Thinking "sustainably": The role of intentions, cognitions, and emotions in understanding the new domains of entrepreneurship

By: Norris Krueger, David J. Hansen, Theresa Michl, and Dianne H.B. Welsh

Abstract:

If we are to better understand what it means to think "sustainably," the entrepreneurship literature suggests that entrepreneurial cognition offers us two powerful tools. Human cognition operates with two nearly parallel systems for information processing, intentional and automatic. Entrepreneurial cognition has long focused on how entrepreneurial thinking and action are inherently intentional. Thus, intentions-based approaches are needed to understand how to encourage the identification of actionable sustainable opportunities. But first, however, we need to address key elements of our automatic processing, anchored on deep assumptions and beliefs. In short, if sustainable entrepreneurship is about addressing sustainable opportunities, then before we can take advantage of research into entrepreneurial intentions, we need a better understanding of how we enact our deep mental models of constructs such as "sustainable."

Keywords: sustainable entrepreneurship | cognitive processing | decision making

Chapter:

Why this Matters

Much of what we have learned about how entrepreneurs think and many of the most powerful questions we are now raising about entrepreneurial phenomena can be traced to the explosion of interest in, first, social entrepreneurship and now, sustainable entrepreneurship. This is much more than simply having fascinating and important new domains in which to ply our trade. It is not even that we are looking at newer, more complex business models and processes (e.g., marketers have known forever that value propositions are multifaceted with both economic and social dimensions.)

Rather, social and sustainable entrepreneurship lays bare realities of entrepreneurial cognition that have implications for human decision making in general. Consider Keynes' notion of

"animal spirits" where amidst several hundred pages of dry rational analysis of how economies work, he almost casually notes that rational calculations are hardly a spur to important action. Instead, there is a decidedly a rational and implicitly emotional element (dubbed "animal spirits") that drives humans to act (1935).

As such, is it any surprise that studying emotional engagement and emotional processing is one of entrepreneurship research's most promising directions? Research already makes it clear that we do not need neuroscience to tell us that human cognition entails both rational and emotional appraisal processes. The added complexity is not an extension of simpler, rational-only models, it is the reality of any human decision (Michl, Welpe, Spörrle, & Picot, 2009; Spörrle & Welpe 2009).

Nor do we need neuroscience to tell us that humans operate at a deep, often automatic level in parallel with more mindful, intentional processes. As incredibly fertile entrepreneurial emotions research promises to be for social and sustainable research, it raises even deeper issues essential to a fuller understanding of entrepreneurial thinking. Rational and emotional appraisal occurs in automatic cognitive processes but by definition we are even less mindful of emotional appraisals than we are of seemingly very mindful intentional processing.

Consider a recent experiment where prospective entrepreneurs were asked to envision either a social opportunity or an economic opportunity. In studying opportunity evaluation and anticipated exploitation, emotional engagement was much higher for those who had envisioned a social opportunity (Krueger, Grichnik, & Welpe, 2009). Yet that emotional processing was not visibly mindful. As research by Michl, Welpe, and others has shown, if we are to understand emotional appraisal of entrepreneurial opportunities, then we need to examine both rational and emotional components of cognitive processing (Welpe, Spörrle, Grichnik Michl & Audretsch, forthcoming; Spörrle & Welpe 2006).

And where better to study this dual processing than in social and especially sustainable entrepreneurship? A recurring theme for those of us immersed in social and sustainable entrepreneurship is passion. Social entrepreneurship and sustainable entrepreneurship are difficult to envision as dispassionate, coolly rational phenomena. Entrepreneurship itself seems irretrievably connected in people's minds to passion. However, it is equally clear that entrepreneurial decision making is characterized by both conscious (intentional) and unconscious (automatic) processes.

The focal phenomenon in entrepreneurship is the opportunity, sustainable, social and/or economic (McMullen & Shepherd, 2006; McMullen, Plummer, & Acs, 2007; Shane, 2003). But somebody has to see that opportunity and two very similar individuals can see very different opportunities, dependent on deep anchoring beliefs (Krueger, 2007).

Enacting a bundle of possibilities into a credible target for action requires processes to be both rational and emotional, both intentional and automatic. A fully-rounded understanding of sustainable entrepreneurs (or any entrepreneur) thus requires understanding the answers to two distinct sets of questions:

1. *What* is it that they see? What influences what they see and how they see it?
2. How do they come to *act* upon them? What is the alchemy by which we convert a credible possibility into an actionable reality?

Social entrepreneurship and sustainable entrepreneurship are both awash in a broad array of typologies and taxonomies (Mair & Marti, 2005) leaving scholars and educators alike too often at cross-purposes and talking past one another. This has evoked the early days of entrepreneurship research where too often whatever it was that we studied got defined as "entrepreneurial," just as Winnie the Pooh, et al. decided that whatever it was they were tracking was the ever-elusive "heffalump." Recent research into the definitions of "social entrepreneurship" (Welsh & Krueger, 2009; Bacq & Janssen 2008; Nichols 2006) found a remarkable non-agreement on definitions, yielding quite a wide variety of prospective "heffalumps." However, we see tantalizing evidence that the different "heffalumps" are associated with equally distinctive mental prototypes of "social entrepreneurship" (Krueger & Welsh, 2010, 2011; Welsh & Krueger, 2009; Nichols, 2006).

Fortunately, we can represent these different beliefs parsimoniously by eliciting mental prototypes using simple Venn diagrams. In the second section we explore this. When we ask about defining "social" and "sustainable" entrepreneurship, a common tool for surfacing our implicit definitions (and for provoking significant discussion) is to simply ask for a Venn diagram with two circles: One circle represents "entrepreneurship" per se, the other represents "social entrepreneurship." Depending on how each term is being defined, an author might draw two concentric circles, two overlapping circles or even one single circle. Similarly, we make comparable judgments about the nature of "social" opportunities.

But what happens when we move to sustainability? Two of the authors of this chapter have experimented with this, finding that while terms like "social entrepreneurship" and even "entrepreneurship" itself are used in a dizzying array of situations, "sustainability" offers equally intriguing variety because of corresponding differences in underlying deep beliefs.

Intentional versus Automatic Cognitive Processing

Before we wade into Dr. Venn's contribution to the sciences, we need to set the stage conceptually. Human decision making depends in part on surface phenomena where we too often assume intentionality. While there is much that entrepreneurs, sustainable or otherwise, are actively mindful of when making decisions, interestingly, there is even more cognitive processing that operates well below the level of mindfulness.

Humans possess a large set of "if-then" rules that guide a great deal of our behavior, not just routine activities (Baron, 1998). Many decisions simply derive from a relatively limited set of decision rules based on an equally limited set of very deep anchoring assumptions (Krueger, 2007). Only relatively few human decisions involve mindful processing; even when they do, it is not unusual to find these deep assumptions still in play. In novel situations, our core deep beliefs engage often without our recognition. To put it another way, since we operate under significant bounded rationality, there are many gaps that our minds readily fill – often based on very deeply seated assumptions.

Neuroscientists will even argue that "we" do not decide much of the time, rather our brains decide. Libet, Freeman, and Sutherland (2004) demonstrated that with the right neurological telemetry, the experimenter would know which hand subjects would move … before the subjects themselves "knew." Neuroscience continues to show us that the drivers of our decisions need not be what we think they are, whether the domain is marketing (Cacioppo & Berntson, 1992), economics (Camerer, Loewenstein, & Prelec, 2005), or even entrepreneurship (Stanton et al., 2008; Krueger & Day, 2009).

Obviously, it becomes very important to understand as best we can what deep assumptions lie beneath our intentions. These assumptions represent the critical architecture of how we structure our knowledge [this includes our cognitive scripts, schemas and maps (Krueger, 2007; Mitchell, Mitchell, & Mitchell, 2009)]. But we must also understand our intentional processes as well.

Why does this matter? Opportunities are not independent of the individuals involved; there are real phenomena, real signals that we detect, but the lenses through which we look play an obviously huge role (Shane, 2003). But what are the deep anchoring assumptions that "tune" the lenses so that we see certain opportunities and not others?

This certainly seems to be the next frontier in entrepreneurial intentions research, if not entrepreneurial cognition in general, and we urge the reader to give significant thought to these issues, as we believe this arena will also be fertile ground for research into social and sustainable entrepreneurship.

Mental Prototypes

Mental models can be thought of in terms of the images that arise when you close your eyes and think "entrepreneur" or "social entrepreneur" or "sustainability" or "opportunity." Even people who seem to be in agreement on these terms will often have very different mental models of those terms or mental prototypes. Mental prototypes can be quite "fuzzy," even incomplete, but they almost always are anchored on one or more critical assumption (often unstated or even unrecognized).

Our mental prototypes of "opportunity" and of "entrepreneur" and of "sustainability" differ widely and are almost certainly anchored by these powerful deep assumptions (Krueger, 2007). Recent research finds that the mental prototypes of "social entrepreneur" are remarkably diverse (Krueger & Welsh, 2010, 2011; Welsh & Krueger, 2009). Despite the effort required to surface these deep beliefs, it may be the only way to truly understand these mental prototypes that are so important (Baron & Ensley, 2006). We all have mental prototypes (not just stereotypes per se) of "opportunity" and of "entrepreneur" and of "sustainability." Consider role identity (Krueger, 2009). If someone's mental prototype of "entrepreneur" does not include themselves, for example, it will be much harder for them to become (let alone succeed at) entrepreneurial behaviors (Baron, 2006; Krueger, 2007).

