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Recognizing Opportunities for Sustainable Development

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Building on the entrepreneurial action and sustainable development literatures, we highlight how the current explanations of opportunity recognition, based on entrepreneurial knowledge and economic motivation, are insufficient for modeling the recognition of opportunities for sustainable development. Our model suggests that entrepreneurs are more likely to discover sustainable development opportunities the greater their knowledge of natural and communal environments become, the more they perceive that the natural and communal environment in which they live is threatened, and the greater their altruism toward others becomes. We propose that entrepreneurial knowledge plays a central role by moderating these effects.

Introduction

Sustainable development is perhaps the most prominent topic of our time. Sustainable development refers to "development that meets the need of the present without compromising the ability of future generations to meet their own needs" (UNCSD, 2001). Reports of ozone depletion, climate change, and destruction of biodiversity that demonstrate the negative and potentially deadly consequences these processes have for living species are commonplace (Brundtland, 1987; IPCC, 2007; United Nations, 2004). However, scholars claim that entrepreneurial action can preserve ecosystems, counteract climate change, reduce environmental degradation and deforestation, improve agricultural practices and freshwater supply, and maintain biodiversity (Cohen & Winn, 2007; Dean & McMullen, 2007). Moreover, such actions can, particularly in developing countries, enhance education, productivity, socioeconomic status, physical health, and self-reliance of individuals and societies (Wheeler et al., 2005). Last but not least, there are numerous examples of where sustainable entrepreneurial action creates gains for investors, entrepreneurs, and economies (Easterly, 2006; Hart, 2005).

Before creating these gains, entrepreneurs must first believe that there exists an entrepreneurial opportunity for someone (third-person opportunity belief) and then determine that the opportunity is one they want to pursue (first-person opportunity belief)

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(consistent with McMullen & Shepherd, 2006; Shepherd, McMullen, & Jennings, 2008). An economics perspective suggests that entrepreneurial opportunities rise from changes in the business environment—*changes in supply* (e.g., technology, Shane, 2000) *and/or changes in demand* (Dew, Sarasvathy, & Venkataraman, 2004). This perspective views opportunities as "situations in which new goods, services, raw materials, and organizing methods can be introduced and sold at greater than their production (Casson, 1982)" (Shane & Venkataraman, 2000, p. 220) and therefore, emphasizes the importance of personal economic gain—financial profit for the entrepreneur—for recognizing opportunities. In contrast, entrepreneurs who recognize opportunities that promote both sustainability and development likely attend to different aspects of their environment than entrepreneurs who recognize opportunities that deliver solely (or mostly) economic gain to them. For example, individuals who attend to the **natural environment**—*phenomena of the physical world including the earth*, *biodiversity* and *ecosystems* (Parris & Kates, 2003)—are more likely to recognize changes in that environment and subsequently form opportunity beliefs that preserve it than individuals whose attention is more focused on the business environment. Similarly, individuals that attend to the **communal environment**—*communities in which people live*—are more likely to recognize changes in that environment and subsequently form opportunity beliefs that preserve it than individuals whose attention is more focused on the business environment or the natural environment.[1]

Why do some entrepreneurs focus their attention on the natural and/or communal environment? Attention is often directed to aspects of the environment (business, natural, and/or communal) based on prior knowledge (Rensink, 2002) and motivation (Tomporowski & Tinsley, 1996). In this article, we investigate the forms of prior knowledge and motivation that focus individuals' attention toward the recognition of **sustainable development opportunities**—*opportunities that sustain the natural and/or communal environment as well as provide development gain for others.* "Development gain for others" denotes *economic gain* (e.g., employment, consumption, economic wealth), *environmental gain* (e.g., diminished air pollution, increased quality of drinking water), and *social gain* (e.g., increased child survival, life expectancy, education, equal opportunity) for the society (also referred to as the "triple bottom line," see Barbier, 1987; Elkington, 1994; Leiserowitz, Kates, & Parris, 2006; National Research Council, 1999). Sustainable entrepreneurship is *the discovery, creation, and exploitation of opportunities to create future goods and services that sustain the natural and/or communal environment and provide development gain for others*.

We offer a model of how sustainable development opportunities are recognized based on the individual's prior knowledge and motivation. We explain why some individuals (more than others) recognize opportunities that sustain the natural or communal environment and provide development gains for others. We limit ourselves to aspects of knowledge and motivation because these constructs are central to an individual-level explanation of why people recognize opportunities (McMullen & Shepherd, 2006). Our model makes three primary contributions.

First, the opportunity recognition literature focuses on prior knowledge of markets (McKelvie & Wiklund, 2004; Shane, 2000; Shepherd & DeTienne, 2005; Zahra, Korri, & Ji, 2005), technology (Dew et al., 2004; Gregoire, Barr, & Shepherd, 2009; Shane, 1996), and business in general (Davidsson & Honig, 2003). This literature acknowledges the role of potential economic gain to capture entrepreneurs' attention (Baron & Ensley, 2006; Kirzner, 1979). We build on, and extend, these studies by investigating knowledge other

1. We acknowledge that these environments can overlap.

than that of business environments, and motivation other than that for personal economic gain, and how types of knowledge and motivation *conjointly* (rather than independently) impact the recognition of opportunities that sustain the natural or communal environment and develop gains for others.

Second, there is a small but emerging literature on sustainable entrepreneurship. This literature makes important contributions to our understanding of the system-level factors that promote sustainable entrepreneurship (Cohen & Winn, 2007; Dean & McMullen, 2007). These system-level approaches provide little explanation (because it is not their purpose) on who is more likely to recognize these opportunities. By taking an individual level of analysis, we are able to investigate why some individuals are more likely to recognize these types of opportunities than other individuals.

