The Cognitive Infrastructure of Opportunity Emergence*

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Abstract

Before we can act on opportunities we must first identify those opportunities. Understanding what promotes or inhibits entrepreneurial activity thus requires understanding how we construct perceived opportunities. Seeing a prospective course of action as a credible opportunity reflects an intentions-driven process driven by known critical antecedents. Based on well-developed theory and robust empirical evidence, we propose an intentions-based model of the cognitive infrastructure that supports or inhibits how we perceive opportunities. We discuss how this model both integrates past findings and guides future research. We also show the practical diagnostic power this model offers to managers.

Some organizations find their pursuit of new opportunities a difficult challenge, yet other similar organizations seem to have little difficulty. Based on well-developed theory and robust empirical evidence, we propose that perceptions of organization members, channeled through intentions, can inhibit or enhance the identification and pursuit of new opportunities. This analysis proposes an intentions-based model of how opportunities emerge. Also offered are suggestions on how to develop an opportunity-friendly cognitive infrastructure.

Consider downsizing: It often arises because firms cannot identify profitable growth opportunities, even in firms that appear to have ample human resources to seek opportunities (Gertz & Baptista, 1996; Krueger & Gertz, 1996). Why is it that these firms cannot find new opportunities, but instead their thinking is dominated by threats? Consider firms that are frustrated by an inability to innovate despite having the requisite resources. Could it be that organization members do not perceive a focus on innovation as an opportunity? In both cases, we know the right questions to ask to understand why firm members do not perceive an opportunity.

An inadequate level of entrepreneurial activity may reflect an inadequate supply of opportunities perceived by organization members, not enough 'entrepreneurial' thinking. If we want to understand how corporate ventures emerge, we need to understand how opportunities emerge. Organizations do not innovate; individuals within those organizations innovate. As Shapero argued, we can increase an organization's entrepreneurial potential by increasing the quality and quantity of potential entrepreneurs within that organization. In turn, we do that by increasing

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the quality and quantity of opportunities perceived by organization members (Shapero, 1982, 1985; Krueger & Brazeal, 1994). Any theory of venturing might wish to consider the process by which individuals identify credible opportunities and the important role of perceptions in that process.

One thing we know about innovative activity is that the adoption of an innovation entails some sort of supporting infrastructure, both tangible and intangible. We focus here on the intangible infrastructure. Individuals need to perceive a prospective new course of action as a credible opportunity, which requires the opportunity to not just be viable, but be perceived as viable.

Thinking 'Entrepreneurially': The Need for Cognition-Based Models

The centrality of perceptions in opportunity identification argues for taking a cognitive approach for insights into the nature of innovative activity and how to nurture it. In particular, social psychology offers the construct of intentions as a consistently useful device to integrate past findings from a theory-driven, empirically robust vantage (Ajzen, 1987; Tubbs & Ekeberg, 1991). From a research perspective, intentions models have proven consistently robust both in explanatory power and in predictive validity (Ajzen, 1987; Tubbs & Ekeberg, 1991). From a managerial perspective, the conceptual framework offers a parsimonious mechanism for diagnosing barriers to entrepreneurial activity.

Entrepreneurship research sorely needs a framework solidly grounded in well established theory (MacMillan & Katz, 1992; Jelinek & Litterer, 1994). Intentions-based models provide us a comprehensive theory-driven conceptual framework. This allows us to explain why (and how) phenomena such as champions operate. We need models that reflect how individuals actually make decisions and take action; these models include scripts and schemata (Lord & Maher, 1990). Intentions models do exactly that.

We can construct a tangible infrastructure to support the pursuit and implementation of existing opportunities. However, what about future opportunities? We do not find opportunities; we construct them. Opportunities are thus very much in the eye of the beholder. This tells us that perceptions and other cognitive phenomena are critical. So again we ask, what enhances the perception of viable, credible opportunities? (Another way of looking at this might be: What inhibits the perception of opportunities? Or even, what increases the perception of threats?).

What sort of infrastructure enables a greater orientation toward seeing opportunities and acting on them? The 'heart of entrepreneurship' is an orientation toward seeing (and acting on) opportunities regardless of existing resources (Stevenson & Jarillo, 1990). In a rapidly changing world organizations need to continually identify new opportunities beyond existing competencies (Hamel & Prahalad, 1989, 1994; Mintzberg, 1994) if they are to survive. This argues that organizations must adopt what Hamel and Prahalad call a "strategic intent" (1989) or what Covin and Slevin describe as an "entrepreneurial orientation" (1991; Lumpkin & Dess,

1996). In short, organizations need to focus strategically on the identification of viable new opportunities.

