ENTREPRENEURIAL ACTION: EXPLOITATION DECISIONS UNDER CONDITIONS OF UNCERTAINTY

ALEXANDER McKELVIE
Whitman School of Management
Syracuse University
Syracuse, NY 13244
mckelvie@syr.edu

VERONICA GUSTAFSSON
Jonkoping International Business School

J. MICHAEL HAYNIE
Whitman School of Management, Syracuse University

ABSTRACT

We explore opportunity exploitation decisions made under varying conditions of uncertainty. We conceptualize uncertainty as a multidimensional construct, and employ conjoint analysis to understand entrepreneurs' likelihood of exploiting an opportunity by going forward with a new product launch given varying combinations of state, effect, and response uncertainty.

INTRODUCTION

In this article it is our aim to investigate the relationship between entrepreneurial action, and one of the most closely held assumptions in entrepreneurship – that entrepreneurs make decisions and subsequently act in the face of inherently uncertain, even unknowable futures (e.g. Knight, 1921; Shane & Eckhardt, 2003; Sarasvathy et al., 2003). We do not challenge that assumption – in fact, we embrace it. All entrepreneurial action, whether embodied as the entering of new markets, the release of a new product or service, altering existing production methods, or the development of a new venture, is subject to uncertainty (McMullen & Shepherd, 2006). It is our purpose to investigate how, and with what consequence, uncertainty is manifest in the decisions of entrepreneurs to *act* on an opportunity that is objectively 'worth' pursuing (McMullen & Shepherd, 2006). Our theorizing is based on the proposition that an important antecedent to the variations in the intensity of entrepreneurial action suggested above is the nature of the uncertainty that surrounds the decision to act.

While the role of uncertainty is central to entrepreneurship, empirical investigations focused on uncertainly as a multi-dimensional construct are limited. Generally, scholars have focused their research on environmental uncertainty, which Miles and Snow define as "the predictability of conditions in the organization's environment" (1978: 195). However, in an important review of the uncertainly literature, Milliken (1987) posits that uncertainty can (and should) represent the concomitant consideration of three dimensions of uncertainty: *state* uncertainty, *effect* uncertainty, and *response* uncertainty. State uncertainty defines the uncertainty associated with the conditions and attributes associated with the organization environment in which the firm is an actor. Effect uncertainty defines uncertainty associated with the nature of the impact of these changes in the environment. Response uncertainty defines the

uncertainty associated with the actions of the actor in the shared, competitive space may pursue in response to changes in the environment (Milliken, 1987). Despite this important theoretical distinction between types of uncertainty suggested by Milliken, subsequent research focused on the relationship between entrepreneurship and uncertainty remains primarily one-dimensional in terms of how scholars consider uncertainty (Atuahene-Gima & Li, 2004). Thus, it is the purpose of this study to investigate how and with what consequence uncertainty impacts the decisions of entrepreneurs to *act* on an opportunity that is objectively 'worth' pursuing (McMullen & Shepherd, 2006).

Our research provides three main contributions. Firstly, we provide novel empirical insights into the role that uncertainty plays in the entrepreneurs' decision to exploit a new opportunity. Uncertainty is a central concept to entrepreneurship research, yet at the present, researchers still have limited knowledge as to how uncertainty affects entrepreneurial decisions (O'Brien, Folta & Johnson, 2003). Secondly, we tease out the individual effects of types of uncertainty on these decisions. By building upon Milliken's (1987) work, we are able to specify the respective impacts of state, effect, and response uncertainty. While Milliken's (1987) study has been highly influential in a number of areas, including how uncertainty affects the strategic behavior of firms (e.g. Miller & Shamsie, 1999), there is a deficit in our understanding as to how *types* of uncertainty influence entrepreneurs. Thirdly, we examine how magnitude of exploitation affects these decisions, thus focusing on how entrepreneurs deal with uncertainty. We find that the type of exploitation moderates the relationship between uncertainty and willingness to exploit an opportunity. As such, we provide a more fine-grained analysis concerning the conditions surrounding exploitation.