Finally, early individual-level studies on environmental entrepreneurship do not distinguish between the formation of third-person and first-person opportunity beliefs, which is the entrepreneurs' recognition of opportunities for someone or for themselves (e.g., Hostager, Neil, Decker, & Lorentz, 1998; Keogh & Polonsky, 1998; Pastakia, 1998). Drawing on a more recent model of entrepreneurial action (McMullen & Shepherd, 2006) allows us make this distinction and gain a deeper and more detailed understanding of the recognition of third-person opportunities for sustainable development.

This article proceeds as follows. First, we introduce a model of the recognition of entrepreneurial opportunities that sustain the natural or communal environment and develop gains for others based on individual knowledge. Subsequently, we expand this model to the recognition of opportunities that sustain and develop the natural/communal environment based on individual motivation. We then discuss how our findings extend the literature on opportunity recognition and sustainable entrepreneurship. Finally, we suggest avenues for future research and draw conclusions.

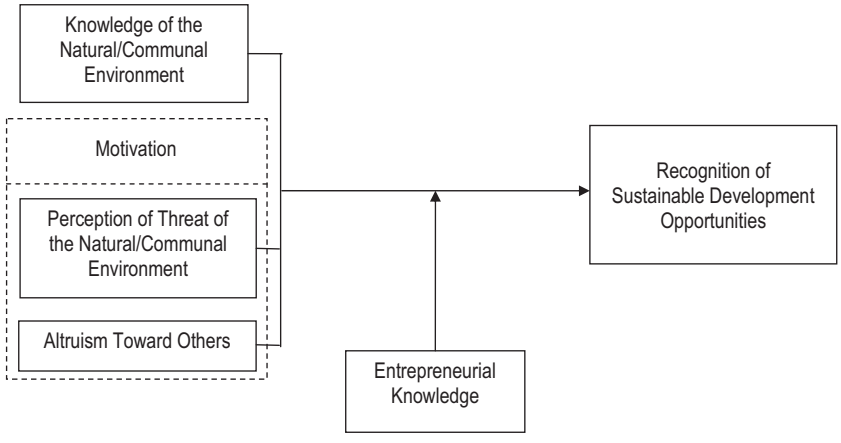
A Model for Recognizing Opportunities for Sustainable Development

Building on the first stage of the theory of entrepreneurial action (McMullen & Shepherd, 2006), we offer a model to explain variance across entrepreneurs in their ability to recognize third-person sustainable development opportunities. This model, illustrated in Figure 1, proposes that the likelihood of recognizing entrepreneurial sustainable development opportunities increases with individuals' prior knowledge of the natural and communal environment, their motivation for personal gains, and their motivation to develop gains for others. These relationships are strengthened when the individuals possess prior **entrepreneurial knowledge**—*knowledge of markets, ways to serve markets, and customer problems* (Shane, 2000).

Before developing our model in detail, it is necessary to clarify two issues. First, we acknowledge the recently emerged substantial literature on social entrepreneurship and its overlap with the definition of sustainable entrepreneurship presented earlier. Definitions of social entrepreneurship abound; for example, in a recent review, Zahra, Gedajlovic, Neubaum, and Shulman (2009) list 20 definitions used in the literature, and in a recently edited volume (Mair, Robinson, & Hockerts, 2006), 10 different definitions are offered by the contributors of the volume. Basically, all of these definitions overlap with our definition of sustainable entrepreneurship in that they emphasize the development of social gain for someone other than the entrepreneur as a major goal of entrepreneurial activity. Two important distinctions, however, can be made. First, with few exceptions (Clifford & Dixon, 2005; Thake & Zadek, 1997), definitions of social entrepreneurship do not include the development of gains for the natural environment. For instance, some definitions

Figure 1

A Model of Recognition of Sustainable Development Opportunities



explicitly refer to a "double bottom line" of developing economic and social gain as goals of social entrepreneurship (cf. Zahra et al.). Second, and more importantly, the social entrepreneurship literature primarily focuses on the *development* of social gain, and not issues of *sustaining* current states of the natural and communal environment as outcomes of entrepreneurial action. That is, "most existing definitions imply that social entrepreneurship relates to exploiting opportunities for social change and improvement" (Zahra et al., p. 4).

Further, we acknowledge our model's underlying assumptions and boundary conditions. First, we focus on the recognition of sustainable development opportunities for someone (third-person opportunities), but we do not investigate individuals' assessments whether these opportunities represent opportunities for themselves (and thus, their intentions and decisions to exploit those opportunities [first-person opportunities]). Both are distinct, subsequent steps in models of entrepreneurial action (McMullen & Shepherd, 2006; Shepherd et al., 2008). We acknowledge the extant literature on entrepreneurial cognition and psychology that in contrast to our work, focuses more on the second step and investigates entrepreneurial decisions to act on opportunities (e.g., Krueger, 2000). Second, we assume that sustainable development entrepreneurs are motivated by more than just personal economic gain. We acknowledge that pure personal economic gains can also motivate individuals to direct their attention toward sustainable development opportunities (Dean & McMullen, 2007; Solow, 1993). However, consistent with our definition of sustainable development opportunities, we focus on gains for those *other than the entrepreneur* because these (perhaps additional) gains distinguish sustainable development from purely economic opportunities (Cohen, Smith, & Mitchell, 2008; Young & Tilley, 2006). Finally, we acknowledge that many factors beyond the knowledge and motivation variables of our model—such as the individuals' networks (Ozgen & Baron, 2007), cognitive structures (Baron & Ensley, 2006; Krueger, 2007), and values (Davidsson & Wiklund, 1997)—may influence individuals' recognition of sustainable development opportunities. Investigating all these factors is beyond the scope of our study. We will now present our model by first investigating aspects of knowledge and then motivation.

Knowledge and Sustaining the Natural and Communal Environment

The sustainable development literature argues that the natural and communal environment are important to sustain for future generations (Barbier, 1987; also referred to as the "triple bottom line," see Elkington, 1994; Hart, 2005; Leiserowitz et al., 2006; National Research Council, 1999; Redclift, 1992). Consistent with the definition of sustainable development, we refer to "sustaining" as *preserving* current states of the natural or communal environment necessary to ensure the ability of future generations to meet their needs (cf. Goodland, 1995).

