramatically, something that modern industrial economies appear to be unable or unwilling to do, and something that developing economies, who view economic growth as the main way to improve their countries' social well-being, see as even more unattractive. Due to this contradiction, [Robinson \(2004\)](#) suggests that sustainable development is really an oxymoron. [Balakrishnan, et al. \(2003\)](#) make the case that sustainability is fundamentally at odds with the prevailing model of capitalism and its emphasis on unbridled growth. They argue that a significant dampening, if not a devolution, of development will be needed to achieve sustainability.³

In response to this critique, many have latched onto the possibility of large-scale economic and societal transformation through innovation. Many are looking to established firms to provide leadership in innovating and delivering more sustainable products and services. Others are skeptical of existing businesses and believe that change will be driven by entrepreneurs. We refer to this belief that entrepreneurs will save the day as the Panacea Hypothesis. The unstated assumption is that green, clean, and low-carbon entrepreneurs will somehow cure most of what ails aging industrial economies. Many green advocates ([WWF, 2009](#); [Stern, 2007](#); [Friedman, 2009](#)) contend that such an entrepreneurial renaissance would spur, not dampen, economic growth and create more jobs. The World Wide Fund for Nature (formerly the World Wildlife Fund) maintains that 400,000 new jobs are being created in Europe in low-carbon energy production, and that the potential is greater in the United States, given its more vibrant start-up environment and larger energy demand ([WWF, 2009](#)). Whether the Panacea Hypothesis will prove true remains an area of active debate.

4. From sustainable business to sustainable entrepreneurship

Despite controversies surrounding it, sustainable development has emerged as an increasingly influential concept in managerial and academic settings. Sustainability has become a mainstay of corporate strategy, with nearly every major firm having a vice-president level executive with “sustainability” in his or her title. Most large firms now have explicit public sustainability policy statements and claim to apply a “triple bottom line” that considers a firm's financial, environmental, and social performance ([Elkington, 1998](#)). All manner of waste reduction and resource substitution are rewarded as symbols of good corporate citizenship (see [Clelland et al., 2000](#)). In many circles, the term “corporate sustainability” has become a synonym for “corporate social responsibility.”

Universities have responded with new faculties and programs dedicated to sustainability. Many business schools have created institutes and endowed chairs. Business researchers are studying the phenomenon of corporate sustainability in earnest, with increasing numbers of studies published in mainstream management journals such as the *Academy of Management Journal*, the *Academy of Management Review* and the *Strategic Management Journal*. Journals from other disciplines such as law, finance, and political science, have also been actively publishing papers on corporate sustainability, making it a truly multidisciplinary (although not necessarily interdisciplinary) research issue.

To date, the majority of the corporate-sustainability literature has been focused on how established firms can reduce their environmental impacts and how sustainable development affects competitive advantage – how much “green” (i.e., profits, ROI) there is in “going green” (i.e., adding to ecologically sound resource use). As with so many scholarly efforts, measurement often predetermines outcomes, and the empirical evidence is mixed. Nonetheless, in an overview of the pays-to-be-green literature, [Ambec and Lanoie \(2008\)](#) suggest that environmental responsibility presents a number of unique “opportunities for increasing revenues.” They identify the following financial benefits from sustainability investments: (a) better access to certain markets; (b) differentiated products; (c) revenue from selling green technology; (d) better risk management and relations with external stakeholders; (e) lower cost of material, energy, and services; (f) lower cost of capital; and (g) lower cost of labor ([Ambec and Lanoie, 2008: 45](#)).

Fewer scholars have explored sustainable development from an entrepreneurship orientation. A number of recent papers have evoked [Schumpeter's \(1942\)](#) concept of “creative destruction,” arguing that new sustainability pressures create various types of market failure, opening up opportunities for new entrants ([Cohen and Winn, 2007](#); [Hall and Vredenburg, 2003](#); [Hart and Milstein, 1999](#); [Hart and Christensen, 2002](#); [Senge and Carstedt, 2001](#)). These authors identify entrepreneurship as a means by which market failures such as environmental and social disruptions can be ameliorated. (In this special issue, [Hockerts and Wüstenhagen \(2010-this issue\)](#) as well as [York and Venkataraman \(2010-this issue\)](#) provide detailed discussions of Schumpeterian dynamics.)