UNCERTAINTY AND THE ENTREPRENEURIAL ENVIRONMENT

The idea of uncertainty is fundamental to entrepreneurship (Knight, 1921; McMullen & Shepherd, 2006). However, while the importance of uncertainty to entrepreneurship is scarcely debated, the notion of exactly how scholars conceptualize uncertainty is far from settled in the literature. Some have suggested that uncertainty defines an 'inability to assign probabilities as to the likelihood of future events' (Duncan, 1972; Pennings, 1981; Pfeffer & Salancik, 1978), while others have proposed uncertainty to be 'a lack of information about cause-effect relationships' (Lawrence & Lorsch, 1972). Still others have suggested that uncertainty describes 'an inability to predict accurately what the outcomes of a decision might be' (Downey & Slocum, 1975; Duncan, 1972; Schmidt & Cummings, 1976). One outcome of these diverging definitions of uncertainty is that there tend to be disagreements as to the impact of uncertainty on action (Miller & Shamsie, 1999). We follow Miliken's (1987) distinction between types of uncertainty in order to develop hypotheses. simplicity.

State Uncertainty

State uncertainty refers to the "perception by an individual that a particular component of the environment is unpredictable; more specifically, that one does not understand how the components of the environment are changing" (Milliken, 1987: 137). As state uncertainty increases, it becomes increasingly difficult to understand and predict the future state of the external environment. Milliken suggests that "To the extent that volatility, complexity, and heterogeneity make the environment less predictable," it is probable that the decision-maker will be more impacted by state uncertainty as compared to a decision-make who 'functions in a more

stable environment' (Milliken, 1987: 137). Milliken (1987) cites several factors that drive state uncertainty, including demographic shifts, socio-cultural trends, and changes in suppliers, customers, and competitors.

The dynamism inherent in entrepreneurial contexts suggests high levels of state uncertainty. For example, technology and customer demand uncertainties are prevalent in dynamic markets. State uncertainty driven by technological change and obsolescence may influence the entrepreneur's ability to predict future technologies. Research suggests that entrepreneurs may avoid exploiting new technology-based products, for example, in environments with high levels of technology uncertainty (Pavitt, 1998). Similarly, substantial changes in customer demand have a negative effect on new product launches, as the state uncertainty associated with future demand patterns may be interpreted to suggest that the entrepreneur has 'lost touch' with the consumer (Jaworski & Kohli, 1993). Customer demand for new products generally depends on whether customers know of the product, and find it valuable (Aldrich & Fiol, 1994). A lack of familiarity with customer needs, as would occur with high levels of demand uncertainty, increases the uncertainty involved in new product launch, which would make an opportunity appear less attractive. Put simply, we suggest that in an environment characterized by high state uncertainty will have a significant influence in the context of an entrepreneur's decision to *act*, to exploit a new opportunity. Thus,

> *H1: An entrepreneur's willingness to engage in entrepreneurial action, as reflected in his or her decision to exploit a new product opportunity, will decrease as the level of state uncertainty increases.*

Effect Uncertainty

Research suggests that even in the presence of high levels of environmental dynamism and uncertainty (state uncertainty), entrepreneurs tend to focus on the direct impact of these changes on the venture (Abernathy & Clark, 1985). That is, decision-makers often believe that they still can satisfy specific needs, despite environmental changes (Grewal & Tansuhaj, 2001). However, decision-makers are still interested in the actual implications of the state uncertainties on the technological and customer needs (Tushman & Nelson, 1990). The predictability of the effects on the firm are thus of further concern for potential product launch. Christensen and Bower (1996) argue that the changes in customer and technological demands rarely deviate beyond the firm's current knowledge and competences. However, the less predictable the effects of the changes are, the higher the risk that the firm's existing knowledge and products will not be able to satisfy technological and customer requirements at that moment (Jaworski & Kohli, 1993). We suggest that entrepreneurs will avoid exploiting opportunities in situations where they are not able to understand and predict the effects of changes in the environment on the firm. Thus,

> *H2: An entrepreneur's willingness to engage in entrepreneurial action, as reflected in his or her decision to exploit a new product opportunity, will decrease as the level of effect uncertainty increases.*

Response Uncertainty

In cases where there is a need to act, response uncertainty is of utmost importance (Duncan, 1972). Experiencing ambiguity in the possible strategic action goes directly against the purpose of the action itself, whether it is eliminating a threat or taking advantage of an opportunity (Milliken, 1987). In the context of this study, we are examining the choice of

exploiting a perceived potential opportunity. Successful action in the case of dynamic markets, while bearing in mind demand and technological uncertainty, is connected to being able to achieve competitive advantage from the action. As competitive advantage in this type of market is not sustainable (Eisenhardt & Martin, 2000), earning repeated advantages is the necessary method. For this to occur, firms can go about doing two things: firstly, they can achieve a first mover advantage by being first to market with a new product (Liberman & Montgomery, 1988). This can be seen as the lead time over competitors following a successful launch, where the firm can be seen as having a monopoly position. Secondly, subsequent releases and updates building upon existing firm-specific competences can keep a firm ahead of competitors (Miller, 1996). However, uncertainty concerning the entrepreneur's ability to do either of these call into question the actual benefits of a making a strategic move.