Sustaining the Natural Environment

The natural environment is a source of resources and services for the utilitarian life support of humankind (Daily, 1997), and sustaining the natural environment is essential to the concept of sustainable development (Goodland, 1995). If aspects of the natural environment are not sustained, the life of many species, including humans, can be threatened. For example, water polluted with infectious agents, bacteria, and chemicals causes millions of deaths per year in least developed countries while overfishing of oceans led to a decline of fish stocks and marine biodiversity (National Research Council, 1999). Not preserving ecosystems also has a direct impact on human life support when, for example, the reduced purification capacity of aquatic habitats leads to contamination of drinking water or when soil erosion diminishes its fertility, leading to lower crop yields. Individuals can sustain these and other sources of life support when they recognize opportunities to prevent a decline in the natural environment including the earth, biodiversity, and ecosystems (cf. Parris & Kates, 2003).

Sustaining the Communal Environment

The *communal environment* denotes the communities in which people live and is an important aspect of sustainable development (Redclift, 1992). Communities are a complex web of relationships between a set of individuals who share values, norms, meanings, history, and identity (Etzioni, 1996). What makes a community distinctive is its *culture*, *groups*, and *places*, and to the extent these decline, community can be lost. For example, preserving the cultural identity of minorities is important to counteract enhanced drug abuse and alcoholism among members of these minorities (Spicer, 2001), and to sustain their physical health and life expectancy (McDermott, O'Dea, Rowley, Knight, & Burgess, 1998). Families and other groups provide a sense of personal identity, and the disruption of these groups diminishes individual well-being (Forste & Heaton, 2004). Finally, sustaining places is important because they can serve as public symbols of culture and history and provide a sense of identity to individuals (Padua, 2007). Thus, it is important that entrepreneurs recognize opportunities to sustain the communal environment including its cultures, groups, and places (cf. Redclift).

Why do some individuals recognize entrepreneurial opportunities that sustain the natural and communal environment and others do not? Following McMullen and Shepherd (2006), we propose that prior knowledge of the natural and communal environment can, in part, explain these differences in recognizing sustainable development opportunities.

Knowledge of the Natural and Communal Environment

Prior knowledge of problems in the natural and communal environment plays an important role in the recognition of opportunities that sustain that environment.

Knowledge of potential sources of air pollution in developing countries led individuals to recognize opportunities for technologies that sustain clean air by drastically reducing particle pollutants in households (Prahalad, 2010). Based on his knowledge of overfishing and declining fish stocks in marine habitats, aquacultural scientist Michael Timmons from Cornell University recognized that Fingerlakes Aquaculture, a start-up company, using innovative filtration and recirculation technology for effective indoor fish farming, could contribute to replenishing depleted natural fish stocks and in addition, counterbalance irregular fish supply and rising prices for the population (Hart, 2005). Knowledge about what constitutes the cultures of indigenous groups has led to the discovery of culture-sustaining opportunities (Foley, 2003), and knowledge of threatened places has led to the recognition of opportunities to develop forms of tourism to sustain those places (Cole, 2004).

Differences in prior knowledge may explain variance in entrepreneurs' direction of attention toward aspects of the natural and communal environment, and thus their recognition of sustainable development opportunities (consistent with Shepherd et al., 2008). Individuals will attend to those opportunities related to their own prior knowledge for a given aspect of their environment (consistent with Shane, 2000). For example, based on prior knowledge, architects or construction engineers will more likely focus attention on opportunities to develop an environmentally friendly coastal infrastructure, whereas chemists may focus on new techniques for water detoxification, and biologists on protecting marine biodiversity through the development of commercial fish farms that reduce overfishing. Thus,

> **Proposition 1:** The greater entrepreneurs' knowledge of the natural/communal environment, the more likely they will recognize an opportunity for sustainable development.

Besides prior knowledge of the natural and communal environment, prior entrepreneurial knowledge is important for the recognition of third-person opportunities. Shane (2000) identifies three types of entrepreneurial knowledge influencing individual discovery of opportunities—prior knowledge of markets, prior knowledge of ways to serve markets, and prior knowledge of customer problems. First, prior knowledge of markets influences the choice of the market. For example, prior knowledge of customers and suppliers in a particular market allows the entrepreneur to assess the acceptance of new technology in that market and the potential gain (Roberts, 1991). Second, prior knowledge of how to serve markets is important in recognizing opportunities because it enables entrepreneurs to assess (and perhaps acquire) the competences necessary for market entry (von Hippel, 1988). Finally, prior knowledge about customer problems with existing technologies can trigger the recognition of opportunities. The more knowledge of these problems individuals have, the more likely they will recognize an opportunity for introducing new products and services that address the customers' problems and thus are accepted by the market (von Hippel).

Entrepreneurial knowledge likely influences the extent to which prior knowledge of the natural and communal environment contributes to recognizing an opportunity for sustainable development. Baron and Ensley (2006, p. 1331) propose that "opportunities are identified when entrepreneurs, using relevant cognitive frameworks, 'connect the dots' between seemingly unrelated events or trends and then detect patterns in these connections suggestive of new products or services." That is, recognizing an entrepreneurial opportunity to sustain the natural or communal environment requires that individuals connect their prior knowledge of (events/trends in) this environment with their prior knowledge of (events/trends in) markets, how to serve markets, and customer problems.