Emotion, Affect, and (Entrepreneurial) Passion?

One unavoidable aspect of addressing deep anchoring assumptions is the role of emotions. Any discussion of entrepreneurial thinking, including entrepreneurial intentions, requires careful, rigorous attention to the important aspects of how our decision making is thoroughly intertwined with rational and emotional appraisal. Bagozzi and colleagues' study of effortful decision-making adds emotional appraisal explicitly to the intentions process (Bagozzi, et al., 2003; Dholakia & Bagozzi, 2002). And is it possible to discuss entrepreneurs without discussing entrepreneurial passion (Cardon, Wincent, Singh, & Drnovsek, 2009)? It seems cliché to suggest that social and sustainable entrepreneurs are even stronger exemplars of entrepreneurial passion. However, equally fascinating research into emotional processing in entrepreneurial decision making is proving essential to understand the processes by which entrepreneurial intentions coalesce, evolve, and are enacted (Michl et al., 2009; Welpe et al., forthcoming).

Non-Compensatory Decision Making

To address these issues, consider two kinds of decision criteria: non-compensatory ("must have") and compensatory ("negotiable"). In purely compensatory decision making, there are always tradeoffs, but in non-compensatory (or lexicographic) decisions, there will be non-negotiable decision criteria. Non-compensatory attributes are often the key anchors for the mental prototype of the most-desired outcome (Fishburn, 1974). Krueger, Kickul, Gundry, Wilson, and Verma (2009) examined the key attributes of intended new ventures and found clear evidence for intentions reflecting two significant lexicographic (non-compensatory) preferences. The two were: Subjects reported strong preference for both "above-average financial performance" and "above-average environmental performance," even lacking further details. On the contrary, subjects reported essentially zero preference for "above-average social performance," suggesting perhaps a much fuzzier mental prototype. This offers an intriguing possibility where studying mental prototypes, especially of "social" and "sustainable" should be fruitful.

If passion or at least highly salient emotional engagement and appraisal are critical to the nature of entrepreneurship itself, then would it not make sense to hypothesize that an individual's mental prototype of "opportunity" would partly reflect what aspects had emotionally engaged them (i.e., their non-compensatory criteria)? In our view, it is too simplistic to say that a mental prototype of "opportunity" is merely something a person is "passionate about." The mechanism, we believe, is more complex: when we identify mental prototypes, one or more of their key elements will reflect emotional engagement at some level which may or may not include passion. Moreover, there is evidence to suggest that entrepreneurs prefer and may even excel at emotion-dependent ("hot") cognitive skills. Consider recent evidence from Cambridge (Lawrence, Clark, Labuzetta, Sahakian, & Vyakarnum, 2008).

In a joint effort by their neuroscience program and their center for entrepreneurial learning, Cambridge University compared matched pairs of serial entrepreneurs and successful managers. On tests of pure "cold" cognition, the two groups both excelled, but on "hot" cognitions (where emotions are closely engaged in decisions) the successful entrepreneurs clearly outperformed the managers (Lawrence et al., 2008). Successful entrepreneurial thinking appears to require expert management of both rational and emotional reasoning. But how does that tie into mental prototypes?

Consider recent research that looked at differentiating how potential entrepreneurs appraise opportunities rationally and emotionally as intentions evolve from identification, evaluation, and exploitation with one salient difference in the subjects' evoked mental prototypes of an envisioned opportunity (Krueger & Welpe, 2008; Krueger et al., 2009). Subjects were induced to envision an opportunity that was either anchored as yielding either above-average economic returns or above-average social returns. Both the cognitive and emotional appraisal of opportunity identification, evaluation, and exploitation differed for the social dimension of an intended opportunity from the appraisal of the economic dimension. But the economic dimension appears to engage primarily rational ("cold") cognition while appraisal of the social dimension appears to engage both emotional ("hot") and rational cognition (Krueger, Grichnik & Welpe, 2009). Additional studies are needed to delve more deeply into the key anchoring beliefs that trigger (or inhibit?) emotional appraisal.

In sum, whether scholar, educator, or public stereotype, we associate entrepreneurial activity with highly salient emotional engagement. Fortunately, emotional (not just rational) cognitive appraisal in entrepreneurs is a relatively newer research area of immense promise (Michl et al., 2009; Welpe et al., forthcoming).

"Drawing" on Our Definitions: The Venn Diagram Exercise

The growing body of research linking mental prototypes to emotional engagement makes the use of Venn diagrams to explore feelings and beliefs much more than metaphor. Consider the following exercise: When we ask people to draw a Venn diagram with three circles – "Entrepreneurship," "Social Entrepreneurship," and "Sustainable Entrepreneurship" – we get similar patterns that make interesting fodder for discussion. If instead we ask people to draw a Venn diagram but this time labeling them as "Economic," "Social," and "Environmental" to represent strategic issues, we get something interesting. The responses almost always are drawn as three overlapping circles. We then ask the respondents to color in the "sustainable opportunities." Suddenly, the patterns cluster around two very different diagrams. Either they perceive "sustainable" as the intersection of the three or they focus solely on the environmental dimension. This dichotomy maps rather nicely on the reality that most people define "sustainable" in those two directions.

The Venn diagram exercise is a simple way to surface these deep anchoring beliefs. We also think this is a versatile and powerful tool for research, teaching, and communicating with diverse audiences. While discrete choice analysis can identify non-compensatory decision criteria (as done by Krueger et al., 2007), it requires identifying the candidate criteria to assess. The Venn diagram approach might be a useful exploratory tool to do so. Also, the Venn diagram approach is an excellent tool for the classroom. Appendix 1 contains a more detailed description of how one of the authors uses this simple, yet potent tool to provoke discussion quickly at a very deep level of analysis. However, we believe that this "fun little exercise" opens the door to some important new research questions that speak not only to "sustainable entrepreneurship" and "social entrepreneurship" but also to entrepreneurship in general.

Consider Dr. Venn's infamous creation and how we can use it to advance our understanding of how to think sustainably. Look at the results of the simpler version of the above exercise, that is,

the one where we ask, "Create a Venn diagram where one circle is 'Entrepreneurship' and the other is 'Social Entrepreneurship.'" Does that Venn diagram look like Fig. 1? (That is a frequent response, the most common among neophytes.)
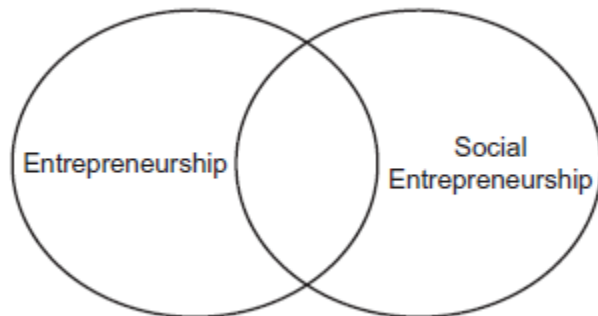
Fig. 1. Innocent Exercise.

Fig. 2(a) represents another common response – that social entrepreneurship is a subset of the broader phenomenon of entrepreneurship. Both Fig. 2(a) and Fig. 1 are common responses. (One rare occasions, respondents visualize them as separate, non-overlapping circles.) Think for a moment about the differing assumptions behind these different mental models. This is a nice shorthand mechanism to categorize mental prototypes for terms such as "entrepreneur," "social entrepreneur," and "opportunity." As we will see, when we extend this exercise to "sustainable entrepreneurship", we begin to see the power and utility of this approach.
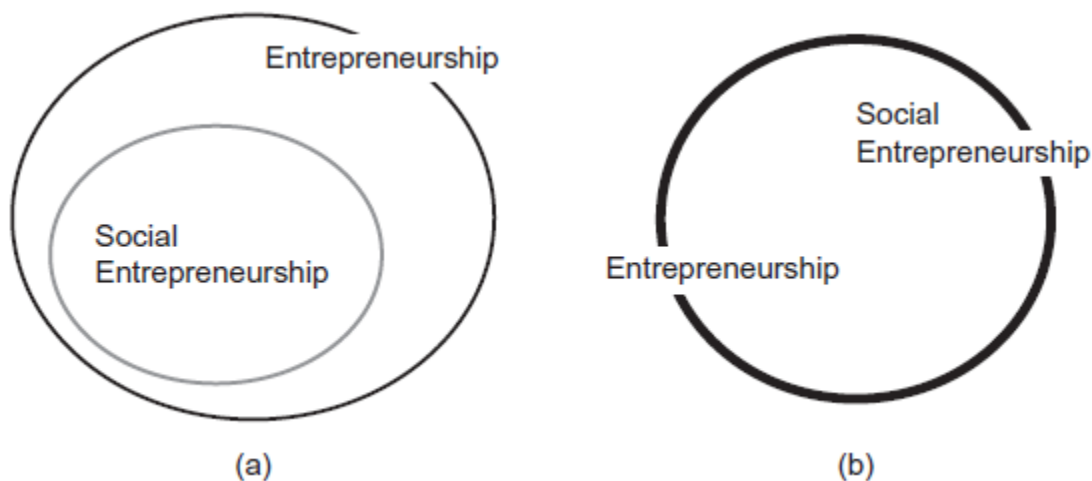

Fig. 2. (a) "Social" Opportunities Defined as Requiring Both; (b) "Social" Opportunities Defined as Purely Social

The most interesting case, though, is represented by Fig. 2(b). This representation reflects that individual's belief that "entrepreneur" and "social entrepreneur" are essentially the same construct. What makes this particularly interesting is that anecdotally we see many prominent social entrepreneurs hold this view, as do leading "economic" entrepreneurs that a great entrepreneur thinks like a social entrepreneur (Drayton, 2002). We believe this suggests that this Venn diagram exercise could be the basis of significant research efforts, not just an interesting fodder for conversation.