This follows a robust economics literature that promotes entrepreneurship as a means of resolving market failures (e.g., [Coase, 1974](#); [North and Thomas, 1970](#); [Demsetz, 1970](#)) and correcting negative externalities ([Pigou, 1912](#)). Indeed, the entrepreneurial economics literature offers considerable insights into how sustainable development may be achieved. For example, [Knight's](#)

³ Other critiques of sustainable development point to its inherent vagueness ([Daneke, 2001](#); [Dasgupta, 2007](#); [Hasna, 2007](#)). It may be this vagueness, however, that allows it to gloss over its underlying contradictions, and which gives it its utility.

(1921) seminal work on risk has been applied to the strategic and entrepreneurial implications of sustainable development (Matos and Hall, 2007), where environmental and social parameters present greater uncertainties, i.e., the domain of the “Knightian entrepreneur.” Baumol’s (1990) framework of entrepreneurial typologies (productive, unproductive and destructive) has been aligned with the social and environmental impacts of business (e.g., Hall et al., 2008; Potocan and Mulej, 2003). Kirzner’s (1973) concept of entrepreneurial alertness can be used to explain how sustainable development opportunities for entrepreneurs arise out of myopic industries that are dedicated to dead-end trajectories. In this issue, Pacheco et al. (2010-this issue) go further by suggesting that proactive entrepreneurs are not only alert to imperfections within existing markets, but may also actively develop the institutions that support the allocation of environmental resources and practices.

5. Lacunae in the entrepreneurship literature

Despite this burgeoning research domain and the relevancy of the canonical entrepreneurship literature, the leading entrepreneurship journals (i.e., those that are listed on Thomson Reuters’s Journal Citation Reports) have only published a few articles on the topic of sustainable development. Of the two entrepreneurship journals that appeared on the London *Financial Times*’ list of “Top 40” academic journals in the business – *Entrepreneurship: Theory and Practice* and *Journal of Business Venturing* – only one (*JBV*) published a mere two papers on sustainable development (Cohen and Winn, 2007; Dean and McMullen, 2007). One paper has been published in *Family Business Review* (Craig and Dibrell, 2006) and another in *Small Business Economics* (Bianchi and Noci, 1998), whereas there were no substantial publications in *International Small Business Journal*, *Entrepreneurship and Regional Development* and the *Journal of Small Business Management*.

Although sustainability-oriented publications within mainstream entrepreneurship journals have been scarce, a substantial number of papers have been published in non-entrepreneurship journals. Table 1 lists articles focused on sustainable development and entrepreneurship that we were able to identify using Business Source Complete. The methodology used to search for these articles began with a broad search on “sustainable development” or “environmental management” and “entrepreneur/entrepreneurship,” using “all text” in peer reviewed journals to limit the search. As a result, 1076 articles were identified.⁴ Each title was scanned to determine if it fit within our general definitions above. When both terms are found in the text, it is common for one to be a misnomer (e.g., “sustainable development” being used to describe the development of a financially sustainable venture, or the term “entrepreneurial” to describe a managerial behavior rather than new ventures). The terms are also often used as adjectives, casually, or as disconnected concepts (i.e., without a theoretical citation or discussion). This highlights the ambiguous use of terminology in this field, which has been variously described as sustainable entrepreneurship (Dean and McMullen, 2007), environmental entrepreneurship (Keogh and Polonsky, 1998), ecopreneurship (Schaper, 2002) and green entrepreneurship (Berle, 1991; Bennett, 1991; Blue, 1990).

A related and more established stream of research excluded from the list is “social entrepreneurship,” organizational innovations and initiatives in governmental organizations, NGOs, and not-for-profits, or, alternatively, where the profits generated from business activities are used to benefit specific disadvantaged groups (Leadbetter, 1997). A recent summary by Zahra et al. (2009: 522) suggests that social entrepreneurship requires an appreciation of individual and group motivations, and encompasses activities and processes to discover, define, and exploit opportunities for the enhancement of social wealth through the creation of new ventures or managing existing organizations. We suggest that this stream of research, although complementary, differs by concentrating on the behavior of a specific category of entrepreneurs and their focus on social needs, rather than a specific focus on sustainable development. Social entrepreneurs may, but do not necessarily have to, engage in sustainable development initiatives, whereas entrepreneurship for sustainable development may be driven by a need for social improvement or simply by opportunity recognition.