This note will propose that organizations that successfully identify new opportunities have an intangible infrastructure – a cognitive infrastructure – that supports its members in perceiving opportunities (and acting on them). Fortunately, we already have a strong knowledge base regarding how we learn to perceive opportunities, knowledge that we can use to explain how organizations can build an opportunity-friendly cognitive infrastructure.

What do We Know About Opportunity Perceptions?

First of all, we cannot lose sight of the reality that organizations do not see opportunities, individuals do. In Krueger and Brazeal's words, entrepreneurial potential requires potential entrepreneurs (1994). In other words, an organization with a strong orientation toward seeing opportunities must support individual organization members who have that orientation toward opportunities.

Second, we have a natural tendency to simplify the world around us by categorizing situations. Here, we tend to categorize strategic issues into opportunities and threats, something that is an ongoing, continuous process (Dutton, 1993). More important, we understand what drives this categorization process. Jackson and Dutton (1988) showed that perceptions of opportunity depend closely on perceptions that a situation is positive and that it is controllable. Perceptions of threat depend on perceptions that the situation is negative and uncontrollable.

Third, opportunity perceptions reflect an intentional process. Mental models of what we intend reflect why we intend an action. Dutton and Jackson's antecedents of opportunity perceptions are largely isomorphic with the known antecedents of intentions. In short, intentions are driven by perceptions of feasibility (e.g. controllability) and by perceptions of desirability (e.g. positiveness). Martin Fishbein and Icek Ajzen have developed a theoretically sound, empirically robust framework for understanding intentions that appears applicable to most planned behaviors, whether the action is narrowly or broadly defined or whether it is proximal or distal.

A wide variety of disciplines have independently found this same near-isomorphism (see Ajzen, 1987), suggesting that this framework is at the heart of human decision making. The intentions literature teaches us that information is important, but the impact of that information is even more important.

Fourth, we have some understanding of the mental models that entrepreneurs share, the scripts and schema that differentiate entrepreneurs (Bird, 1988; Mitchell & Chesteen, 1995). It seems probable that we have cognitive access to both an 'opportunity' schema and a 'threat' schema. Which schema is activated first (or activated more strongly) depends on critical cues from the environment. We know that humans process negative situations differently from positive situations: We differ in how we value information; we may even use different parts of our brain. Yet, one individual facing the same cues may see a threat while another sees an opportunity.

Fifth, a review of the literatures on entrepreneurship finds strong arguments for intentionality (Bird, 1988; Katz & Gartner, 1988). Existing applications of intentions models or self-efficacy show consistent support (Krueger & Brazeal, 1994). For example, Shapero's model of the 'entrepreneurial event' (1982) is homologous to the Ajzen-Fishbein framework (Krueger, 1993; Krueger, Reilly, & Carsrud, in press). He argued that the decision to undertake entrepreneurial activity required a pre-existing belief that the activity is both desirable and feasible, coupled with some personal propensity to act on opportunities and some sort of precipitating factor.

Sixth, at the heart of these scripts and schemas are critical perceptions that map elegantly onto the common framework of intentionality. For example, we know that perceptions of competence strongly influence our perceptions of whether a situation is controllable. Perception of self-efficacy is a substantial antecedent of perceived opportunity (Krueger & Dickson, 1994). If we see ourselves as competent we are more likely to see a course of action as feasible, thus we are more likely to see an opportunity.

The critical task for this research note is to go into a bit more detail about the intentional nature of how opportunities emerge in an organization. The perceptual basis of opportunity emergence argues that we carefully consider this intangible infrastructure-this cognitive infrastructure that facilitates (or inhibits) the perception of opportunities by organization members and thus the organization's ability to identify viable, credible future opportunities. Only then can we propose mechanisms for building a supportive cognitive infrastructure.

First, however, let us address why this is important, not just to researchers but to managers.

Strategic Intent, or Why Managers Should Care About Intentionality

Hamel and Prahalad (1989, 1994) argue that organizations need to exhibit some degree of "strategic intent" toward new opportunities. Identifying their core competencies will permit an organization to formulate a coherent strategic intent to explore and guide future strategic action. We also know that building new competencies to address new opportunities is a critical antecedent to capturing rents from innovation (McGrath, Tsai, Venkataraman, & MacMillan, 1996).