Mental Prototypes: "Social," "Economic," and "Sustainable"

Consider now Figs. 3(a) and (b). What is a "social" opportunity? Is it an opportunity with both expected social returns and expected economic returns (begging the question, of course, of how we conceptualize "returns")? Fig. 3(a) reflects that social opportunities do require both, hence the intersection. However, it would not be surprising if one might conceive of a social opportunity as including those possibilities with expected positive social returns, regardless of economic considerations. Fig. 3(b) reflects that mental model. A social opportunity could be profitable, but need not be.
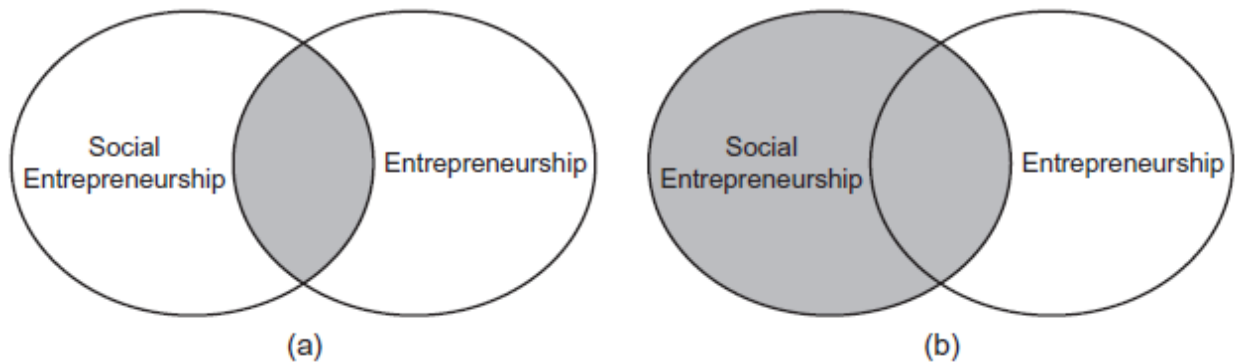
Fig. 3. (a) "Social" Entrepreneurship Is a Subset of Entrepreneurship; (b) Essentially Equivalent.

When we add sustainability to the mix, we see diverging mental models even more strongly. Whether in scholarly presentations or the classroom or even casual conversation, it is all too easy to assume that everyone defines "sustainable" differently. For those familiar with the triple bottom line model of sustainability, when it is assumed a venture should be environmentally sustainable, socially sustainable, and economically sustainable, it can be a shock to realize that a significant number of individuals either emphasize the double bottom line (Fig. 4(a)) or even consider only environmental performance to the exclusion of other considerations. But that is what our experiments have revealed. The triple bottom line model (Fig. 4(b)) adds more than just another circle; it adds a layer of complexity in how respondents mentally model the phenomena.
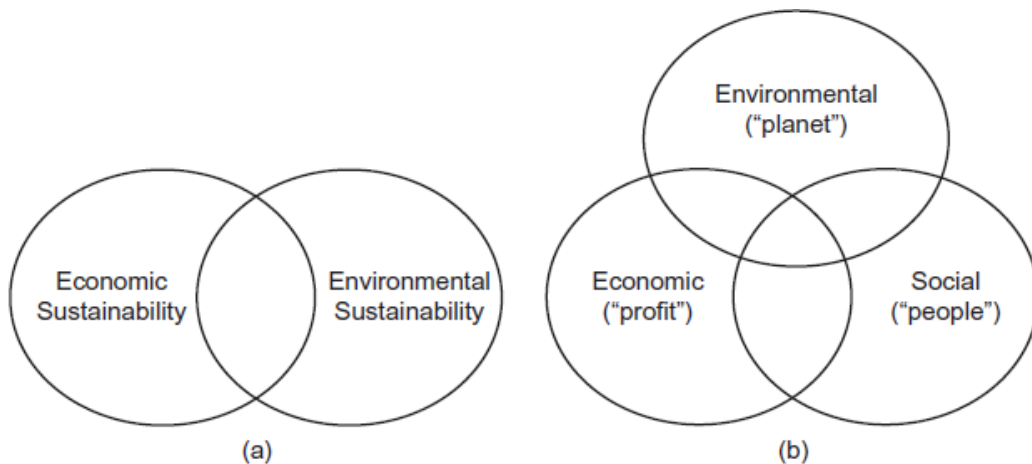
Fig. 4. (a) Double Bottom line; (b) Triple Bottom line Model of Sustainability.

Evidence of Non-Compensatory Decision Criteria?

The Krueger et al. (2007) data reported above suggests that subjects clearly favored the double bottom line model with both economic and environmental performance as "must have" criteria, as illustrated in Fig. 5.
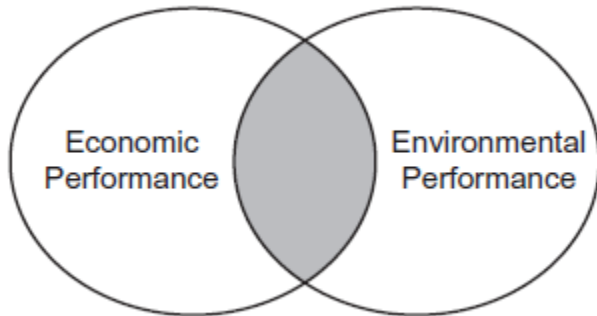
Fig. 5. Economic and Green Performance Required.
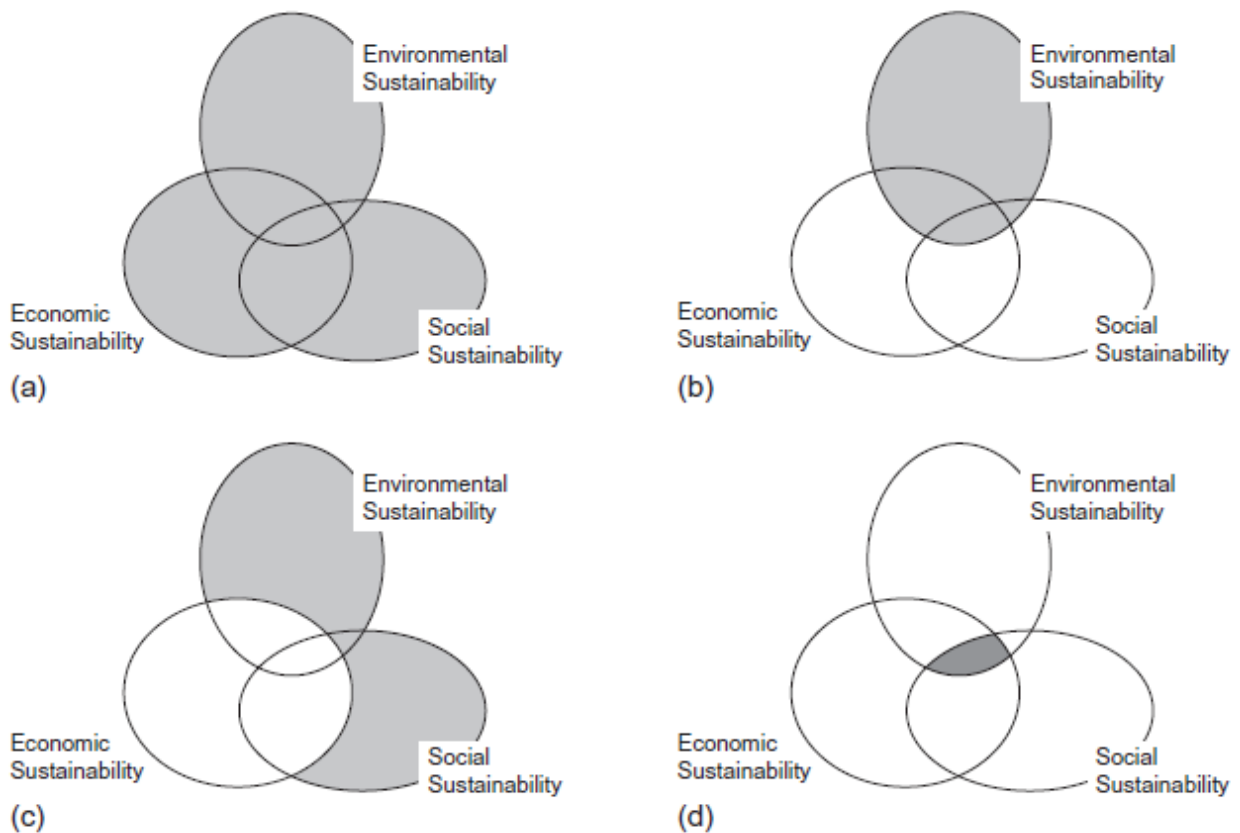
Fig. 6. (a) Inducive Model of "Sustainability"; (b) Green-Only Model of "Sustainability"; (c) "Activist" Model of "Sustainability"; (d) ''True'' Triple Bottom Line ("Sustainability" Narrowly Defined).