For example, consider a chemist who has discovered a new chemical that potentially substitutes for greenhouse gases. This individual will only recognize a sustainable development opportunity if he or she also knows about a potential market where the chemical can be used to replace greenhouse gases. Knowledge about the market and ways to serve it is a prerequisite for him or her to develop a belief that the newly discovered chemical can contribute to sustaining the natural environment because it will be accepted by customers and will be widely distributed. If the chemist has little knowledge about markets for the new chemical and ways to enter markets, he or she may believe that the chemical could perhaps replace greenhouse gases technically because of similar chemical properties, but he or she will be ignorant about specific opportunities to distribute the chemical to potential customers and is unlikely to recognize this "invention" as an opportunity to sustain the natural environment. Thus,

Proposition 2: The positive relationship between entrepreneurs' knowledge of the natural/communal environment and the likelihood of recognizing an opportunity for sustainable development is stronger when their entrepreneurial knowledge is high than when their entrepreneurial knowledge is low.

Motivating Economic, Environmental, and Social Gain

The sustainable development literature and the "triple bottom line" approach emphasize economic, environmental, and social gain as important development goals (Elkington, 1994; Leiserowitz et al., 2006; National Research Council, 1999). Consistent with the definition of sustainable development, we refer to "development" as *changing* current, unfavorable conditions in the society in order to ensure that future generations can meet their own needs.

Economic gain, such as employment, financial wealth, and consumption, improves the socioeconomic status of people and leads to psychological (Twenge & Campbell, 2002), and physical health (Hanson & Chen, 2007). A substantial body of literature finds that the discovery of entrepreneurial opportunities yields economic gain for people and the society in which they live (see Audretsch, Keilbach, & Lehmann, 2006). Our conceptualization of sustainable development opportunities emphasizes the development of economic gains for *someone other than the entrepreneur*. We do not exclude the gains that entrepreneurs develop for themselves, but this is not a necessary condition for recognizing sustainable development opportunities. For example, an individual may recognize an opportunity for a technology that can be introduced to the market by starting a new organization. If this new organization succeeds, it develops economic gains for the society (e.g., creates new jobs), independent of the individual's role in that organization and his or her personal economic gain—perhaps he or she will leave the company soon after foundation and not profit from the new technology at all.

Environmental gain—the improvement of conditions of the natural environment—is an important development goal in societies that are confronted with poor air quality and drinking water, overexploited soil and aquatic habitats, declining forests, and other diminished natural resources. As stated earlier, an environmental state where these resources are depleted can lead to both psychological and physiological health problems for people living in those societies (Costanza et al., 1997; Daily, 1997). Entrepreneurs may recognize opportunities to improve environmental conditions. For example, individuals discovered opportunities to develop cheap technological processes that convert polluted water to drinking water in developing countries (Prahalad, 2010)

and opportunities for ecological fish farming that allow depleted fish stocks in the oceans to recover (Hart, 2005).

Social gain developed in society includes child survival, life expectancy, education, equity, and equal opportunity (Board Sustainable Development, 1999; Parris & Kates, 2003). For example, in low-income countries, one out of every 10 children dies before the age of five. The United Nations aims to reduce this by two thirds (Millennium Goals, United Nations). Further, some people are exploited such that their "true" value is not recognized or rewarded. For example, stakeholder research focuses on the means to ensure that profits from resources are deployed fairly between firms and other stakeholders. If resource deployment is unfair, then stakeholders are being exploited. Social gain is developed by improving the "well-being and security of national states, regions and institutions and, more recently, the valued social ties and community organizations" (Board Sustainable Development, p. 25).

Motivating Personal Gains by Sustaining the Natural and Communal Environment

Besides knowledge, motivation to focus attention is an important determinant of opportunity recognition (Baron & Ensley, 2006; Kirzner, 1979; McMullen & Shepherd, 2006). Motivation to direct attention toward sustaining the natural and communal environment likely arises when individuals perceive that their physical and psychological well-being is threatened. For example, destruction of the natural environment by pollution threatens the lives of many people, and individuals living in highly polluted areas are vitally interested in opportunities to reduce pollution. Further, self-determination theory is concerned with explaining the psychological processes promoting optimal functioning and health (Ryan & Deci, 2000). Aspects of life that satisfy individuals' psychological needs for *competence* (appear competent to themselves and others), *relatedness* (entertain social relationships with others), and *autonomy* (a certain degree of decision latitude) enhance psychological well-being (Ryan & Deci). When these aspects of life are threatened, individual psychological well-being is threatened.[2]

Threats to Needs for Competence. When individuals perceive that nature is declining, this may indicate to them that they—as part of the society in which they live—are not competent to manage their natural environment in a way that guarantees adequate living conditions for future generations. For example, the consequences of ozone layer depletion and climate change will be more severe for future generations (Dentener et al., 2006) and the extinction of species and disappearance of some natural habitats (e.g., oceans or rain forests) can never be fully repaired. To the extent that individuals attribute these consequences to their own (and their society's) inability to sustain the natural and communal environment, their sensitivity to opportunities for sustainable development will be enhanced.

2. It is possible that knowledge of the natural and communal environment and motivation to direct attention to these environments are correlated, but cases are possible where individuals have high levels of knowledge and low motivation to direct attention, and vice versa. For example, a biologist may have extensive knowledge about the natural environment but live in a rural area where he or she is not threatened by environmental decline and thus, focuses his or her attention on issues other than preserving environmental resources that are abundant. Similarly, individuals living in places threatened by air pollution may be motivated to counteract these problems although they have little knowledge about underlying scientific contingencies.

Threats to Needs for Relatedness. Declining natural and communal environments can also thwart the entrepreneurs' needs for relatedness, which is their tendency to connect with others (Ryan & Deci, 2000). Diminishing environmental conditions that mostly harm following generations will make it more difficult for entrepreneurs to build up relationships to those generations. For example, children may accuse their parents (or their parents' generation) of a selfish and egocentric way of life that exploited and destroyed nature, the consequences of which the children and their generation will have to suffer. Secondly, global warming, ozone layer depletion, and overfishing is, to a large extent, attributable to industrial activities and consumption in developed countries, but substantial consequences and costs of those activities in terms of ecosystem decline are imposed on developing countries (Srinivasan et al., 2008). The latter may accuse developed countries of selfishness and recklessness, thus hurting the building of interpersonal relationships across societies. Third, declining communal environments can disrupt important social relationships such as ties between parents and children when families are dissolved. The more these conflicts and disruptions of ties thwart the individuals' need for relatedness, the more attention they will pay to opportunities to sustain the natural and communal environment and prevent harm to future generations and others.