However, what influences an organization's readiness for the change required to pursue new opportunities? What is necessary for an organization to learn how to identify new opportunities? Senge focusses on what he labels simply "mental models": Managers' and employees' internalized cognitive schemata that guide much of their daily activity. We all need multiple schemata to adapt to a changing world. In turn, this requires that we learn multiple mental models and that we learn how to learn new schemata (Senge, 1992).

Intentions are at the heart of all this. Intentionality is deeply ingrained in how we process information into action. Any planned behavior is intentional by definition, thus strategic behaviors are inherently intentional. As such, it becomes useful to

understand that intentions depend on a handful of critical antecedents. Personal and situational influences affect intent only by affecting these critical antecedents. For example, role models can help promote entrepreneurial activity, but only if they influence perceptions of desirability or, more likely, perceptions of feasibility.

Consider the notion of "entrepreneurial orientation" (Covin & Slevin, 1991). An entrepreneurial orientation seems useful in supporting strategic intent. We have an increasing understanding of what comprises the dimensions of entrepreneurial orientation (Lumpkin & Dess, 1996), but we know relatively little about its antecedents. Again, for an organization to be more entrepreneurial first requires that its members see more opportunities. Before acting on opportunities they 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 will help us understand how we can support (or avoid inhibiting) the perception of opportunities. It will help us to diagnose why attempts to innovate fall short. If organization members do not perceive a proposed innovation as an opportunity (or worse, see it as a threat), we can ask intelligent questions to understand why a particular innovation was not perceived as an opportunity.

In sum, models of intentions appear useful and potentially enlightening in diagnosis: how to understand and how to increase an organization's potential for entrepreneurial activity. Let us examine the nature of intentions and their antecedents more closely. To successfully apply this model requires a better understanding of the key conceptual and empirical issues.

The Nature of Intentions

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. In other words, innovation usually entails taking significant planned (intentional) 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 can better understand what.

The theoretical underpinnings for intentions models are nicely reviewed in Ajzen (1987). 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. 1 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.

The latest version of the framework, Ajzen's 'theory of planned behavior' 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), (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.

Critical Attitudes

The theory of planned behavior 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. 1 shows that intentions toward innovation are best predicted by three critical perceptions: that the innovative activity (e.g. a new venture) is (a) perceived as personally desirable, (b) perceived as supported by social norms, and (c) perceived as feasible.

Exogenous Factors

How do intentions models handle other variables, those that are exogenous to the attitude-intention-behavior process? Exogenous factors such as individual differences and purely situational influences operate indirectly on intentions (and thus behavior) by changing these antecedents, not by directly affecting intentions. That is, a change in objective circumstances would thus change intentions if and only if the change altered a decision intiker's attitudes. Path analyses using meta-analysis clearly support the causal linkage from attitudes to intentions to behavior (Kim & Hunter, 1993).

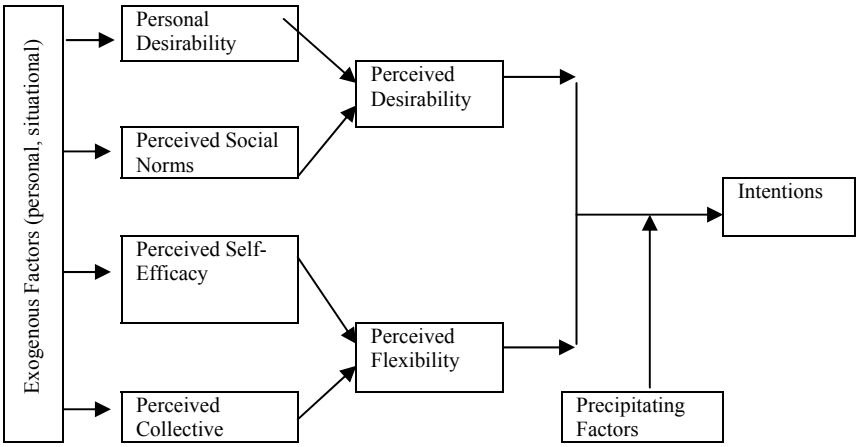

Fig. 1. Intentions model (Shapero, 1982; Krueger, 1993; Krueger & Brazeal, 1994)

Precipitating Factors

Research also suggests that certain exogenous variables can serve to facilitate or 'precipitate' the realization of intentions into behavior (Shapero, 1982; Krueger & Brazeal, 1994; Stopford & Baden-Fuller, 1994).

The Robustness of Intentions Models

Empirically, meta-analyses demonstrate clearly that this framework is remarkably robust with very large effect sizes. While designed to predict specific, proximal behaviors, this class of models appears to apply equally well to behaviors that are distal or less specific (e.g. Kim & Hunter, 1993). Again, this permits us to apply this model to relatively broad (innovation in general) or to relatively narrow phenomena (a specific innovation).