However, as a diagnostic tool, the triple bottom line model yields more complex Venn diagrams that are also potentially more illustrative. Consider Fig. 6. Fig. 6(a) reflects a very inclusive model of a "sustainable" opportunity, that is, if it is an opportunity on any dimension, then it is sustainable. But Fig. 6(b) reflects the belief that "sustainable" relates only to environmental performance. As long as it is "green," it falls into the evoked set of opportunities. Fig. 6(c) reflects what we might call the "social activist" mindset where as long as it creates expected social returns or environmental returns, it can ignore the economic dimension. Finally, Fig. 6(d) reflects the classic triple bottom line model of sustainability: All three dimensions have to be positive.

Embellishing the Venn Diagram

In using the Venn diagram exercise, we also see that individuals will occasionally change the shape of the circles or ellipses, making one much larger than the other. In the case of the three circles, it is sometimes easy to see the relative importance or salience of a particular dimension.

Sometimes after some discussion, respondents have redrawn their diagram and made fuzzy borders, whether the circles themselves are drawn fuzzily or they are shaded-in. Another common response is to request a way to differentiate between positive rents and negative rents. That's because there seems to always be respondents who believe it is one thing to be green and break even, and quite another to be green and lose money. These additional embellishments we leave to our colleagues to explore.

Bratman (1987) argued that intent was a function of both choice and commitment, where it was likely that we were only mindful of one and not mindful of the other. As such, to understand sustainable entrepreneurial thinking, we need to understand both conscious and unconscious cognitive processes. Thus we next turn from the automatic processing side of thinking sustainably to the intentional. As above, our focus is to apply a cognition-based approach (mostly based on lessons from the intentions model) to how to encourage identification, evaluation, and exploitation of sustainable opportunities.

**From Perceived Opportunity to Action? The Role of Intentions**

In attempting to understand what it means to think "sustainably," assessing perceptions of opportunity is not enough. As researchers, we also need to focus on actionable opportunities and that leads us inevitably to the need to understand behavioral intentions as applied in this setting. Although the "entrepreneurial mind" offers multiple avenues for examination, entrepreneurship research has focused extensively on intentions (e.g., Carsrud & Brännback, 2009; Gregoire et al., 2009; Krueger & Day, 2010), the study of entrepreneurial intentions is extensive and still growing and it seems apt for us to apply its implications to sustainable entrepreneurial intent and, ultimately, sustainable entrepreneurial action.

The Nature of "Sustainable" Opportunity and Intent: Theory and Evidence

Acting on an opportunity requires that someone first *see* that opportunity. However, seeing opportunities can be more complex than simply having good "eyesight." Entrepreneurial

thinking requires a cognitive focus on seeking opportunities and their concomitant risks (in contrast to bureaucratic thinking that emphasizes avoiding threats). Entrepreneurial thinking thus entails a greater tolerance for uncertainty and ambiguity to focus on possibilities.

Fortunately, the dominant model of behavioral intentions, Ajzen's Theory of Planned Behavior (1987, 1991; Fig. 7) already gives us one potent set of critical antecedents of entrepreneurial thinking: A potential opportunity must be perceived as both desirable and feasible. This is just as true for sustainable opportunities. A key policy implication flows from this understanding: How can we reform institutional arrangements to nurture those green ends that result from entrepreneurial actions? How can we nurture individuals' perceptions that environment-friendly opportunities are both desirable and feasible? (And in a world inherently characterized by multi-criteria decision making, it also begs the question of what **is** "desirable" and what is "feasible").
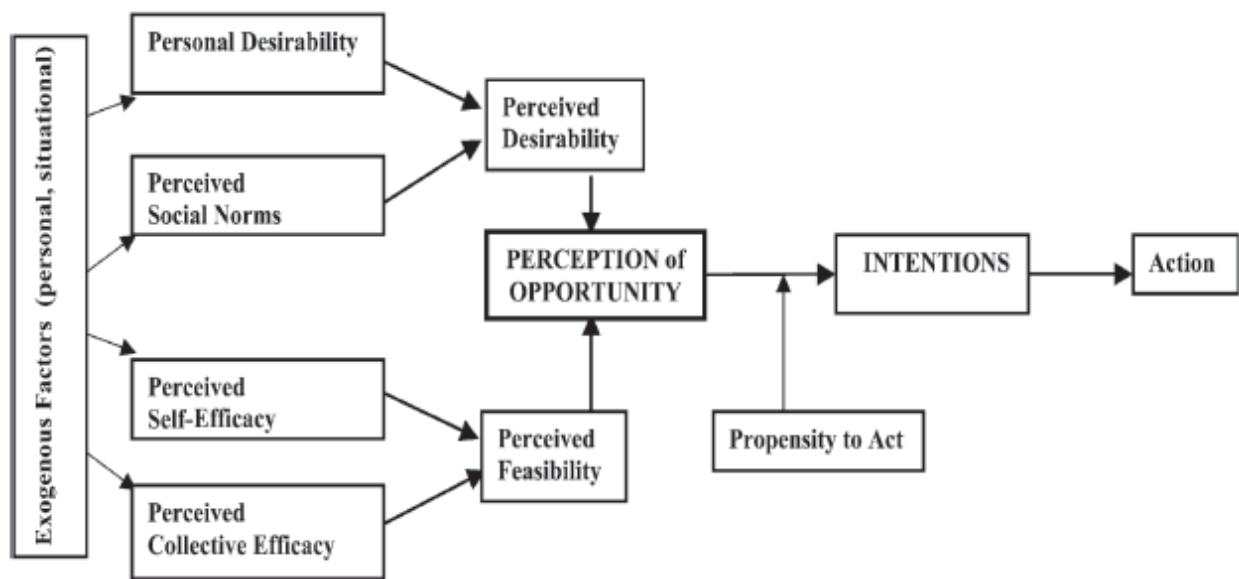
Fig. 7. Intentions Model. *Sources*: Shapero and Sokol (1982); Krueger and Brazeal (1994); Krueger (2000); Krueger et al. (2000).

Entrepreneurial Action Requires Entrepreneurial Actors

The ability to capitalize on such as-yet-unseen opportunities is rarely more crucial than when a local economy is facing significant structural changes. Demands for greater "sustainability" are especially important today in an atmosphere of constrained natural resources, rampant population growth, and uncertain climate conditions. Not only do such forces demand attention to sustainability issues, the kinds of changes needed to address them could be disruptive to the equilibrium of business systems.

Joseph Schumpeter described these changes as the "gales of creative destruction" that transform an economy, destroying traditional opportunities while creating new possibilities in different fields. But in the ensuing creative construction, the world now demands greater sustainability, making it even more important to understand not only what we mean by "sustainability" but also how do we precipitate and facilitate action.

But first somebody still has to identify these newer opportunities and evaluate them as having reasonable chances of success (Bratman, 1987; DeCarolis & Saparito, 2006; McMullen & Shepherd, 2006; McMullen et al., 2007; Shane, 2003). Again, entrepreneurial thinking involves seeing opportunities, not threats. In short, before we can benefit from entrepreneurial opportunities, we must first have entrepreneurs to perceive those opportunities. Moreover, how do we help prospective entrepreneurs to perceive sustainable opportunities?

Key Correlates of Intent: How Do We Learn to See Opportunities?

We know from prior research the critical components of opportunity and intent. Broadly speaking, when we perceive a course of action as representing an opportunity, we also perceive that the outcomes of that action are (on balance) desirable and that these desirable outcomes are also feasible. Perceptions of feasibility depend, unsurprisingly, on perceptions that we have or can acquire the requisite skills. Perceptions of desirability reflect both our perceptions that likely outcomes are personally beneficial and reflect perception of desirability to key stakeholders in the decision: "significant others," friends, family, neighbors, and other key stakeholders. Obviously, but importantly, "desirable" and "feasible" need not include financial considerations; it is easy to envision non-economic criteria as influential in predicting the perception of an opportunity.

How Do We Perceive Sustainable Opportunities?

In Krueger and Brazeal's words (1994), entrepreneurial potential requires potential entrepreneurs To be effective, an organization with a strong orientation toward seeing opportunities must have individual organization members who have that orientation toward opportunities. Intentions are at the heart of this. Intentionality is deeply ingrained in how we process information into action (Ajzen, 1991; Bratman, 1987). Any planned behavior is intentional by definition, thus it becomes useful to understand that intentions associated with sustainable entrepreneurship depend on a handful of critical antecedents.

Again, *being* more entrepreneurial requires first *seeing* more opportunities. Before acting on opportunities, entrepreneurs must first see the opportunities. Seeing more possible opportunities increases the chances of finding appropriate ones to pursue. Thus, it is vital to understand how we perceive opportunities. This helps us understand how we can support (or avoid inhibiting) the perception of sustainable opportunities (Krueger, 1998, 2005).

In sum, the class of intentions models based on Ajzen's Theory of Planned Behavior (Fig. 7) appear useful and potentially enlightening in diagnosis: How do we understand and how do we increase the potential for identifying sustainable opportunities and acting on sustainable opportunities?

The Nature of Intentionality

Innovation usually entails taking significant action. Absent intention, action is unlikely. Intentions represent the belief that "I will perform a certain behavior," the belief "I will act."

Logically, intent thus precedes action. Action requires effort; if we are to try, we must first intend to try. We all have mental models of what we intend to do (and, by extension, what we do not intend). At a deeper level, these mental models reflect why we intend a given action. If we can better understand why we perceive a new environmental technology as an opportunity, we can better understand how to encourage it.