Threats to Needs for Autonomy. Finally, experiencing autonomy requires that individuals have a set of options available (Ryan & Deci, 2000), and with declining environmental conditions, the number of options decreases. For example, the death of coral reefs as a result of global warming diminishes the number of attractive holiday destinations (Tourtellot, 2007), and climatic changes also diminish opportunities to grow crops in many regions, which impacts the amount and variety of food available (IPCC, 2007). When groups are disrupted, individual ability to form social ties with others, specifically the other group members, diminish.

In sum, individual threat perception with respect to competence, relatedness, and autonomy will motivate individuals to gain improved psychological well-being by attending to opportunities that sustain the natural and communal environment. The intrinsic motivation is stronger when individuals perceive their physical and psychological health to be directly threatened. These individuals will focus on the sources of that threat while paying less attention to nonthreatening issues (Mathews & MacLeod, 1994). For example, individuals whose families have historically made their living from fishing will be more sensitive to changes in marine biodiversity and to the opportunities for maintaining this biodiversity in order to signal competence in responsible fishery to their sons and daughters. Further, the impact of global climate change on the variety of food available differs across regions (IPCC, 2007), and individuals that live in more affected areas will perceive more threats to their need for autonomy and well-being—and thus be more sensitive to opportunities to reduce global warming—than individuals living in other areas. Thus,

> **Proposition 3:** The more entrepreneurs perceive that their natural/communal environment is threatened, the more likely they will recognize an opportunity for sustainable development.

After threat recognition and overcoming the initial fear, individuals tend to systematically seek opportunities to escape this threat (Beck & Clark, 1997).[3] At this stage of

3. There are also individuals with anxiety disorders who escalate their anxiety and are unable to respond to the threat strategically and constructively (Beck & Clark, 1997). These individuals are unlikely to form an opportunity belief as a threat response. We focus on mentally healthy individuals able to seek opportunities to escape the threat.

"elaborative strategic processing of threat," information is processed slowly and a "secondary appraisal process occurs in which anxious individuals evaluate the availability and effectiveness of their coping resources to deal with the perceived threat" (Beck & Clark, p. 53). One way to cope with a perceived threat is to try and eliminate its underlying source (Folkman & Lazarus, 1985; Folkman & Moskowitz, 2004). Entrepreneurial knowledge can constitute a coping resource that facilitates individual abilities to address this underlying source of a decline in their environment (natural/communal) through recognizing a sustainable development opportunity.

Consider an individual living in a city center with heavy traffic where car emissions and air pollution threaten her or his health and that of family, friends, and acquaintances. This individual seeks opportunities to escape that threat and improve the air quality in the place where he or she lives. If he or she has knowledge about the local car market and new ways to serve that market, he or she may recognize an opportunity to open a "green car" store for small and environmentally friendly vehicles that cause lower emissions; thereby improving urban air quality. In addition, this individual may understand the problems of local car customers, such as finding a parking space for large cars, and see the opportunity to sell them small cars at the "green car store" thereby aiding the urban air quality cause. Individuals lacking car market knowledge are more likely to escape the threat without discovering an opportunity to reduce car-caused air pollution—for instance, they may decide to move somewhere with cleaner air. For these individuals, perceived threat is less of a motivation to seek sustainable development opportunities than for those with knowledge of the car market (entrepreneurial knowledge). Thus,

> **Proposition 4:** The positive relationship between entrepreneurs' perception of threat to their natural/communal environment and the likelihood of recognizing an opportunity for sustainable development is stronger when their entrepreneurial knowledge is high than when their entrepreneurial knowledge is low.

Motivating Development Gains for Others by Sustaining the Natural and Communal Environment

Individuals differ in their motivation to direct attention toward the development of economic, environmental, and social gains for others in the society. Altruism is the *individual motivation to improve the welfare of another person* (Penner, Dovidio, Piliavin, & Schroeder, 2005, p. 368). A substantial body of literature investigates why altruistic behavior occurs, and explanations include reciprocal altruism, group selection, gains of social reputation and recognition by others, genetic disposition, personality factors, and improved psychological and emotional well-being for those who help. While many of these explanations imply that individuals (consciously or nonconsciously) act altruistically because it is in their self-interest in contrast to developing purely personal gain (as discussed earlier), altruistic action always includes some sacrifice to oneself and an intention to develop benefits for others (Penner et al.).

Arousal and affect approaches emphasize the important role of emotions in the development of altruistic motivation. An altruistic motivation arises when individuals experience *empathy* and *sympathy* for others (Batson, 1991; Davis, 1996).[4]

4. We acknowledge that knowledge of societal problems and motivation to direct attention toward these problems may be correlated. However, studies show that individuals with the same knowledge about problems of others differ in their empathetic response toward others (Westbury & Neumann, 2008) and thus, in their motivation to address the others' problems. Similarly, individuals may have a general tendency to think themselves into others (high empathy) but may not know about concrete examples where help is needed.

Empathy. Empathizing individuals are able to think, feel, and experience for themselves similar emotions to those experienced by others (Eisenberg, 2000). For example, individuals able to empathize with people in poor societies can themselves (partly) experience other people's sorrows. The greater empathy an individual has for the poor, the more attuned they are to opportunities that will counteract the negative emotional experiences and sorrows of poor people. These individuals are motivated to find sustainable development opportunities that change the poor people's situation because in doing so, they can improve their own emotional state.