H3: An entrepreneur's willingness to engage in entrepreneurial action, as reflected in his or her decision to exploit a new product opportunity, will decrease as the level of response uncertainty increases.

Tolerance of uncertainty is a trait commonly attributed to entrepreneurs (McClelland, 1961). This is partially explained by their specific attitudes, internal locus of control (cf. Delmar, 2000) and to a larger degree by their specific cognitions and heuristics (Busenitz & Barney, 1997; Baron, 1998). In other words, attitudes and the way of thinking would support the entrepreneur's confidence in the company's ability to cope with market uncertainty. However, when the actions and decisions of an entrepreneur go from trying to understand the external environment and how it is changing to trying to understand the consequences of one's own actions, then this confidence shifts. Uncertainty pertaining to one's own behavior provides serious doubt as to whether an action is feasible or profitable. That is, uncertainty concerning external factors may be overcome by (over)confidence; uncertainty concerning one's own abilities and behaviors is not as easy to overcome. For this reason, we argue that response uncertainty, i.e. that relating to the outcomes of the behavior of the entrepreneur, will have a large effect on exploitation decisions than state and effect uncertainty.

H4: The negative relationship between state, effect, and response uncertainty and the willingness of the entrepreneur to engage in entrepreneurial action, as reflected in his or her decision to exploit a new product opportunity, will be more negative for response uncertainty than for state and effect uncertainty, all else being equal.

Type of entrepreneurial action

In highly dynamic markets, where uncertainty reigns, it is not possible to "wait and see" or use a follower strategy, as competitive positions change and windows of opportunity close (Bourgeois & Eisenhardt, 1988). Achieving competitive advantage is difficult, if not impossible, without engaging in some sort of large-scale operation. Entrepreneurs, though they are not in general uncertainty averse, will engage in various actions in order to reduce the level of uncertainty that they encounter. This supports the idea that firms will prioritize an incremental process over a comprehensive one in changing markets (Braybrooke & Linblom, 1963; Daft & Weick, 1984). On the other hand, research bears witness that entrepreneurs may behave entrepreneurially before all potential uncertainties are resolved (Busenitz & Barney, 1997; Baron, 1998). In industries with moderate uncertainty, entrepreneurs are more willing to engage in more large-scale action in order to maximize revenues (cf. Stevenson and Jarillo, 1990). But, a more experimental, small-scale approach will be used in extremely fast-changing markets so that

entrepreneurs can learn more about the environment (McGrath, 1999), and a more encompassing, large scale one where the market is more moderately dynamic.

H5a-c: The negative relationship between state, effect, and response uncertainty, and the willingness of the entrepreneur to engage in entrepreneurial action, is moderated by the scale of the exploitation action, such that the relationship is less negative for a small-scale launch as compared to a large-scale launch.

RESEARCH METHOD

To investigate the hypotheses presented above, we employ conjoint analysis. Conjoint analysis represents a research design that requires respondents to make a series of evaluations or judgments based on a defined set of attributes that together, describe a given exploitation scenario. The underlying factors responsible for the respondent's decision policy are decomposed using hierarchical liner modeling techniques (Shepherd & Zacharakis, 1997). Conjoint studies have been applied widely and with great impact in the fields of marketing, psychology, strategic management, and many other disciplines (Green & Srinivasan, 1990).

For this study, the conjoint was as a web-based design. The sample for this study consisted of technology entrepreneurs working in the Swedish software industry. Our final sample included 90 technology entrepreneurs and these were the main decision-makers at firms with 50 employees or fewer. The entrepreneurs were instructed to evaluate, of a scale of 1-9, their willingness to exploit a new product opportunity given the unique combination attributes representative of each scenario. We define the dependent variable as willingness to begin immediate full-scale operations in launching this product to the market. The conjoint study uses six independent variables, corresponding to two variables per type of uncertainty that Milliken (1987) laid out.