The theoretical underpinnings for intentions models are reviewed in (Ajzen, 1987, Ajzen & Fishbein, 2005). Ajzen argues persuasively that intentions-based models capture how individuals actually think. Even routine behaviors are anchored by intentions; the intentionality is simply more deeply placed. The process depicted in Fig. 7 shows how the intentions framework serves as a conduit to channel our interpretations of events into action. This implies that intentions are constructed, even where they appear to arise spontaneously. [As discussed earlier, however, the actual drivers of intent may be anchored quite deeply. Our mental prototypes of what constitutes (or not) an opportunity or a sustainable opportunity can have a significant impact on how the intentions process plays out.]

The latest version of the framework, Ajzen's "theory of planned behavior" (Ajzen, 1991; Ajzen & Fishbein, 2005; Kolvereid, 1996) posits that intentions toward a given target behavior depend on certain fundamental underlying attitudes. These specific attitudes reflect decision makers' attributions about a potential course of action. Decision makers should perceive the course of action as (a) within their competence and control (thus feasible), as (b) personally desirable, and (c) consonant with social norms. Barriers to any of the critical antecedents will represent a substantive inhibition to an organization's intent to seek and act on opportunities. If we inhibit the intent, we inhibit the action.

Let us look at the critical variables associated with intent and, by extension, opportunity perception. Where possible, we look at this in terms of sustainable opportunities. Ajzen's (1991) theory of planned behavior and independently developed rival models (Shapero & Sokol, 1982; Davidsson, 1991) argues that perceptions of desirability and feasibility explain (and predict) intentions significantly. Intentions are driven by perceptions that outcomes from the behavior are personally desirable and that they are socially desirable. Fig. 7 shows that intentions toward adopting a sustainable opportunity are best predicted by three critical perceptions: that the innovative activity is perceived as (a) personally desirable, (b) supported by social norms, and (c) feasible.

Demonstrated Antecedents of Intentions

Perceived Desirability: Personal Attitude

Under Ajzen's Theory of Planned Behavior (1991), personal attitude depends on perceptions of the consequences of outcomes from performing the target behavior: their likelihood as well as magnitude, negative consequences as well as positive, and especially intrinsic rewards as well as extrinsic (in short, an expectancy framework). However, the model also argues that these perceptions are learned. Thus, organizations and communities influence those perceptions, often indirectly and often unintentionally. Consider the successful sustainable innovator who is

"rewarded" by a promotion from R&D into management, something perceived as a mixed blessing at best.

Researchers such as Ajzen (1991) can argue that to make the course of action more personally desirable (make the attitude antecedent more positive), we must either increase expectancies by raising perceptions of positive outcomes (or their likelihood) or lowering perceptions of negative events (or their likelihood). If we think back to mental prototypes, our perceptions of what is "sustainable" and "entrepreneurial" may well be incomplete at best and quite possibly distorted; the careers literature has long noted this (Lent, Brown, & Hackett, 1994). Two remedies particularly applicable in entrepreneurial settings are (a) to provide direct exposure to multiple perspectives (e.g., multiple mentors as in the TechStars, Founders Institute, or Y-Combinator models) that frequently work with green entrepreneurs or (b) to provide prospective entrepreneurs with diverse life experiences, especially in different types of sustainable ventures. These help individuals to recognize a broader range of desirable options (McCall, et al., 1988; Krueger, 2007, 2009).

Perceived Desirability: Social Norms

In studying entrepreneurial intentions, social norms represent perhaps the most interesting component of the Theory of Planned Behavior. This measure is a function of perceived normative beliefs of significant others (e.g., family, friends, co-workers) weighted by one's motive to comply with each normative belief. Human decision making is unavoidably embedded in one or more social contexts, thus social norms often reflect the influence of community or organizational culture. That is, the impact of climate and culture on intent operates by its impact on perceptions of desirability (and perhaps feasibility as well). However, these influences need not be obvious to the individual.

In a community or organization, social norms can influence significantly what is (or is not) seen as an opportunity. T. Bryant and Bryant (1998) describe how/when social norms associated with environmental dimensions change in a community, in turn that changes the range of what might to be seen as an opportunity. Measuring social norms does require identifying the appropriate reference groups. The reference group for a potential sustainable entrepreneur need not be family and friends, rather the perceived beliefs of top management and their colleagues (including those who have already started a "green" venture). Note the recent work of Carsrud, Brännback, Krueger, and Kickul (2007) and Stephan, Huysentruy, and Van Looy (2010) that demonstrate multiple social influences on intent.

Consider the notion of "entrepreneurial orientation" (Covin & Slevin, 1991) that both reflect and serve social and cultural norms within organizations. An entrepreneurial orientation seems useful in supporting an entrepreneurial strategic intent. We have an increasing understanding of what comprises the dimensions of entrepreneurial orientation (Lumpkin & Dess, 1996), but we need to know more about its antecedents in specific settings such as sustainable opportunities (Lumpkin, 2010; Lumpkin, Moss, Gras, Kato, & Amezcua, forthcoming). Moreover, imagine an organization whose role identity is being very entrepreneurial (perceived high EO) in traditional product-markets but the opposite in "green" product-markets. That organization is facilitating a mental prototype of "opportunity" that may include only economic criteria.

Perceptions of Feasibility: Self-Efficacy

Albert Bandura and associates developed and elaborated a social-cognitive model of human agency that demonstrates considerable predictive power (e.g., Bandura, 1986). Bandura's model argues that taking action requires consideration of not just outcome expectancies (i.e., desirability) but also perceived self-efficacy (i.e., feasibility) and is particularly critical with significant strategic change (e.g., a new venture into a range of environmentally friendly products). Bandura defines self-efficacy as an individual's perceived ability to execute a given target behavior, thus reflecting the belief in a personal capability to perform a particular job or set of tasks.

Self-efficacy perceptions play a powerful role in managerial and employee behavior. For instance, gender and ethnicity differences in work interest and performance can often be traced to differences in self-efficacy, supporting self-efficacy's role in the empowerment of organization members (Lent et al., 1994). We also see cultural differences (Bandura, 1986). High self-efficacy leads to increased initiative-taking and persistence and thus subsequent performance; low self-efficacy reduces effort and thus performance (Eden, 1992).

Increasing self-efficacy requires more than just teaching competencies; students and trainees must fully internalize the competencies. Also, psychological and emotional support from management and peers reinforces perceptions of increased self-efficacy. A common mechanism is to provide credible models of key behaviors through effective mentors and champions.

Even better are developmental experiences that provide opportunities to experience mastery of those competencies (McCall, Lombardo, & Morrison, 1988; Senge, 1992). Exposure to diverse life and work experiences broadens individuals' range of what they perceive as feasible. Providing opportunities for diverse mastery experiences are even better able to increase individuals' evoked set of feasible alternatives, such as for sustainable opportunities.

Perceptions of Feasibility: Collective Efficacy

However, perceiving personal competence need not translate into perceiving group-level competence. If fellow organization members are needed to support an intended action, perceptions of collective efficacy are likely to be important (Bandura, 1986). This is crucial: Organization or community members may be perfectly capable of finding and promoting new opportunities and their self-efficacy beliefs may be high. Yet, low levels of perceived collective efficacy can and will inhibit opportunity seeking (Shepherd & Krueger, 2002). Just as perceived desirability has both personal and social aspects, empowering organization members to seek more sustainable opportunities thus rests on beliefs about both personal and collective efficacy.

Person and Situation

Personal and situational influences affect intent only by affecting these critical antecedents. For example, role models can help promote the identification of an environmentally friendly

opportunity, but only if they influence perceptions of desirability or, more likely, perceptions of feasibility, such as by modeling the key behavior both visibly and credibly.

Intent into Action: Precipitating Factors

As Fig. 7 suggests, external factors may also influence the intention–behavior relationship by precipitating or facilitating the realization of intentions (Shapero & Sokol, 1982; Ajzen, 1991). One such factor may be a personal propensity to act on sustainable opportunities as argued by Shapero (Shapero & Sokol, 1982).

However, Shapero also noted that for an intent to be translated into action (what he dubbed the "entrepreneurial event"); it often required a trigger, either the removal of a barrier or the presence of a facilitating factor. While tangible barriers may serve to prevent an intention from coming to fruition, cognitive barriers can present even greater obstacles. External conditions may lie beyond what an organization can influence, but organizations can provide explicit, credible cues that the new circumstances represent an opportunity for a sustainability-increasing action. Precipitating factors are not well understood in entrepreneurship and essentially unexplored in social and sustainable entrepreneurship, so research in this area is apt to shed some particularly important new light.

The robust empirical track record of intentions models and their firm theoretical grounding both argue that we do have a sound grasp of the critical components of opportunity perception. We also know how to overcome inhibitions to opportunity perception by influencing these critical antecedents. The perception driven nature of intentions implies that a healthy cognitive infrastructure will change as circumstances (and our perceptions) change. Thus, there are no specific universal prescriptions. Instead we must continually maintain a healthy cognitive infrastructure by keeping a close eye on the perceptions of organization members. An organization that wishes to innovate must accept that it needs to both empower its members and minimize activities that inhibit sustainable opportunity-seeking. Intentions models thus appear highly applicable to sustainable entrepreneurship just as they are to entrepreneurial behaviors in general, with the same strengths and the same limitations.