Sympathy. In contrast to empathy, sympathizing individuals can think and feel themselves into others but experience emotions different to the others' emotions (Eisenberg, 2000). Individuals that sympathize with very poor people are able to understand their sorrows about children's nutrition and health, but they will not experience those sorrows themselves but instead, experience pity. Pity is an altruistic emotion that motivates individuals to alleviate the suffering of others, even if helping is associated with substantial costs to the individual (Dijker, 2001). That is, individuals sympathizing with others will be motivated to help them and attend to opportunities that improve their situation.

There are numerous examples where altruistic behavior focuses individual attention toward problems of others, thus triggering the recognition of sustainable development opportunities. For instance, Anita Roddick, an activist for human rights empathizing with poor people and animals, sought to improve their living conditions through entrepreneurial action: "I have been in business now for 25 years with the zealousness of a religious convert trying to put altruism back on the business agenda" (Roddick, 2002, p. 189). To do so, she founded the Body Shop, a venture focused on the production and commercialization of environmentally sustainable cosmetics. Many of the Body Shop's manufacturing locations are located in poor rural areas in order to improve the poor community living conditions: "My job and commitment to these farmers therefore is to look at economic alternatives, to see how we can put the crops they grow—sugar, soya, and sweet potato in our products" (Roddick, p. 189). Ben Cohen and Jerry Greenfield, founders of Ben & Jerry's Ice Cream, recognized that using organic ingredients for food production could help improve the health of others and sustain a healthy natural environment. As Ben Cohen puts it, "if you care about the environment as a food producer, it's clear that the way food is conventionally grown is really bad for the environment, in terms of all the chemicals that end up going into the environment. And then those chemicals have negative effects on human health, and so I think if a food manufacturer is environmentally responsible, they really have no choice but to come out with an organic alternative for their customers" (Wieder, 2003).

Finally, individuals do not just experience empathy and sympathy for humans but also for animal species (Westbury & Neumann, 2008). Altruistic motivation for animals can drive individuals to recognize opportunities that help species by improving the environmental conditions in which they live. By founding Dolphinwatch, Bill Levelett—an ecotourism venture and the first commercial dolphin watching business in Hong Kong—found not just an opportunity for economic gain but also a way to promote awareness of dolphins among the public, thus contributing to sustaining and improving the living conditions for the animals (Geneste, 2005). Thus,

> **Proposition 5:** The greater entrepreneurs' altruism toward others, the more likely they will recognize an opportunity for sustainable development.

While altruism motivates the recognition of sustainable development opportunities, we suggest that this effect is enhanced by the individual's entrepreneurial knowledge.

Knowledge of markets will direct the attention of altruistically motivated individuals toward entrepreneurial activities that develop economic, environmental, and social gain. In contrast, for those without entrepreneurial knowledge, other ways of helping, such as supporting existing development aid or animal rights organizations, may channel their altruistic motivations.

Ben Cohen and Jerry Greenfield offer an example of how knowledge of markets and ways to serve markets transforms altruism into sustainable entrepreneurial activity. During their years in college and high school, both acquired knowledge of selling ice cream by working in ice cream shops and other food service outlets. Using their knowledge, the duo recognized that by establishing an organic ice cream shop they could channel their motivation and improve the living conditions of others while contributing to the preservation of the natural environment and the health of consumers (Wieder, 2003).

Jacqueline Novogratz, founder of the Acumen Fund, is another example for the complementary relationship between altruistic motivation and entrepreneurial knowledge in recognizing sustainable development opportunities. The Acumen Fund is a not-for-profit organization that supports entrepreneurs who produce goods and services critical for societal development such as medical care, housing, and clean drinking water in least developed countries. Novogratz' altruistic motivation was triggered by witnessing the devastating conditions of living and the consequences of genocide in Rwanda and other poverty-stricken regions of the world. Using her experience in banking and knowledge of the microfinance market, she recognized that the establishment of a fund that carefully selects and invests in entrepreneurs who can contribute to the region's development would create more gain for poor societies than a simple handing out of money to the people. Entrepreneurial knowledge in the form of knowledge about the microfinance market provided an opportunity for Novogratz to channel her altruistic motivation into action by founding Acumen as an opportunity for sustainable development. Thus,

> **Proposition 6:** The positive relationship between entrepreneurs' altruism toward others and the likelihood of recognizing an opportunity for sustainable development is stronger when their entrepreneurial knowledge is high than when their entrepreneurial knowledge is low.

Discussion

Our article adds to the opportunity recognition literature by emphasizing how entrepreneurial knowledge of the natural or communal environment is an important antecedent to the recognition of sustainable development opportunities. Although knowledge is known to be an important antecedent of opportunity identification, existing studies primarily take an economic perspective and focus on knowledge related to markets (McKelvie & Wiklund, 2004; Ozgen & Baron, 2007; Shane, 2000; Zahra et al., 2005) and technology (Dew et al., 2004; Shane, 1996), as well as knowledge on how to run a business (Davidsson & Honig, 2003). While these types of knowledge may also be important for the discovery of sustainable development opportunities, it is unlikely sufficient to recognize opportunities that create economic, environmental, and social gain for others. Entrepreneurs with knowledge of the natural and communal environment are likely to focus their attention on those environments, thus discovering opportunities that sustain them. Recognizing sustainable development opportunities requires that entrepreneurs go beyond personal economic gain as suggested by the literature on the recognition of nonsustainable opportunities (Baron & Ensley, 2006; Kirzner, 1979). Recognizing

opportunities for sustainable development requires that individuals are not only knowledgeable about changes in the market equilibrium but also about changes in the natural/communal environment in which they live.