As shown in Table 1, prior to 2002 there were only a few papers in the area of sustainable development and entrepreneurship. However, this is changing, with an increasing number of papers being published. Most of the recent ones appeared in relatively new sustainable development/environmental management journals such as *Greener Management International* (which published two special issues on the topic), *Business Strategy and the Environment* (which published six articles) and the *Journal of Cleaner Production* (which published three articles). Of these three journals, only the *Journal of Cleaner Production* is currently listed in Thompson’s 2008 Journal Citation Reports, with an impact factor of 1.36. *Energy Policy*, a practitioner-focused journal with an impact factor of 1.76, published three papers, but did not delve into any detailed academic discussion of entrepreneurship. Indeed, the majority of these papers generally came from scholars with a stronger orientation towards sustainable development rather than entrepreneurship.

As can be expected from an emerging area, the basic themes of sustainable development and entrepreneurship remain disjointed. Much of the literature is more prescriptive than descriptive. In fairness, many may have merely assumed that the “business case for sustainability” had become well established or at least thoroughly debated. Nonetheless, concrete examples are often invoked to buttress plausible normative arguments. Actual cases of “ecopreneurship” are often cited to illustrate how certain start-up firms are able to forge complementary relationships between their multiple bottom lines, i.e., social, economic, and environmental (see Dixon and Clifford, 2007).

Many look at the motivation of entrepreneurs to pursue sustainable ventures. Dixon and Clifford (2007: 326) contend that there is a strong link between entrepreneurialism and environmentalism. Other research maintains that ecopreneurs are really a separate

⁴ We acknowledge that there are limitations to this search. Business Source Complete is limited to 11,200 sources, including about 1200 scholarly business journals. Books are also not covered. Our assessment of appropriate articles was also limited to our understanding of the topic, and the way in which keywords and other referencing techniques were applied, how they were presented in articles. We apologize if we missed any relevant papers.

Table 1

Publications on sustainable development and entrepreneurship from select journals.

	1996–2001	2002/3	2004/5	2006/7	2008/9
Accounting, Auditing and Accountability J					Caron and Turcotte (2009)
American J of Agricultural Economics			Gray et al. (2004)		
Business Strategy and the Environment	Larson (2000)			Cohen (2006) Ketola (2007) Kirchgeorg and Winn (2006) Masurel (2007) Young and Tilley (2006) Elkington (2006)	Cohen et al. (2008)
Corporate Governance: An Int. Review					
Energy Policy			Agterbosch et al. (2004)		Reddy et al. (2009) Ilskog (2008)
Engineering Economics				Kriščiūnas and Greblikaitė (2007)	
Entrepreneurship and Regional Development	Gibb and Adhikary (2000) Staber (1997)	Desrochers (2002)		Clydesdale (2007)	Cahn (2008)
Greener Mgmt Int.	Isaak (1997)	Astad (2002) Isaak (2002) Linnanen (2002) Schaltegger (2002) Schaper (2002) Schick et al. (2002) Volery (2002)			Gibbs (2009) O'Neill et al. (2009) Parrish and Foxon (2009) Schlange (2009) Tiley and Young (2009)
Harvard Business Review				Brugmann and Prahalad (2007)	
Human Systems Management					Coman (2008)
ICFAI J of Entrepreneurship Devel.t					Majumdar and Nishant (2008) Mathew (2009)
Int. J. of Business Research				Butzloff and Greif (2007)	
Int. J of Social Economics				Gliedt and Parker (2007)	
Irish J of Management				Ní Bhrádaigh (2007)	
J of Business Venturing				Cohen and Winn (2007) Dean and McMullen (2007)	
J of Business Research				Rothenberg (2007)	
J of Cleaner Production		Keijzers (2002)	Lordkipanidze et al. (2005)	von Blottnitz (2006)	
J of Developmental Entrepreneurship	Olatunji (2000)				
J of Global Business and Technology					de Wet Fourie (2008)
J of Management Inquiry		Peredo (2003)			
J of Organizational Change Management	Keogh and Polonsky (1998)			Dixon and Clifford (2007)	
J of Small Business and Entrepreneurship					Gherib et al. (2009)
Long Range Planning	Firnberg (1996)				
MIT Sloan Mgmt Review	Hart and Milstein (1999)		Wheeler et al. (2005) Barrios and Barrios (2004)	Senge et al. (2007)	
Public Administration Quarterly					
Public Finance and Management		Potocan and Mulej (2003)			
Service Industries J					Camison (2008)
Sustainable Development	Solaiman and Belal (1999)				Junquera et al. (2008) Ras and Vermeulen (2009) Šavriņa et al. (2008)
Tech and Economic Devel. of Economy					
Tourism and Hospitality Research		Kokkranikal and Morrison (2002)			