Fostering Sustainable Entrepreneurial Intent: Supportive Cognitive Infrastructure

Shapero and others (Shapero & Sokol, 1982; Krueger & Brazeal, 1994; Krueger, 2000) argue that to maintain a reasonable supply of opportunity-seeking individuals requires that organizations (and communities) provide a congenial environment, as seen from the perspective of prospective opportunity seekers. For potential opportunity seekers to enact an organizational environment that is personally favorable that will usually require a learning-supportive cognitive infrastructure. How do we help individuals to perceive more sustainable opportunities as both desirable and feasible?

Shapero proposed that communities and organizations seeking to innovate should provide what he called a "nutrient-rich" environment for potential entrepreneurs. This "seedbed" would provide intangible "nutrients" such as credible information, credible role models, visible social norms, and emotional/psychological support as well as more tangible resources. McGrath

(1995) points out that organizations need to support its members in learning from adversity. Organizations should provide opportunities to attempt innovative strategies at relatively low risk (i.e., trying and failing is not career-threatening).

Consider the useful metaphor of the antenna. We are much more likely to notice (and take seriously) signals from directions in which we are already looking. Intentions contribute to how an organization's antennae are "tuned." We are less likely to notice opportunities from directions that do not appear desirable and feasible. Increasing the perceived desirability and feasibility of sustainable opportunities should "tune" the antenna in that direction.

On the contrary, any sort of entrepreneurial activity (especially where disruptive of existing products and markets) will generally lack legitimacy with the rest of the organization (e.g., Brazeal, 1993). Organizations thus need to set explicit, credible organizational policies that increase both the perceived feasibility and the perceived desirability of this sustainable activity. For example, SGS Thomson now mandates that all its suppliers must comply with strict environmental guidelines such as in packaging – but they also teach their suppliers how to achieve this.

However, an objectively supportive infrastructure is not enough; organization members must perceive it as truly supportive. Entrepreneurial organizations appear to provide this kind of supportive cognitive infrastructure (Krueger & Brazeal, 1994). We propose that those organizations actively pursuing sustainable innovations are likely to provide a more supportive cognitive infrastructure.

Returning to the antenna metaphor, organization members are obviously more likely to respond to highly credible cues. Increasing the credibility of cues that encourage the pursuit of sustainable opportunities may require the perception of signals from more credible sources such as top management, a visible champion, or a trusted mentor. The cognitive infrastructure should enhance perceptions in organization members that a sustainable opportunity is personally and socially desirable and that members are personally and collectively competent to pursue sustainable opportunities. Such a cognitive infrastructure would provide the empowerment needed to promote more proactive seeking of sustainable opportunities.

(a) *Increasing feasibility perceptions*: To promote feasibility perceptions about sustainable opportunities, we need to increase perceptions of personal ("I can do this") and collective ("We can do this") efficacy. Perceived feasibility entails perceptions that resources are available and obstacles are surmountable (including the obstacle of having tried and failed). Fortunately, promoting perceived efficacy is relatively straightforward and reasonably well understood; we already know how to do this (Bandura, 1986; Eden, 1992). Organizations and communities need to be vigilant in providing the necessary explicit cues and explicit support. As already noted, providing mastery experiences that increase perceptions of personal (and collective) efficacy is invaluable. For example, providing experiences that demonstrate mastery in even a limited domain can increase efficacy perceptions, if the individuals perceive their mastery as generalizable ("If I can implement a small process improvement that reduces environmental damage, I can improve the whole production process"). This, of course, requires that somebody actively provides the salient, credible cues that the skills are transferable to newer, larger

domains (e.g., Weick, 1979). One mechanism is benchmarking. Benchmarking to a successful environmental innovator offers concrete evidence that this opportunity is visibly feasible.

(b) *Increasing desirability perceptions*: However, desirability perceptions may require more complicated interventions. Increasing perceived desirability requires that individuals perceive mostly positive outcomes for their innovative activity, including intrinsic rewards such as a supportive culture. Again, objectively supportive reward systems need not be perceived as such by the person rewarded. Supportive formal rewards can be trumped by informal punishments (Brazeal, 1993).

Innovation is often its own reward. Extrinsic rewards can interfere with intrinsic motivation. (Some innovators even enjoy being "illegitimate.") Also, the most skillfully designed formal reward system may be overridden by informal punishments. It is thus important to investigate the set of rewards (and punishments), both intrinsic and extrinsic, both formal and informal for organizations with different capacities for supporting the pursuit of sustainable opportunities. Reward systems should be viewed from the perspective of potential innovators, not those far removed from the trenches.

Enhancing the Identification of Sustainable Opportunities: Implications for Practitioners

The literature offers some interesting prescriptions that will be considered: clear signals from top management, the role of teams, the role of mentors and champions (including multiple mentors), and providing explicit developmental experiences.

   a) *Explicit cues*: One of the most common recommendations one finds is that top management give clear, unambiguous signals of support for key elements of innovative activity (Senge, 1992; Hamel & Prahalad, 1994). For instance, senior management should visibly encourage the risk taking associated with the pursuit of new opportunities with clear cues that setbacks can be learning experiences (Shapero & Sokol, 1982). Many are familiar with the legendary Jack Welch of GE who described his role as a cheerleader and facilitator. Welch clearly seemed bent on promoting the perceived desirability of seeking new opportunities and promoting perceptions of feasibility, removing cognitive as well as more tangible barriers. Also, we already noted the case of SGS Thomson who made it clear that suppliers must comply with higher environmental standards, but will coach them.
   b) *Strategic controls*: Although it may seem contrary to the spirit of entrepreneurship, bureaucratic mechanisms can also help. Greer and van Loben Sels (1997) show how a seemingly benign budgeting system blocked a completely feasible reduction of pollution. Organizations' control mechanisms exert considerable influence over the intensity of R&D spending in general: Long-term strategic controls help much more than short-term financial controls. (Obviously, it can influence its direction as well.) Long-term controls can reward opportunity seeking while short-term controls inadvertently punish short-term setbacks. Consider the Enter-Prize Program at Ohio Bell (Kanter, 1985) that allows fledgling intrapreneurs to test the waters. This program encourages employees to develop "newstreams" of new products or services that will compete for funding by top management. If the "newstream" proves successful, its developers participate in the

profits, sending the clear message that Ohio Bell values both innovation and innovators and that innovation is both feasible and desirable. The strategic controls reward success at opportunity seeking, but do not punish those whose sincere efforts were unsuccessful.

c) *Benchmarking and best practices*: Increasing the visibility of what is truly feasible is central to benchmarking, but it also increases the credibility of what is feasible and builds motivation to achieve it: "If a competent competitor can do this, so can we." Thus, the credible example of a competitor's success may also increase the desirability of new sustainable opportunities.

d) *Teams*: Teams represent an especially useful means for promoting perceptions of feasibility and desirability. Objectively, teams provide tangible resources for innovation. Teams also provide the multiple perspectives and schemata offered by different team members, thus teams, not "lone wolves," are the best source of feasible ideas. Teams also provide a cognitive and emotional buffer from the rest of the organization. In the extreme, organizations have chosen to physically separate innovative groups from the rest of the organization (e.g., Lockheed's "skunkworks"® concept). Rainey (2006) argues that this temporary "out of sight, out of mind" separation can not only help incubate sustainable business practices but also help cultivate other strategic innovations. Such separation has symbolic implications for reducing barriers to many kinds of innovative activity.

The social reinforcement of one's team can promote perceptions of collective efficacy and supportive social norms without the perception of negative reinforcements by the bureaucracy. Encouragement and support from team members can also promote perceptions of personal desirability and of personal efficacy. In a study of entrepreneurial recycling coordinators, Lounsbury (1998) offers the example of how one's social network can serve the same function. Most important, a well-constructed team is best suited to help innovators actually implement an idea. A supportive team does not ask: "*Can* we do this?" Rather, it asks: "*How* do we do this?" The diversity of perspectives in a good team helps raise perceptions of feasibility – by defusing perceived negatives that might arise from the environment-friendly innovation.

e) *Mentors and champions*: Mentoring is often promoted as vital for management development in general and for innovation development specifically. One specific variation on the mentoring process is the concept of "champions" or "change masters"; another common prescription for promoting innovative activity involves internal ventures (Brazeal, 1993, Kanter, 1985). The existence of a "champion," someone who will fight for a new sustainable opportunity, sends a clear signal that the organization at least tolerates the pursuit of new opportunities. That signal alone should increase perceptions of supportive social norms. However, mentors and roles affect intentions only insofar as they first affect key attitudes such as self-efficacy. We should expect that a skillful champion would contribute to stronger perceptions among organization members of a sustainable innovation's desirability and feasibility.

f) *Multiple mentors*: In the world of Academe, there is often a norm of multiple mentors. Multiple mentors can provide multiple perspectives and multiple schemata that should broaden protégés' perceptions of desirability and feasibility. Lounsbury (1998) found that the breadth of network members enhanced opportunity perception despite the embryonic nature of the recycling industry. Multiple influences (particularly those that enhance self-

efficacy) are also associated with entrepreneurship (Krueger & Brazeal, 1994). The multiple mentors should include one or more successful innovators. As in Academe, multiple mentors are likely to cross functional boundaries and even organizational boundaries. Successful innovators typically engage in considerable boundary-spanning, proactively seeking such multiple influences (Shapero & Sokol, 1982). An organization may wish to tangibly and visibly encourage successful innovators to mentor others. For example, recent evidence suggests that successful innovators are committed to both their profession and to their organization. "Serving two masters" is often associated with higher performance, contrary to the social norms of many organizations.

g) *Developmental experiences*: Any organization can profit by providing its members with a diverse range of developmental experiences (McCall et al., 1988). Experiences can provide explicit cues that the organization supports sustainable opportunities and members can internalize those into appropriate attitudes and intentions. The more we expose members of an organization to deeper, broader understanding of sustainable issues, the more likely they are to perceive sustainable opportunities as feasible and desirable (and more likely to enact them). Hands-on mastery experience is particularly valuable (Bandura, 1986; Senge, 1992).