Motivation provides an additional explanation beyond knowledge for why some individuals recognize meaningful patterns in their environment that constitute entrepreneurial opportunities and others do not (cf. Baron & Ensley, 2006; Shane, Locke, & Collins, 2003). Our model posits that perceived personal threats and altruism can explain why some individuals, more than others, recognize sustainable development opportunities. Personal threat is a motivation for "necessity entrepreneurship," which refers to entrepreneurial action responding to threats toward individual economic well-being (Henrekson, 2005; Ho & Wong, 2007). We suggest that threats other than those to economic well-being—perceived threats to psychological and physiological well-being arising from declining natural and communal environments—may also trigger recognition of sustainable development opportunities, specifically opportunities that counteract these threats. These opportunities may or may not impact the individuals' personal economic conditions. Moreover, identifying empathy and sympathy as a driver of recognizing sustainable development opportunities is consistent with anecdotal evidence in the literature on social entrepreneurship that emphasizes altruism and the desire to help others as motivating entrepreneurial action that creates social gain (Austin, Stevenson, & Wei-Skillern, 2006; Zahra et al., 2009).

Perhaps the most interesting part of our model relates to the role of entrepreneurial knowledge—defined as knowledge of markets, ways to serve markets, and customer problems (Shane, 2000)—as moderating the impact of other knowledge and motivation variables on the recognition of sustainable development opportunities. We proposed a complementary relationship between entrepreneurial knowledge and knowledge of the natural/communal environment, perceptions of threat, and motivation of altruism. These moderating relationships suggest that findings from prior studies that focused on the direct effects of knowledge on opportunity recognition (e.g., Shane; Zahra et al., 2005) may provide an incomplete picture when applied to the recognition of sustainable development opportunities. Additional types of knowledge are necessary, and entrepreneurial knowledge facilitates the transformation of these types of knowledge into the recognition of sustainable development opportunities.

This notion that types of knowledge and motivation *conjointly* rather than independently influence the recognition of sustainable development opportunities is consistent with recent work by Baron and Ensley (2006) who found that "the recognition of new business opportunities often involves pattern recognition—the cognitive process through which individuals identify meaningful patterns in complex arrays of events or trends" (p. 1331). According to this model, individuals identify opportunities when they make connections between independent events or trends. Our contingency model suggests that connecting different types of knowledge about events (changes) in the environment—declines in natural/communal environments and changing market environments—facilitates the recognition of sustainable development opportunities above and beyond the direct, independent effects that knowledge and motivation have on opportunity recognition. An important implication for future research is that studies investigating the recognition of sustainable development opportunities should take into account potential interactions between knowledge and motivation variables.

The simultaneous emphasis on different types of knowledge in the recognition of sustainable development opportunities is also supported by Hart (2005), who proposes that within the money economy (industry and commerce composed of developed and emerging economies), the traditional economy (village-based economies in rural areas

mainly in developing countries) and natural economy (natural systems and resources that support the money and traditional economy) as well as at the intersections of these economies, individual entrepreneurs and firms can recognize ample opportunities to sustain the natural and communal environment and develop gains for themselves and others in the society. That said, "managers, particularly in multinational corporations, are more accustomed to viewing the global market as a single monolithic entity. They focus almost exclusively on the money economy and customers who have achieved a certain level of affluence" (p. 42). Many managers in developed and emerging markets lack sufficient knowledge about the natural/communal environment and consequently, miss important sustainable development business opportunities. Knowledge dissemination may help entrepreneurs in all countries recognize business opportunities overcoming the challenges to sustainable development: "In the past, ignorance and isolation meant that those in the traditional and market economies were largely unaware of their plight. Today, however, the digital revolution is bringing information—and ideas—to growing number of the world's poor. Such knowledge is potentially empowering, as we will see, creating the potential to reform corrupt regimes, solve environmental problems, and spur more equitable forms of development" (Hart, p. 41).

Consistent with our model, the social entrepreneurship literature emphasizes altruistic motives and the desire to help others as drivers of opportunity recognition (Hockerts, 2005; Mair & Noboa, 2003; Spear, 2006), but it has not investigated the role of perceived personal threat in this process. Personal threat may constitute another nonaltruistic motivation beyond personal financial gain that triggers the recognition of opportunities to create social gain. Further, much of the literature on social entrepreneurship highlights individuals' knowledge of actual societal problems as drivers of opportunity recognition (e.g., Alford, Brown, & Letts, 2004; Drayton, 2002), but understanding what constitutes cultures and groups (the communal environment) may also contribute to recognizing opportunities that create social gain. For instance, entrepreneurial action may create greater social gain when it considers the cultural values and social groups of the communities it targets for sustainable development.

Finally, existing research and anecdotal evidence suggest that many social entrepreneurs possess knowledge about markets and ways to serve them (Seelos & Mair, 2005a; Zahra et al., 2009), but current models of opportunity recognition do not consider a moderating influence of this type of knowledge on other drivers of social entrepreneurial activity (e.g., Robinson, 2005). Following our study, social entrepreneurship scholars may develop more sophisticated models of opportunity recognition that take contingencies between knowledge and motivation variables into account as well as contingencies between knowledge variables.

Academic literature dedicated to sustainable entrepreneurship is still emerging. Two recent studies take an economic perspective and identify system-level factors explaining the emergence of sustainable opportunities (Cohen & Winn, 2007; Dean & McMullen, 2007). The underlying assumption of these studies is that the decline of the natural environment constitutes a market failure, and that entrepreneurs can accumulate economic gain when they solve this failure by recognizing and exploiting sustainable opportunities. Our work complements these system-level studies by taking an individual-level perspective and suggesting which individuals are more likely to discover an opportunity to overcome such market failure. Consistent with the Austrian economics perspective suggesting that idiosyncratic knowledge determines who discovers entrepreneurial opportunities and who does not (Kirzner, 1997), we propose that heterogeneity in individuals' knowledge of the natural/communal environment and entrepreneurial knowledge explains, to some extent, why some individuals are more likely to recognize a sustainable

development opportunity than others. These arguments and findings are consistent with anecdotal evidence and case studies of well-known entrepreneurs whose work sustains natural and communal environments while fostering societal gains (Austin et al., 2006; Duggan, 2002; Seelos & Mair, 2005b).