breed. Vega and Kidwell (2007) studied 80 diverse ventures, and found that while there are some similarities, entrepreneurs differed in terms of traits, goals, tendencies, and sources of motivation. Choi and Gray (2008) focused on twenty-one successful sustainability-oriented entrepreneurs. They found that a majority had unorthodox human-resource practices and funding sources. Furthermore,

they had little previous business experience, but developed artful marketing strategies. These studies raise an interesting chicken-and-egg problem. That is, do only environmentalists become sustainable development entrepreneurs, or does the business case draw others to the “green side”? Kuckertz and Wagner (2010-this issue) explore this question — specifically, how sustainability orientation influences entrepreneurial intentions.

Another interesting line of inquiry is whether entrepreneurs or incumbent firms are more likely to pursue sustainability-oriented opportunities. The crux of the entrepreneurial case is that entrepreneurs are better equipped to detect (even spearhead) subtle shifts in societal values and much more able to ignore precedence and pursue innovations (Abrahamsson, 2007; Anderson, 1998; Senge, et al., 2008). Dean and McMullen (2007) point out that it is the very nature of environmental problems that argue for entrepreneurial solutions. They elaborate as follows:

Environmental economics concludes that environmental degradation results from the failure of markets, whereas the entrepreneurship literature argues that opportunities are inherent in market failure. A synthesis of these literatures suggests that environmentally relevant market failures represent opportunities for achieving profitability while simultaneously reducing environmentally degrading economic behaviors. It also implies conceptualizations of sustainable and environmental entrepreneurship which detail how entrepreneurs seize the opportunities that are inherent in environmentally relevant market failures. (Dean and McMullen, 2007: 50)

Cohen and Winn (2007: 29) flesh out this perspective by highlighting specific market imperfections that yield opportunities for sustainability entrepreneurs, including “inefficient firms, externalities, flawed pricing mechanisms and information asymmetries.”

6. Overview of this special issue

Indicative of the nascent nature of this literature, the papers in this special issue vary greatly in their focus and approach. There are three empirical papers and three theoretical ones. One of the papers relies on in-depth case studies, and two rely on a large-sample econometric analysis. Some focus on the individual-level highlighting motivations to start a sustainability-oriented venture, while others focus on the institution-level motivations and their influence on entrepreneurship. All papers, however, share a common interest in understanding what drives sustainable entrepreneurship and recognize the importance of this topic for policy.

Following in the tradition of early sustainability discourse concerned with environmental degradation and drawing on canonical entrepreneurship theories, York and Venkatatraman (2010-this issue) propose that entrepreneurs find solutions to environmental degradation, rather than being the cause of it. They present a model outlining how entrepreneurial actions can address environmental degradation and argue that environmental issues clearly represent the type of opportunity with which entrepreneurs are particularly well oriented. They further suggest that “the more uncertain and intractable the environmental problem, the greater likelihood that entrepreneurs can make a contribution to resolving it.” They place a particular emphasis on the role of for-profit new ventures as a supplement to regulation, corporate social responsibility, and activism in resolving environmental problems.

Pacheco et al. (2010-this issue) employ a game-theory lens to examine sustainability choices. They describe the prisoner's dilemma problem created by the cost of pursuing sustainability in advance of one's competitors, before norms and institutions for green business are established. They assert that this “green” prisoner's dilemma might be redressed by the types of sustainable resource arrangements exhibited by certain fishermen, farmers, and foresters faced with the “tragedy of the commons” (Hardin, 1968; Ostrom, 1990; Axelrod, 1984). Ostrom (1990: 205–211) has observed that averting the collapse of a particular commons requires a substantial list of priors or preconditions among appropriators, not the least of which is the presence of an “institutional entrepreneur.” Hence, Pacheco and colleagues contend that a green enterprise should devote some effort to generating communal institutions to “improve the competitiveness of sustainable behaviors.” The authors present a number of cases of entrepreneurial cooperation, ranging from environmental tourism to organic labeling, and further argue that green entrepreneurs may require institutional structures that go well beyond the standards-setting coalitions customary in many nascent industries.