Moreover, if we promote the ability of organization members to identify a broader range of alternatives as desirable and feasible that will give them an increased ability to learn new mental models. This ability to learn offers value beyond any particular innovation in question, helping organization members perceive the ability to learn and implement new competencies (Senge, 1992). Organizations should consider such development as an integral part of their strategy (McCall et al., 1988) and thus provide the right kind of cognitive infrastructure to encourage the seeking of sustainable opportunities.

h) *Supportive cognitive infrastructure*: If we accept the Theory of Planned Behavior model, the most obvious implication is that enhancing its components should pay off in a higher level of entrepreneurial intent, thus entrepreneurial activity. This should be true both in general and in specifically (e.g., environmental). Organizations and communities must develop a cognitive infrastructure among their members that is friendly toward seeing sustainable opportunities that are actionable, one that increases and broadens what members see as desirable and perceive as feasible. The model can also be used to diagnose potential reasons why (and especially why not) organization members seek new opportunities and which specific sustainable opportunities are (and not) identified.

The Theory of Planned Behavior and its variants also suggest the absence of panaceas; we must not assume that we fully understand how the perceptions of organization members change. One risk is organizational innovation into new domains such as "green" is creating new dysfunctions such as replacing one blind spot with another (e.g., Zahra & Chaples, 1993). Consider how fully embracing "green" could blind an entrepreneur to triple bottom line opportunities.

Might we also risk being too successful and generate an obsession with innovation (Miller, 1990) or even with being so purely "green"? (Or "green" that we define almost unconsciously as different from others in our industry? Or our customers?) Might we generate over-optimistic perceptions of feasibility and desirability, leading to a rude awakening? The "can-do" spirit is a

two-edged sword: The very spirit that facilitates change could lead an organization and its members to take needless risks.

Hamel and Prahalad (1994) argued for a focus on core competencies, but they also argue even harder for organizations to work hard at envisioning radical new opportunities. Both they and Senge (1992) argued that strategic planning must fully incorporate learning as a driver, not just a parallel activity or outcome. To do so also requires an appropriately supportive cognitive infrastructure. However, this same intentional process gives us ample evidence to consider inverting the usual process of analyzing external environments (e.g., SWOT). If perceptions of feasibility are critical, they can bias an organization's information search and learning processes. Almost by definition, needs assessments are likely to anchor perceptions of feasibility. The very nature of intentionality argues that strategy formulation should be driven as much by external issues as it is by perceived capabilities, by learning and exploration as much as by existing capabilities. Thus, managers and entrepreneurs should benefit from looking first at potential opportunities before risking any biases introduced by assessing current strengths and weaknesses. This is especially true for embryonic domains where premature closure on strengths and weaknesses could deter the recognition of novel opportunities. The realm of sustainability is exactly such an embryonic domain.

Conclusions

Understanding what inhibits or facilitate entrepreneurial activity (sustainable entrepreneurship or not) requires understanding how intentions toward a prospective course of action are constructed. Mental models of what we intend reflect why we intend an action. Intentions-based models capture how individuals really formulate mental models. On the basis of well-developed theory and robust empirical evidence about intentions, we have proposed a social psychological model of how opportunities emerge. Perceptions of desirability (personal and social) and perceptions of feasibility (personal and organizational) are critical to the construction of intentions toward important behaviors. The cognitive infrastructure of a community or organization should enhance, not impede, these critical perceptions.

However, it is equally important to understand the less-intentional, less-conscious, and emotional, and emotional aspects of entrepreneurial decision making, specifically here sustainable entrepreneurship. We need to see what lies beneath our intentions, especially at what deep anchoring assumptions drive our definitions of "opportunity" and even "entrepreneur." These deeper structures are powerful influences on how we think and feel. If we are to enhance entrepreneurial thinking beyond a superficial level, we need to help entrepreneurs change these deeper structures in appropriate directions.

Studying entrepreneurs has informed our understanding of intentions and other important cognitive phenomena (Baron, 1998; Carsrud & Brännback, 2009; Krueger, 2009, 2010; Michl et al., 2009; Welpe et al., forthcoming). Studying social and sustainable entrepreneurs has definitely informed our understanding of entrepreneurship in general (Krueger, Michl, & Welsh, 2010).

Recall that Bratman (1987) argued that intent was a function of both choice and commitment, but usually we are only mindful of one and not the other. Therefore, to understand sustainable entrepreneurial thinking, we need to understand both conscious (intentional) and unconscious (automatic) cognitive and emotional processes. To this end, the authors suggest that any cognition-based and emotion-based model of sustainable entrepreneurship requires an underlying cognition-based and emotion-based model of sustainable opportunities, one that embraces both "pieces" of the "puzzle." We offered here (1) a powerful yet simple tool for surfacing an individual's mental prototype of a sustainable opportunity, then (2) used the intentions model as a vehicle for understanding how organizations and individuals can be encouraged to identify (and act upon) sustainable opportunities.

As Bratman also pointed out, intentions equal choice plus commitment. For sustainable entrepreneurs, like the rest of us, one is intentional, the other is automatic. But we can choose to be mindful of both. We suspect the successful sustainable entrepreneur does exactly that.

References

Ajzen, I. (1987). Attitudes, traits & actions: Dispositional prediction of behavior in social psychology. Advances in Experimental Social Psychology, 20, 1–63.

Ajzen, I. (1991). The theory of planned behavior. Organizational Behavior & Human Decision Processes, 50, 179–211.

Ajzen, I., & Fishbein, M. (2005). The influence of attitudes on behavior. In: D. Albarracin, B. T. Johnson & M. P. Zanna (Eds), The handbook of attitudes. Hillsdale, NJ: Lawrence Erlbaum Associates Hillsdale, NJ.

Bacq, S., & Janssen, F. (2008). From social entrepreneurship as a practice to a legitimate field of research: Literature review & classification. Bodø, Norway: European Summer University Conference on Entrepreneurship.

Bagozzi, R. P., Dholakia, U., & Basuron, S. (2003). How effortful decisions get enacted: The motivating role of decision processes, desires & anticipated emotions. Journal of Behavioral Decision Making, 16, 273–295.

Bandura, A. (1986). The social foundations of thought & action. Englewood Cliffs, NJ: Prentice-Hall.

Baron, R. A. (1998). Cognitive mechanisms in entrepreneurship: Why & when entrepreneurs think differently than other people. Journal of Business Venturing, 13, 275–294.

Baron, R. A. (2006). Opportunity recognition as pattern recognition: How entrepreneurs "connect the dots" to identify new business opportunities. Academy of Management Perspectives, 20(1), 104–119.

Baron, R. A., & Ensley, M. (2006). Opportunity recognition as the detection of meaningful patterns: Evidence from comparisons of novice & experienced entrepreneurs. Management Science, 52(9), 1331–1344.

Boumans, R., Costanza, R., Farley, J., Wilson, M. A., Portela, R., Rotmans, J., …Grasso, M. (2002). Modeling the dynamics of the integrated earth system and the value of global ecosystem services using the GUMBO model. Ecological Economics, 41, 529–560.

Bratman, M. E. (1987). Practical intention. Cambridge, MA: Harvard University Press.

Brazeal, D. (1993). Organizing for internally developed corporate ventures. Journal of Business Venturing, 8, 75–100.

Bryant, T., & Bryant, J. (1998). Wetlands & entrepreneurs: Mapping the fuzzy zone between ecosystem preservation & entrepreneurial opportunity. Journal of Organizational Change Management, 11(2), 112–134.

Cacioppo, J. T., & Berntson, G. (1992). Social psychological contributions to the decade of the brain: Doctrine of multilevel analysis. American Psychologist, 47, 1019–1028.

Camerer, C. L., Loewenstein, G., & Prelec, D. (2005). Neuroeconomics: How can neuroscience inform economics? Journal of Economic Literature, 43(1), 9–64.

Cardon, M. S., Wincent, J., Singh, J., & Drnovsek, M. (2009). The nature and experience of entrepreneurial passion. Academy of Management Review, 34(3), 511–532.

Carsrud, A. L., & Brännback, M. (2009). The entrepreneurial mind. New York, NY: Springer.

Carsrud, A. L., Brännback, M., Krueger, N., & Kickul, J. (2007). Family business pipelines. Philadelphia, PA: Academy of Management.

Costanza, R., & Farber, S. (2002). Introduction to the special issue on the dynamics and value of ecosystem services: integrating economic and ecological perspectives. Ecological Economics, 41, 367–373.

Covin, J., & Slevin, D. (1991). A conceptual model of entrepreneurship as firm behavior. Entrepreneurship Theory & Practice, 16(1), 7–25.

Davidsson, P. (1991). Continued entrepreneurship. Journal of Business Venturing, 6(6), 405–429.

DeCarolis, D., & Saparito, P. (2006). Social capital, cognition, and entrepreneurial opportunities: A theoretical framework. Entrepreneurship: Theory & Practice, 30(1), 41–56.