Kim and Hunter (1993) found that personal desirability and social norms explained 76% of the variance in intentions, while intentions explained 67% of the variance in behavior (after adjusting for statistical artifacts). Ajzen (1991) found that adding a measure of perceived feasibility explains an additional 10% of variance in intentions. Such findings compare rather favorably with the 10% of variance typically explained by traits or other dispositional measures (Ajzen, 1987).

More important, the model held in virtually every study, even where researchers took considerable liberties with model specification or measurement. That is, path analysis confirms that the correlation between attitudes and behavior is fully explained by the attitude-intention and intention-behavior links (Kim & Hunter, 1993). Moreover, formal intentions models have already been applied successfully to entrepreneurial behavior (e.g. Davidsson, 1991; Krueger & Brazeal, 1994; Reitan, 1997).

Applying the intentions framework to work motivation proved enlightening (Tubbs & Ekeberg, 1991), thus so should research applying intentions to the processes of corporate venturing. For example, if an organization's members had the requisite skills to launch a new venture that it would deem desirable, but failed to do so, the model would diagnose a potential shortfall in perceived feasibility.

Known Antecedents of Intentions

Perceived Desirability: Personal Attitude

In the Ajzen-Fishbein framework, 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 influence those perceptions, often indirectly and often unintentionally.

For example, a successful innovation might lead to a promotion from R&D into management; this need not be perceived as positive (e.g. it might entail a transfer to another location). To increase attitude, increase expectancies by raising perceptions of positive outcomes (or their likelihood) or lowering perceptions of negative events (or their likelihood). Exposure to multiple perspectives (e.g. multiple mentors) and diverse life experiences (developmental experiences) will help individuals to recognize a broader range of desirable options.

Perceived Desirability: Social Norms

Social norms represent perhaps the most interesting component of the AjzenFishbein framework. This measure is a function of perceived normative beliefs of significant others (e.g. family, friends, co-workers) weighted by the individual's motive to comply with each normative belief. Social norms often reflect the influence of 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). For example, work group relationships do influence individual innovation (Scott & Bruce, 1994).

Measuring social norms requires identifying the appropriate reference groups. A potential corporate entrepreneur's reference group may not be family and friends, but rather the top management and their colleagues (including those who have already started a venture).

Perceptions of Feasibility: Self-Efficacy

Albert Bandura and associates have developed and elaborated a social-cognitive model of human agency (e.g. Bandura, 1986, 1995). This model argues that taking action requires consideration of not just outcome expectancies (i.e. desirability) but also perceived self-efficacy (i.e. feasibility). This becomes particularly critical with significant strategic change (e.g. a new venture).

Bandura defines self-efficacy as an individual's perceived ability to execute some target behavior. Thus, it reflects the perception of a personal capability to do a particular job or set of tasks. Measuring perceived efficacy is relatively straightforward; one can use simple self-report measures (Bandura, 1986; Eden, 1992).

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. This illustrates the vital role of self-efficacy in the empowerment of organization members. Increases in self-efficacy lead to increased initiative 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 by experiencing mastery of the skills in question. 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 at those competencies (McCall, 1992; Senge, 1992). Exposure to diverse life and work experiences broadens individuals' range of what they perceive as feasible. These offer opportunities for behavioral modeling where organization members can experience mastery. This behavioral modeling can work either vicariously using credible experts or directly by affording members the hands-on experience in 'safe' settings (Bandura, 1986; Weick, 1979). Providing opportunities for diverse mastery experiences is an even better way to increase individuals' evoked set of feasible alternatives.

Perceptions of Feasibility: Collective Efficacy

However, perceptions of personal competence need not translate into perceptions of organizational competence. If fellow organization members are needed to support an intended behavior, perceptions of collective efficacy are likely to be important (Bandura 1986, 1995). This point is crucial: organization members may be perfectly capable of finding and promoting new opportunities and their self-efficacy beliefs may be high. Yet, perceptions that collective efficacy is low can inhibit opportunity seeking. Empowering organization members to be more entrepreneurial thus rests on beliefs about both personal and collective efficacy, just as perceived desirability has personal and social components. Organizations can employ the same behavioral modeling discussed above to enhance perceptions of collective efficacy.