Hockerts and Wüstenhagen (2010-this issue) advance a model of the conditions under which we expect to see sustainable entrepreneurs emerge versus incumbents. They propose that early in the transformation of an industry towards sustainability, new entrants — “Emerging Davids” in their terminology — are more likely to pursue sustainability opportunities. Eventually, incumbent firms respond to the new entrants and adopt sustainability practices. These “Greening Goliaths” are less progressive but have considerable impact due to their existing market presence. Ultimately, new entrants and incumbents co-evolve, creating incentives and competitive positions that allow both new entrants and incumbents to survive. Hockerts and Wüstenhagen argue that progress in creating sustainable industries and economies will rely on an interplay of entrepreneurial entry and transformation of incumbent players.

Meek et al. (2010-this issue) look at how the broader institutional context influences incidence of sustainable entrepreneurship. In particular, they focus on the role that social norms and government incentives play. Using a panel of new firm foundings in the U. S. solar energy sector between 1999 and 2006, they explore a variety of private and public factors that influence state-level solar entrepreneurship levels. Public factors include the existence of state-sponsored renewable energy portfolio legislation. Private factors were gleaned from the GSS study of state-level social norms. Meek et al. (2010-this issue) find that social norms favorable to sustainability objectives appear to partially predict higher levels of entrepreneurial foundings in the solar energy space.

Parrish (2010-this issue) further explores the motivation of entrepreneurs to pursue sustainable ventures. He highlights the difference between opportunity-driven and sustainability-driven entrepreneurs. Opportunity-driven entrepreneurs' primary motivation is to build a profitable venture. Sustainability is viewed as a market opportunity and serves as a means to achieving

profit objectives. Sustainability-driven entrepreneurs' primary motivation is to contribute to sustainability, whereas a viable, profitable enterprise is a means to that end. Drawing on four cases of sustainability-driven entrepreneurs, Parrish finds that the organizational design principles adopted by these entrepreneurs deviate in important ways from those commonly associated with entrepreneurs in general. He analyzes four diverse cases and isolates five key factors, which he translates into the following design principles: resource perpetuation, benefit stacking, strategic satisficing, qualitative management, and the worthiness of the contribution. These features arise within a unique organizational process, which Parrish calls “perpetual reasoning” – a design context that places increased weight on the extension of resources far into the future – and, which, he believes, most distinguishes sustainability organizations from other forms of entrepreneurship.

In a related piece, Kuckertz and Wagner (2010–this issue) explore individuals who are concerned with environmental and societal issues and could potentially be interested in supporting initiatives and forming businesses that support sustainable development. They root their study within the entrepreneurship and sustainable development discourse, and draw on large-scale survey data to provide empirical insights into how sustainability orientation and entrepreneurial intentions are related. They hypothesize a positive relationship between an individual's sustainability orientation and entrepreneurial intention. However, based on the literature on organizational legitimacy and empirical findings from research on business ethics, they also hypothesize that business experience negatively influences this relationship. Drawing on data collected from students and alumni from science, engineering, and business programs at three European universities, they apply ordinal probit models and find support for these hypotheses. Engineering students with a stronger sustainability orientation are more likely to plan to be self-employed, but this association becomes insignificant when the engineering student sample is compared to the business student sample and an alumni sample. Hence, Kuckertz and Wagner conclude that sustainability orientation influences entrepreneurial intention, but not for every group of individuals, and that business experience apparently destroys the positive relationship between sustainability orientation and entrepreneurial intention.

7. Potential future research directions

The papers in this special issue provide a foundation for future research in the field of sustainable development and entrepreneurship. While the papers offer considerable insights, there remain ample opportunities for further research in this emerging area, which in turn may reveal underlying factors for our general understanding of entrepreneurship. As discussed above, the potential for societal transformation – the Panacea Hypothesis – is an active undercurrent in the sustainable development and entrepreneurship literature. However, the relationship between sustainable development and entrepreneurship is more prescriptive than descriptive and, perhaps, overly optimistic. Hence, it remains an open question as to whether, and to what extent, entrepreneurs have the potential for creating sustainable economies. Answering this question will require insights into a number of related questions, some of which are fundamental to entrepreneurship.

First, under what conditions do we expect to see entrepreneurial ventures rather than incumbent firms provide sustainable products and services? While many papers in this issue and elsewhere allude to the differences between new entrants and incumbents, there are scant empirical studies exploring which of these types of organizations (or combinations thereof) are more likely to transform our economies into more sustainable systems. The emergence and legitimization of sustainable development within business and policy circles changes the rules of the game, which implies that there will be winners and losers, with implications for both incumbents and new entrants. To what extent do the complexities created by considerations of sustainability exacerbate issues of bounded rationality which may, or may not, place new ventures at a disadvantage? Conversely, to what extent are established organizations too myopic and focused on past successful routines and competencies, to adapt? Ultimately, how are industries likely to evolve, as new ventures and incumbents enter and evolve? One potential approach to make headway on these issues is agent-based simulations (see Wu and Ho, 2009) that start with simple game-theory assumptions and institutional rules and model the growth of social and environmental markets.