We focus on two major components of state uncertainty, effect uncertainty, and response uncertainty respectively. For State uncertainty, defined as the uncertainty encountered in the external environment to the firm, we focused on the rate of technological change and the rate of demand change. For Effect uncertainty, relating to the impact of environmental (i.e. state) uncertainty, we looked at the predictability of technological change and the predictability of demand change. Response uncertainty relates to the uncertainty in understanding the response options that the firm can partake in and the value/utility of these. We capture this with the Potential lead-time over competitors and Ability to sustain innovative leadership. These reflect the perceived "window of opportunity" and ability to release further innovations respectively.

We also use one moderating variable in this study. Type of launch method is defined as the method in which the firm chooses to exploit the opportunity at hand. Potential launch methods were "major launch", where the firm would be required to release the product directly to a national market, and "minor launch" where the firm would release to only a few customers. The former would involve greater costs in launching but potentially higher financial return, whereas the latter would entail smaller costs and lower potential returns.

Our statistical analysis draws on 32 decisions from 90 individuals, thus yielding a total of 2880 exploitation decisions. However, these data points are not entirely independent since each set of 32 observations is nested within an individual decision-maker and his or her organizational environment. We therefore applied Hierarchical Linear Modelling (HLM), which accommodates autocorrelation and potential heteroskedasticity of data (Hofmann, 1997). HLM has been applied in conjoint experiments before (e.g. Brundin, Patzelt & Shepherd, 2007).

DISCUSSION & CONCLUSION

The purpose of this research was to evaluate the differential effects of type of uncertainty on decisions to engage in entrepreneurial action, following Milliken's (1987) theoretical distinctions. Not surprisingly, we found that higher levels of uncertainty had a negative impact of individual's willingness to launch a new product to the market. This generally leads us to conclude that entrepreneurs may be adverse to uncertainty when it comes to making decisions about opportunity exploitation. However, more importantly, we find that the 'type' of uncertainty matters. Response uncertainty, i.e. the uncertainty concerning the outcomes of the behaviors that the individual engages in, represents the most impactful impediment to opportunity exploitation. This implies that the most important facet of uncertainty pertains to the extent to which entrepreneurs can predict the outcomes of their own behavior. We see this as suggesting that decisions concerning entrepreneurial action are primarily governed by the ability of entrepreneurs to control the future via their own actions, not their ability to predict the future.

This type of logic resonates well with Sarasvathy's (2001) descriptions of effectuation. According to this view, effectuation is a decision-making strategy where entrepreneurs do not attempt to predict the unknowable future (e.g. Knight, 1921). Rather, through their own actions, knowledge, and skills, entrepreneurs create their own future (Sarasvathy et al., 2003). Her results, and to an extent ours, are generally in line with already numerous studies of entrepreneurial cognitions (cf. Baron, 1998; Busenitz & Barney, 1997), which state that entrepreneurs are prone to widely use heuristics, or mental shortcuts, i.e. decision-making techniques that can be at variance with statistically relevant methods of decision-making and choice. Using heuristics and internal control is in direct contrast to the approach to decision-making that is often taught at business schools, where rational analyses of the environment are carried out.

Further, we find evidence that the magnitude of the exploitation (i.e. small, incremental launch vs. broad, large-scale launch) significantly moderates the relationship between the entrepreneurs' willingness to act and uncertainty. This suggests that as the market potential and success of an innovation might diminish, firms prefer to act quickly in order to maximize returns from this launch. This finding is in line with the entrepreneurial management literature (e.g. Stevenson & Jarillo, 1990) and risky behavior. This type of approach also falls in line with the effectuation reasoning, namely the "affordable loss" principle (Sarasvathy, 2001). Indeed, as uncertain situations call for trial-and-error approach, entrepreneurs can launch the new product on a smaller scale, without putting too much at stake; this can explain why entrepreneurs prefer uncertainty-reduction strategies to profit maximization. This finding may simply be an artifact of the sample that we are studying. Small firms may be more resource-strapped and vulnerable to errors based on unexpected negative consequences of a faulty decision.

REFERENCES AVAILABLE FROM THE FIRST AUTHOR