Exogenous Factors

Research often examines variables other than attitudes and intentions, but intentions models posit that these exogenous variables operate indirectly on intentions (and thus behavior). As the model suggests, most exogenous factors influence intentions (and behavior) through influencing one or more critical attitude. The various literatures on innovation management and entrepreneurship offer numerous examples of exogenous factors logically related to innovative or entrepreneurial activity, though often with disappointing results. If effects are actually indirect, then applying this framework may strengthen the findings. For example, the presence of role models may increase entrepreneurial behavior only if the role models actually change a key attitude such as self-efficacy (Krueger & Brazeal, 1994).

Precipitating Factors

As Fig. 1 suggests, exogenous factors may also influence the intention-behavior relationship by precipitating, or facilitating the realization of intentions (Shapero, 1982; Ajzen, 1987; Stopford-Fuller & Baden, 1994). One such factor may be perceptions of resource availability (Triandis, 1967). Another might be a personal propensity to act on opportunities (Shapero, 1982).

Tangible barriers may serve to prevent an intention from coming to fruition, but the subtleness of cognitive barriers can present even greater obstacles. While Shapero notes that purely subjective conditions can precipitate action, such as facing a fortieth birthday, it appears that the typical precipitating event reflects some sort of displacement, a disruption of one's inertia such as getting fired or being offered a big contract. Yet, how we react to displacement depends on our perceptions of the impact of that event; Shapero argues that our reaction also depends on the believable options that we perceive.

External conditions may lie beyond what an organization can influence, but organizations can provide explicit, credible cues that the new circumstances represent an opportunity. Precipitating factors are not well understood, so research in this area is very likely to shed some new light.

Let us now turn the discussion in a more practical direction. Not everyone accepts the role of subjective elements (e.g. Weick, 1979), but if we accept the notion of intentions and their antecedents, how might an organization promote an appropriate cognitive infrastructure?

Building a Supportive Cognitive Infrastructure

Shapero (1982, 1985) argues that for an organization to maintain a reasonable supply of opportunity-seeking individuals requires that organizations provide a congenial environment, from the perspective of the prospective opportunity-seekers. Opportunity-seekers may enact an organizational environment that is personally favorable, but doing so requires a learning-supportive cognitive infrastructure. How do we help organization members perceive more things as desirable and feasible?

Consider the useful metaphor of the antenna. We are much more likely to notice (and take seriously) signals from directions 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.

On the other hand, entrepreneurial activity (especially activity that is disruptive of existing products and markets) will generally lack legitimacy with the rest of the organization (Dougherty, 1994). We thus need to set explicit, credible organizational policies that increase both the perceived feasibility and the perceived desirability of entrepreneurial activity.

However, an objectively supportive infrastructure is not enough; organization members must perceive it as supportive. Brazeal finds that supportive reward systems and supportive top management need not be seen as such (199–3). No matter

how supportive an organization may be objectively (e.g. in terms of reward systems), the perceived supportiveness appears crucial. Entrepreneurial organizations appear to provide exactly this kind of supportive cognitive infrastructure (Brazeal, 1993; Krueger & Brazeal, 1994).

Returning to the 'antenna' metaphor, organization members are obviously more likely to respond to highly credible cues. Increasing the credibility of cues may require that the signals be perceived as coming 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 opportunity-seeking is personally and socially desirable and that members are personally and collectively competent to pursue new opportunities. Such a cognitive infrastructure would provide the empowerment needed to promote opportunity-seeking.

Increasing Feasibility Perceptions

To promote feasibility perceptions, 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 (Eden, 1992). Organizations 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 are 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 launch a minor new product, I can launch a major new product!") This, of course, requires that organizations provide salient, credible cues that the skills are transferable to newer, larger domains by providing multiple low-risk mastery experiences (see Weick's (1979) notion of 'small wins').

Finally, it is just as important to dispel spurious beliefs of infeasibility. One useful mechanism is benchmarking, which can offer concrete evidence that, yes, this opportunity is feasible.

Increasing Desirability Perceptions

However, desirability perceptions may require more complicated interventions. Increasing perceived desirability requires that individuals perceive mostly positive out-comes for their innovative activity, including intrinsic rewards such as a supportive culture. For example, objectively supportive reward systems need not be perceived as such by the person rewarded. Innovation is often its own reward. Extrinsic rewards can interfere with intrinsic motivation. Some innovators even enjoy being 'illegitimate' (Dougherty, 1994).

Also, the most skillfully designed formal reward system may be overridden by informal punishments. We would recommend examining the entire set of rewards (and punishments), both intrinsic and extrinsic, formal and informal. It may also prove more useful to counter spurious beliefs about an innovation's downside. Most important, reward systems must be viewed from the perspective of potential innovators, not those far removed from the trenches. For example, what about the informal rewards from other innovators for developing a cutting-edge technology, even if it's not marketable?