Dholakia, U., & Bagozzi, R. (2002). Mustering motivation to enact decisions: How decision process characteristics influence goal realizations. Journal of Behavioral Decision Making, 15, 167–188.

Drayton, W. (2002). Entrepreneurship in the citizen sector. Keynote speech. Denver, CO: Academy of Management Preconference.

Eden, D. (1992). Leadership & expectations: Pygmalion effects and other self-fulfilling prophecies in organizations. Leadership Quarterly, 3(4), 271–305.

Elkington, J. (1997). Cannibals with forks: The triple bottom line of 21st century business. Oxford: Capstone.

Fishburn, P. (1974). Lexicographic order, utilities and decision rules: A survey. Management Science, 20, 1442–1471.

Gowdy, J., & Erickson, J. D. (2005). The approach of ecological economics. Cambridge Journal of Economics, 29, 207–222.

Greer, L., & van Loben Sels, C. (1997). When pollution prevention meets the bottom line. Environmental Science & Technology, 31(9), 418–422.

Gregoire, D., Corbett, A., & McMullen, J. (2009). The value-added contribution of entrepreneurship cognition research: A critical review of three decades of research. Babson Park, MA: Babson Entrepreneurship Conference.

Hamel, G., & Prahalad, C. K. (1994). Competing for the future. Boston, MA: Harvard Press.

Kanter, R. (1985). Supporting innovation and venture development in established companies. Journal of Business Venturing, 1(1), 47–60.

Keynes, J. M. (1935). The general theory of employment, interest & money. New York, NY: Harcourt Brace & World.

Kolvereid, L. (1996). Prediction of employment status choice intentions. Entrepreneurship Theory & Practice, 21(1), 47–57.

Krueger, N. (1998). How social opportunities emerge. Journal of Organizational Change Management, 11, 174–183.

Krueger, N. (2000). The cognitive infrastructure of opportunity emergence. Entrepreneurship Theory & Practice, 24(3), 5–23.

Krueger, N. (2005). Sustainable entrepreneurship: Broadening the definition of "Opportunity." USASBE conference.

Krueger, N. (2007). What lies beneath? The experiential essence of entrepreneurial thinking. Entrepreneurship Theory & Practice, 31(1), 123–138.

Krueger, N. (2009). Entrepreneurial intentions are dead: Long live entrepreneurial intentions. In: A. Carsrud & M. Brännback (Eds), The entrepreneurial mind (pp. 97–140). New York, NY: Springer.

Krueger, N., & Brazeal, D. (1994). Entrepreneurial potential & potential entrepreneurs. Entrepreneurship Theory & Practice, 18(3), 91–104.

Krueger, N., & Day, M. (2009). Neuroentrepreneurship: Can entrepreneurship learn from neuroscience? Presented at the United States Association of Small Business & Entrepreneurship Conference, Anaheim, CA.

Krueger, N., & Day, M. (2010). Looking forward, looking backward: From entrepreneurial cognition to neuroentrepreneurship. In: Z. Acs & D. Audretsch (Eds), Handbook of entrepreneurship research (pp. 321–357). New York, NY: Springer.

Krueger, N., Grichnik, D., & Welpe, I. (2009). Anticipated outcome emotions & cognitive appraisal: Assessing social & economic dimensions of social entrepreneurial opportunities. Babson Park, MA: Babson Entrepreneurship Conference.

Krueger, N., Kickul, J., Gundry, L., Wilson, F., & Verma, R. (2009). Discrete choices, tradeoffs & advantages: Modeling social venture opportunities & intentions. In: J. Robinson, J. Mair & K. Hockerts (Eds), International perspectives on social entrepreneurship. Basingstoke, UK: Palgrave.

Krueger, N., Michl, T., & Welsh, D. H. B. (2010). Everything (new) I know about entrepreneurial cognition… I learned from social & sustainable entrepreneurs. NYU Satter Research Conference on Social & Sustainable Entrepreneurship, New York, NY.

Krueger, N., Reilly, M., & Carsrud, A. (2000). Entrepreneurial intentions: A competing models approach. Journal of Business Venturing, 15(5/6), 411–432.

Krueger, N., & Welpe, I. (2008). The influence of cognitive appraisal & anticipated outcome emotions on the perception, evaluation & exploitation of social entrepreneurial opportunities. Chapel Hill, NC: Babson Conference.

Krueger, N., & Welsh, D. H. B. (2010). Social & sustainable heffalumps? Nashville, TN: USASBE conference.

Krueger, N., & Welsh, D. H. B. (2011). And tigger too…. Working Paper. Entrepreneurship Northwest, Boise ID.

Lawrence, A., Clark, L., Labuzetta, J. N., Sahakian, B., & Vyakarnum, S. (2008). The innovative brain. Nature, 456, 168–169.

Lent, R., Brown, S., & Hackett, G. (1994). Toward a unifying social cognitive theory of career and academic interest, choice and performance. Journal of Vocational Behavior, 45, 79–122.

Libet, B., Freeman, A., & Sutherland, K. (2004). The volitional brain: Towards a neuroscience of free will. Exeter, UK: Imprint Academic.

Lounsbury, M. (1998). Collective entrepreneurship: The mobilization of college & university recycling coordinators. Journal of Organizational Change Management, 11(1), 50–69.

Lumpkin, G. T. (2010). Entrepreneurial processes in social contexts: How are they different, if at all? Keynote address, NYU Satter Research Conference on Social & Sustainable Entrepreneurship, New York, NY.

Lumpkin, G. T., & Dess, G. (1996). Clarifying the entrepreneurial orientation construct and linking it to performance. Academy of Management Review, 21(1), 135–172.

Lumpkin, G. T., Moss, T., Gras, D., Kato, S., & Amezcua, A. (forthcoming). Entrepreneurial processes in social contexts: How are they different, if at all? Small Business Economics.

Mair, J., & Marti, I. (2005). Social entrepreneurship research: A source of explanation, prediction & delight. Journal of World Business, 41(1), 36–44.

McCall, M., Lombardo, M., & Morrison, A. (1988). The lessons of experience. Lanham, MD: Boston, MA.

McGrath, R. G. (1995). Advantage from adversity. Journal of Business Venturing, 10, 121–142.

McMullen, J., Plummer, L., & Acs, Z. (2007). What is an entrepreneurial opportunity? Small Business Economics, 28(4), 273–283.

McMullen, J., & Shepherd, D. A. (2006). Entrepreneurial action & the role of uncertainty in the theory of the entrepreneur. Academy of Management Review, 31(1), 132–152.

Michl, T., Welpe, I., Spörrle, M., & Picot, A. (2009). The role of emotions in entrepreneurial decision making. In: A. Carsrud & M. Brännback (Eds), The entrepreneurial mind (pp. 167–190). New York, NY: Springer.

Miller, D. (1990). The Icarus paradox. New York, NY: HarperBusiness.

Mitchell, R. K., Mitchell, B., & Mitchell, J. R. (2009). Entrepreneurial scripts & entrepreneurial expertise. In: A. Carsrud & M. Brännback (Eds), The entrepreneurial mind (pp. 97–140). New York, NY: Springer.

Nichols, A. (2006). 'Playing the field': A new approach to the meaning of social entrepreneurship. Social Enterprise Journal, 2(1), 1–6.

Rainey, D. (2006). Sustainable business development. Cambridge: Cabrudge University Press.

Senge, P. (1992). Mental models. The Planning Review, 20, 4–11.

Shane, S. (2003). A general theory of entrepreneurship: The individual-opportunity nexus. Cheltenham: Elgar.

Shapero, A., & Sokol, L. (1982). Some social dimensions of entrepreneurship. In: C. Kent, D. Sexton & K. Vesper (Eds), The encyclopedia of entrepreneurship. Englewood Cliffs, NJ: Prentice-Hall.

Shepherd, D. A., & Krueger, N. (2002). Cognition, entrepreneurship & teams: An intentions-based perspective. Entrepreneurship Theory & Practice, 27(2), 167–185.

Spörrle, M.,&Welpe, I. (2006).How to feel rationally: Linking rational emotive behaviour therapy with components of emotional intelligence. In: N. Ashkanasy, W. Zerbe & Ch. Härtel (Eds), Individual and organizational perspectives on emotion management and

display, (Vol. 2, pp. 291–322). Research on Emotion in Organizations, Oxford, UK: Elsevier.

Stanton, A., Day, M., Krueger, N., Welpe, I., Acs, Z., & Audretsch, D. (2008). The questions (not so) rational entrepreneurs ask: Decision-making through the lens of neuroeconomics. Anaheim: Academy of Management.

Stephan, U., Huysentruy, M., & Van Looy, B. (2010). Social opportunity recognition & the comparative study of the values of social entrepreneurs. New York, NY: NYU Satter Research Conference on Social & Sustainable Entrepreneurship.

Weick, K. (1979). The social psychology of organizing (2nd ed.). Reading, MA: Addison-Wesley.

Welsh, D. H. B., & Krueger, N. (2009). Social? sustainable? entrepreneurship? A first look at mental prototyping of "social" entrepreneurship. Babson Park MA: Babson Entrepreneurship Conference.

Welpe, I. M., Spörrle, M., Grichnik, D., Michl, T., & Audretsch, D. (forthcoming). I think it's good, but I am also afraid: The interplay of opportunity evaluation and emotions as antecedent of entrepreneurial exploitation. Entrepreneurship Theory & Practice.

Zahra, S., & Chaples, S. (1993). Blind spots in competitive analysis. Academy of Management Executive, 7(2), 7–28.