Second, under what conditions do we expect to see entrepreneurs pursue sustainable ventures? This has been, and, we imagine, will remain, one of the dominant questions in the field. A number of previous studies, and a number of those included in this special issue, explore this question from various angles. To what extent are entrepreneurs incentivized to pursue sustainable ventures? Are there structural barriers to the capture of economic rents for sustainable ventures? Do sustainability-oriented entrepreneurs differ from traditional entrepreneurs? To what extent are they motivated by non-pecuniary incentives such as social norms or private values? Do they have different risk preferences or opportunity costs than traditional entrepreneurs? Answers to these questions will help us make progress on the preceding question, concerning incumbents versus new entrants. Clearly, those and related questions require additional theoretical and empirical work. The growing literatures on “entrepreneurial opportunity” (e.g., Shane, 2004) and “effectuation” (Sarasvathy, 2008) are promising theoretical frameworks with direct application to the above-mentioned questions.

Third, under what conditions can entrepreneurship simultaneously create economic growth, while advancing social and environmental objectives? Noticeably absent among the papers in this special issue is exploration of entrepreneurial dynamics in impoverished communities within developing and emerging economies. A key foundation of sustainable development is the recognition that social pressures, especially those within impoverished communities, are a major hindrance to environmental improvement. While there is a growing literature on the “triple-bottom line” and the “base of the pyramid,” much of it remains prescriptive and anecdotal. There is a need for greater ties between the more environmentally-oriented sustainable development and entrepreneurship literature, represented by the papers in this special issue, and the robust literature on the role of entrepreneurship in economic development in underdeveloped communities. Ultimately, a better understanding of

entrepreneurial dynamics within these segments of society will provide a more accurate picture of entrepreneurial dynamics for sustainable development.

Fourth, related to the last question, under what conditions is entrepreneurship welfare-creating versus welfare-destroying, especially once all externalities are factored in? Much of the work to date in the entrepreneurship field has an implicit assumption that entrepreneurship only leads to positive outcomes for society. A rich area for further research may explore the downsides to entrepreneurship. For example, do entrepreneurs move into unsustainable business activities that have been vacated by incumbent firms because of their detrimental environmental and/or social impacts? In addition to potential “unsustainable” rent-seeking by entrepreneurs, entrepreneurial dynamics may also lead to unanticipated problems. To what extent do new products and services pioneered by entrepreneurs create new social and environmental challenges? Indeed, the history of business is filled with solutions to problems that have led to new negative externalities that are now being addressed (Nelson and Winter, 1982).

Finally, under what conditions does public policy positively influence the incidence of sustainable entrepreneurship? Each of the questions outlined above have important implications for policy and practice. Should policy be geared to regulating large established firms to reduce their environmental impacts, or should it be geared to creating a rich entrepreneurial ecosystem? The answer to this question depends on the extent to which innovation will be led by incumbents or new ventures. One could imagine that the answer may vary from sector to sector, depending on industry structure and dynamics. Are demand-side tax incentives for renewable energy more effective than supply-side R&D subsidies in fostering entrepreneurship for sustainable development? The answer to this question will in part be conditional on what drives entrepreneurs to adopt a sustainable orientation. Do pro-growth zoning laws and tax policies simultaneously help enrich communities while lowering their environmental footprint? The answer to this question clearly needs a better understanding of the interplay and tradeoffs between competing social, environmental, and economic objectives.

8. Conclusion

While sustainable development remains ambiguously defined and controversial, it has emerged as an influential concept for entrepreneurship policy, practice, and theory. However, while entrepreneurship has been cited as a significant conduit for a more sustainable society, there remains considerable uncertainty regarding the nature of this role and how it will unfold. We outlined recent research in the area, acknowledging that the majority of studies exploring the relationship between sustainable development and entrepreneurship have been published outside of the mainstream entrepreneurship journals, and suggest that this special issue is a first step in filling this void. However, while papers in this special issue provide a major step in this direction, there remain considerable opportunities for further research. Although we provided suggestions for further research in this increasingly important area, the key issue, as a research agenda and in practice, remains: will entrepreneurs rise to the challenge?

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