Our study also adds to the emerging sustainable entrepreneurship literature by expanding the notion of sustainability from a sole emphasis on the natural environment (Schaper, 2005) to include other aspects of the communal environment (cf. Cohen et al., 2008). Recently, scholars started investigating the interplay between entrepreneurial activity and the communal environment. For example, Peredo and Chrisman (2006) developed the concept of "community based enterprise" and suggested that poverty can be reduced when entire communities act as entrepreneurs and enterprises in pursuit of the common good. Consistent with our model, these authors argued that social and economic threats, and the development of knowledge within the community, are important antecedents of entrepreneurial activity that sustain the community while developing solutions for societal problems.

Finally, the literature on sustainable development develops a taxonomy of sustainable development goals stating what has to be sustained—namely nature, life support, and communities—and what has to be developed—namely people, economy, and society—in order to allow both current and future generations to meet their needs (Parris & Kates, 2003). Several means are suggested to reach these goals including the promotion of certain values in society such as freedom, tolerance, and respect for nature (Leiserowitz et al., 2006), and the development of appropriate political frameworks (Solow, 1993; Woolcock, 1998). This literature, however, does not yet sufficiently acknowledge the role of entrepreneurship in providing a mechanism that contributes to the attainment of sustainable development goals. Sustainable development entrepreneurs recognize new opportunities to sustain the natural and communal environments and develop economic, environmental, and social gain for societies.

Future Research

Future research can depart from our study by relaxing its assumptions and boundary conditions. First, the scope of our study was to focus on the first step of entrepreneurial action, which is the formation of the belief that a sustainable development opportunity exists for someone. However, entrepreneurial action also requires the formation of first-person opportunity beliefs, which is the belief that the recognized opportunity can be exploited by the person who discovered it (McMullen & Shepherd, 2006; Shepherd et al., 2008). Both steps are conceptually different. While our model offers an explanation identifying who is more likely to recognize sustainable development opportunities, other variables explain who ultimately becomes a sustainable entrepreneur acting on the recognized opportunities. Scholars who focus on the formation of first-person sustainable opportunity beliefs can draw on the literature on entrepreneurial intention (Krueger, 2000) and entrepreneurial motivation (Shane et al., 2003) to investigate the impact of knowledge, motivation, psychological characteristics, and individuals' perceptions of desirability and feasibility of opportunity exploitation (Krueger). Following our model, scholars may pay particular attention to interactions between explanatory variables.

Secondly, we assume a linear, positive relationship between knowledge or motivation variables and opportunity recognition. We acknowledge that more knowledge or motivation may not always be better for sustainable development opportunity recognition and that (some of) the relationships may be curvilinear with diminishing returns at higher levels of knowledge/motivation. For example, high levels of perceived threat and empathy

may hinder rather than foster opportunity recognition because the distress experienced by highly threatened and empathic individuals can lead them to inaction or focus their attention elsewhere in order to "escape" (e.g., Wood, Saltzberg, Neale, Stone, & Rachmiel, 1990). One possible avenue for future research is to investigate these potential nonlinear relationships in sustainable entrepreneurship.

Thirdly, in this study, we focus on gain for others rather than for the individuals themselves as a motivator to direct attention toward sustainable development opportunities, but personal economic gain is also a known driver of sustainable entrepreneurship (Cohen & Winn, 2007; Dean & McMullen, 2007). It is possible that there will be trade-offs between personal economic gain and economic, environmental, and social gain for others. For example, exploratory work shows that extrinsic motivation can counteract the motivation of corporate employees to engage in sustainable innovation projects (Austin et al., 2006). There is also a likely link to public policy. Government incentives are often offered as a means to motivate entrepreneurs by personal economic gain to discover and exploit opportunities that sustain the natural and communal environments while generating social gains (e.g., Gutermuth, 2000; Lewis & Wiser, 2007). However, empirical research on the effectiveness of such programs is mixed (Martinot, Chaurey, Lew, Moreira, & Wamukonya, 2002; Ruiz, Rodríguez, & Bermann, 2007). Future research can investigate the role of trade-offs between the motivation to develop personal economic gains (and incentives provided by government bodies) and the motivation to help others as well as the contingent relationship motivation has with entrepreneurial knowledge.

Fourthly, there is ample room for scholars to extend the boundaries of our model by integrating additional variables. For example, research could investigate the role of individual networks (Ozgen & Baron, 2007) and cognitive structures (Baron & Ensley, 2006; Krueger, 2007), which are known to influence the recognition of entrepreneurial opportunities in general. Further, the sustainable development literature emphasizes the role of human values to achieve sustainable development (Leiserowitz et al., 2006), and perhaps, these sustainability values explain, in part, the likelihood that individuals will form a third-person opportunity belief, and subsequently, form a first-person belief thus engaging in sustainable entrepreneurial action.

Finally, our model is conceptual and requires empirical testing. The propositions we offer are indeed testable. Researchers can follow prior research in measuring entrepreneurial knowledge (Shane, 2000), and there are approaches to measure individuals' threat perceptions (e.g., Crowson, Debacker, & Thoma, 2006) and altruism (e.g., Batson, Fultz, Schoenrade, & Paduano, 1987), which can be adjusted to the sustainability context.

Conclusion

In conclusion, we suggest that the recognition of opportunities for sustainable development depends on interdependencies between individuals' entrepreneurial knowledge and their knowledge of the natural/communal environment, perceived personal threat, and altruism. Our contingency perspective offers an approach to partly explain these interdependencies, and suggests that the recognition of sustainable development opportunities is perhaps more complex than the recognition of nonsustainable opportunities motivated solely by economic gain for the entrepreneur. It appears that entrepreneurial knowledge plays a key role in recognizing sustainable development opportunities since it enhances the impact of all other motivation/knowledge variables. There is much to learn about sustainable entrepreneurship, and we hope that this article makes a small step toward our increased understanding of this important topic.

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