Shapero (1985) proposed that organizations seeking to innovate should provide what he called a 'nutrient-rich' environment for potential innovators. This 'seed-bed' would provide 'nutrients' such as credible information, credible role models, and emotional/psychological support as well as more tangible resources. McGrath (1995) points out that organizations need to support its members in teaming from adversity. Organizations should provide opportunities to attempt innovative things at relatively low risk (i.e. trying and failing is not career-threatening).

Potential Mechanisms

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

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 (Guth & Ginsberg, 1990). 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, 1985). Many are familiar with the legendary Jack Welch who describes his role as a cheerleader and facilitator. Welch clearly seems bent on promoting the perceived desirability of seeking new opportunities and promoting perceptions of feasibility, removing cognitive as well as more tangible barriers.

Strategic Controls

Yes, even bureaucratic mechanisms can help. Organizations' control mechanisms exert considerable influence over the intensity of R&D spending: long-term strategic controls help much better than short-term financial controls. Long-term controls can reward opportunity seeking while short-term controls inadvertently cause short-term setbacks (Hoskisson, Hitt, & Hill, 1993).

Consider the Enter-Prize Program at Ohio Bell (Kanter & Richardson, 1991) which 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 attempt was unsuccessful.

Information Flows

Similarly, information systems can play a surprising role. If information supportive of innovative activity is relatively unavailable, but data about its downside is easily accessible, innovation may not occur. While this is true of both informal and formal flows of information, making innovation-supportive information readily available through formal channels sends a signal of its true importance to the organization about its mission. For example, how easily can one find external information about markets and competitors? Brazeal (1993) argues for making such a knowledge bank readily available to employees.

Benchmarking and Best Practices

This model tells us why benchmarking and best practices can be so useful. Increasing the visibility of what is truly feasible is central to benchmarking, but it also increases the credibility of what is feasible: "If a competent competitor can do this, so can we." The credible example of a competitor's success may also increase the desirability of the new opportunity. For example, the success of a competitor may spur the perceived need to innovate.

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 internal source of feasible ideas. Teams also provide a cognitive and emotional buffer from the rest of the organization. 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.

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 defuse the potential negative ramifications, and raises perceptions of feasibility, that might arise from the innovation.

Changing Structure

In the extreme, organizations have chosen to physically separate innovative groups from the rest of the organization (e.g. the 'skunkworks' concept). Such separation has symbolic implications for reducing barriers to opportunity-seeking. For example, the separation can reduce rivalry for resources. This also serves as a de facto flattening of the organization, improving speed of decision making.

Mentors and Champions

Mentoring is often promoted as vital for management development in general and for innovation development in particular. One specific variation on the mentoring process is the concept of 'champions' or 'change masters' (Kanter & Richardson, 1991; Day, 1994; Shane, 1994). The existence of a 'champion,' someone who will fight for a new venture, sends a clear signal that the organization at least tolerates entrepreneurial activity. That signal alone should increase perceptions of supportive social norms. However, mentors and roles affect entrepreneurial 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 an innovation's desirability and feasibility.

Multiple Mentors

Let us propose a notion founded in the practices of academe, that of multiple mentors.[1] Multiple mentors can provide multiple perspectives and multiple schemata that should broaden proteges' perceptions of desirability and feasibility. 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 innovator. As in academe, multiple mentors are likely to transcend functional boundaries and even organizational boundaries. Successful innovators typically engage in considerable boundary-spanning themselves, practively seeking such multiple influences (Shapero, 1985). An organization may wish to tangibly and visibly encourage successful innovators to mentor others.

For example, recent evidence suggests that successful innovators can be committed to both their profession and their organization. "Serving two masters" is actually associated with high performance, contrary to many organizations' norms

[1] Thanks to Gayle Baugh for this useful insight.

(Baugh & Roberts, 1994), perhaps by multiple mentors providing multiple behavioral models (Bandura, 1995).

Developmental Experiences

Any organization can profit by providing its members with a diverse range of developmental experiences (McCall, 1992). Here, experiences can provide explicit cues that the organization supports innovation and members can internalize those into appropriate attitudes, thus intentions. The more that we expose organizational members to innovation and the more they understand its nature, the more likely they are to see innovation as feasible and desirable. McCall notes that for managers, there is no substitute for having 'bottom-line' responsibilities in charge of a new or turnaround venture.

Moreover, promoting the ability of organization members to identify a broader range of alternatives as desirable and feasible yields 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 competences (Senge, 1992). Organizations should consider such development as an integral part of their strategy (McCall, 1992) and thus provide the right kind of cognitive infrastructure.

Implications

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 antecedents 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 empower its members to help them see a broader range of new opportunities. Meanwhile, it should minimize activities that inhibit opportunity seeking.

Exploring questions such as these should prove both interesting and useful.

Integrating Past Research

One useful exercise might be to test these propositions by examining past research efforts that explored the dimensions of successful (and unsuccessful) innovation. For instance, the work of Eisenhardt and Schoonhoven (1990) illustrates the importance of initial decisions, a fundamental characteristic of intentional behavior. We might examine the specific activities of leaders such as Welch to assess their

impact on perceptions of desirability and feasibility. We can see how initial strategies and intentions depend upon perceptions of desirability and feasibility in other well-executed studies of the innovative process (e.g. Jelinek & Schoonhoven, 1993). We can explore how existing inventories of barriers to innovation or corporate venturing reflect (or not) perceptions of desirability and feasibility (MacMillan, Block, & Narasimha, 1986; Kuratko, Montagno, & Hornsby, 1990).

We have a number of existing constructs (e.g. champions) that successfully explain facets of entrepreneurial behavior. We can test whether the intentions model explains their success. We can test whether successful champions influence entrepreneurial behavior indirectly through changing attitudes and intentions, as the model would predict. We can test the precipitating factors proposed by Shapero (1982, 1985) and Stopford and Baden-Fuller (1994). We can test whether the critical success factors of learning organizations (e.g. Senge, 1992) influence attitudes and intentions. That is, what aspects of the cognitive infrastructure supports or inhibits organizational learning? Would it be valuable for organization members to perceive organizational learning itself as an opportunity?

We often argue that innovative firms exhibit an innovation-friendly climate. If we examine existing inventories that measure barriers to innovation we find that many items directly reflect perceptions of personal desirability, social norms, personal efficacy and collective efficacy, as well as possible precipitating or inhibiting factors (MacMillan et al. 1986; Kuratko et al. 1990; Scott & Bruce, 1994). This suggests that the exploratory research that generated these inventories implicitly captures the intentional nature of entrepreneurial activity.

This model suggests that 'barriers' and 'climate' are also in the eye of the beholder. For example, we would predict that organizations that are both highly innovative and entrepreneurial would have a climate where organization members see 'red tape' as "paying dues" rather than as a mechanism of intimidation.

Guiding Future Research

Intentions models such as the theory of planned behavior are already widely used in many settings. The intentions approach tells us that the effects of exogenous factors such as individual differences (e.g. personality, demographics) are indirect. This knowledge can help us identify stronger, more consistent effects from exogenous factors, enriching the explanatory and predictive power of our research.

Exploring Limitations

However, we should also explore the limits of this type of model. Does the scope of its applicability extend, for instance, to 'really new' products? We may find even more valuable insights from applying other formal models of human cognition (e.g. Lord & Maher, 1990; Jelinek & Litterer, 1994).

For example, if the conventional wisdom is correct that teams are critical for innovation (e.g. Senge, 1992), then we need to explore ways to apply this framework to the team level of analysis.

Unanswered Questions

From Intent to Action. Even more important is the critical issue of how intentions become reality. Fig. 1 argues that exogenous factors can also precipitate, facilitate, or inhibit the realization of intentions. We have already noted Triandis's (1967) perceptions of resource availability and Shapero's (1982) propensity to act. Shapero (1982), Ajzen (1987), and Stopford-Fuller & Baden (1994) also offer other 'likely suspects' for testing.

What catalyst serves to crystallize beliefs and attitudes into a salient intention? Shapero suggested the existence of some sort of personal propensity to act. However, does this propensity help attitudes coalesce into intentions or facilitate the realization of intentions? This would contribute to a broader understanding of intentions in general.

Intentions Toward Implementation. We also need to examine the specific path by which intentions are realized. To achieve the implementation of a new opportunity typically requires at least several steps along the way. The choice of intermediate actions is also an intentional process; thus we can examine why certain choices were made. That is, the intentions model should also help us understand specific aspects of a new venture. For example, consider a new perceived opportunity involving a new consumer product there is still a choice of marketing channels and that choice should be influenced by intentions and the critical antecedents.

Changing Intentions. We can also track how changing perceptions change the opportunities (or lack thereof) perceived by organization members over time (e.g. Ropo & Hunt, 1995). We know surprisingly little about changing intentions; the study of intrapreneurial activity might thus contribute to our overall knowledge about intentions. We might gain a better understanding of how we re-categorize strategic issues and how we cognitively convert threats into opportunities (an activity that we often prescribe to students and trainees).

A Deeper Look. We can look more deeply into how our beliefs influence our perceptions through how we process cues from the environment. For example, what individual differences (demographics, personality, etc.) appear to moderate relationships in this model? Parallel to this, we should look closely at how information is presented (e.g. framing effects, anchor-and-adjust processes, and other cognitive phenomena).

For another example, social cues may prove more important for perceived feasibility (through effects on collective and personal efficacy) than for perceived desirability. Each of these represents a useful contribution to the broader overall literature on intentions.

Qualitative Tests. This model also merits a formal qualitative test. One specific approach that we propose is action research to identify whether influencing attitudes does indeed influence opportunity perceptions (and thus behavior). Research should also explore the links between the attitudes and intentions of organization members and their organizations' entrepreneurial orientation (Lumpkin & Dess, 1996). What dimensions of cognitive infrastructure influence which dimensions of entrepreneurial orientation?

Practical Issues. The literature often prescribes perfusing the entire organization with a supportive corporate culture, but what if we can work with only one group – who should it be? Do we need to influence the intentions of the rank and file? Middle managers? Top managers? Perhaps the role of leadership (as with Jack Welch) here is to promote a desired cognitive infrastructure, not just with internal stakeholders, but also with external stakeholders. For example, this model suggests that the team level may be critical. Finally, what else will be required to help managers to adopt and skillfully use this framework to promote and diagnose innovation in their organizations?

Collective Efficacy. Finally, this model suggests that an opportunity-friendly organization requires high levels of collective efficacy. The scarcity of research into collective efficacy further suggests that this will be a fruitful opportunity to advance both practical and theoretical knowledge.

Implications for Practice and Teaching

If, as Weick, Senge, and others argue, managers and leaders guide the sensemaking of their colleagues and subordinates, the most important implication is that this model offers guidelines for doing so. For example, a leader can frame even a large setback as simply "paying dues." Consider the example of Thomas Watson and the story of an executive who lost IBM $10 million. The manager offered his resignation, but Watson reputedly said, "Not a chance, not after I just invested $10 million in training you!" Even if apocryphal, such stories send a clear signal throughout the organization that top management supports a gallant failure. An organization that faces downsizing can use this model to help its members identify and pursue opportunities for growth.

Supportive Cognitive Infrastructure. If we accept the model, the most obvious implication is that enhancing, its components should pay off in a higher level of entrepreneurial activity. Organizations must develop a cognitive infrastructure among its members, which 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 opportunities are (and are not) identified. Was it a deficit in perceived desirability? In perceived feasibility?

A Possible Downside. However, the model also suggests the absence of panaceas; we must not assume that we fully understand how the perceptions of organization

members change. We must avoid creating new dysfunctions such as replacing one blind spot with another (e.g. Zahra & Chaples, 1993). We might also risk being too successful. We might generate an obsession with innovation. We might generate over-optimistic perceptions of feasibility and desirability, setting the organization up for 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.

Re-thinking SWOT. However, this same intentions process gives us ample evidence to consider inverting the usual process of environmental analysis (e.g. SWOT). If perceptions of feasibility are critical, they can bias an organization's information search. 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. That is, change the question from "Can we do it?" to "How can we do it?"

Hamel and Prahalad (1989) may argue for a focus on core competencies, but they also argue for an organization working hard to envision radical new opportunities (1994). Both Senge (1992) and Mintzberg (1994) would argue that strategic planning must fully incorporate learning. To do so also requires an appropriately supportive cognitive infrastructure to encourage an "opportunity-first" approach.

Conclusion

Perhaps the most critical antecedent of organizational action is the categorization of strategic issues into opportunities and threats. As with intentions, opportunities are constructed, not found (Mintzberg, 1994; Dutton & Jackson, 1987; Dutton, 1993). An organization that wishes to promote entrepreneurial activity must establish conditions where its members see the prospect of seeking new opportunities (and the uncertainty associated with it) itself as an opportunity, not as a threat.

Understanding what inhibits entrepreneurial activity in an organization 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. Based on 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. An organization's cognitive infrastructure should enhance, not impede, these critical perceptions.

The pursuit of entrepreneurial opportunities appears quite amenable to the use of such models in teaching and practice as well as research. We look forward to further testing the model and its components.

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