

How 'Job Creators' Think

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Abstract

In this study, we present a model of venture growth that incorporates several individual and firm-level constructs to explore how the cognitive style of owner-managers influences the likely antecedents of firm growth, and thereby indirectly firm growth itself. Drawing on a sample of 150 principal owner-managers of technology-oriented SMEs, we tested our model using structural equation modeling. Cognitive style is indirectly related to venture growth through prior ownership experience, intentions to grow, formalization, and planning. Counter to prediction, prior ownership experience and formalization are negatively related to venture growth. The implications of these findings for researchers and practitioners are also discussed.

Introduction

Venture growth is an essential component of entrepreneurship (Covin & Slevin, 1997) and while it leads to highly valued economic and social outcomes (e.g., Aldrich, 1999) venture growth as a research phenomenon is still not sufficiently understood (Wiklund, Patzelt, & Shepherd, 2009). There has been an increasing recognition in the entrepreneurship literature that firm growth is a complex outcome influenced by a host of factors (Shane & Venkataraman, 2000) and that comprehensive models of venture growth, including multiple theoretical approaches and variables across different levels of analysis, are necessary to capture the complexities of the process and outcome (e.g., Baum & Locke, 2004; McKelvie & Wiklund, 2010). In their comprehensive book *Entrepreneurship and the Growth of Firms*, Davidsson, Wiklund and Delmar (2006, p. 39) concluded that despite the central importance of venture growth in entrepreneurship and substantial research on the topic, "knowledge about what facilitates and hinders growth is scattered and limited."

Firm Growth

The same is true for insights into the antecedents of firm growth for small to medium-sized enterprises (SMEs), which are the primary drivers of economic and job growth in most economies, and technology-oriented SMEs which play a particularly pivotal role in economic growth and prosperity (Baron & Markman, 2003).

SMEs are most often run by owner-managers, and in the U.S., approximately 12 million businesses have owners whose principal occupation is operating and managing their firms (Dennis, 2000). Despite their key role as enactors of firm growth, the importance of business owners is often overlooked in the study of firm growth (Achtenhagen, Naldi, & Melin, 2010). Baum, Locke and Smith (2001) concluded that the owner-managers of small firms have more influence over their firms' growth than established macro explanations such as population ecology or resource dependence theory (e.g., Hannan & Freeman, 1977; Pfeffer & Salancik, 1978) would likely predict. Furthermore, Baum and Locke (2004) assert that multiple individual dimensions of the owner-manager, including traits, motivations, and goals, either directly or indirectly affect firm growth, and suggested that future research on venture growth should examine other psychologically based individual constructs.

Thus, understanding the influence of the owner-manager concurrent with other potential determinants of venture growth in technology-oriented SMEs is an important research goal.

Recognizing the critical role of the entrepreneur in entrepreneurship, some researchers have sidestepped trait-based research which has a problematic history (see, e.g. Brockhaus, 1986; Sexton and Bowman-Upton, 1990, 1991) to incorporate psychologically based individual-level constructs into the larger



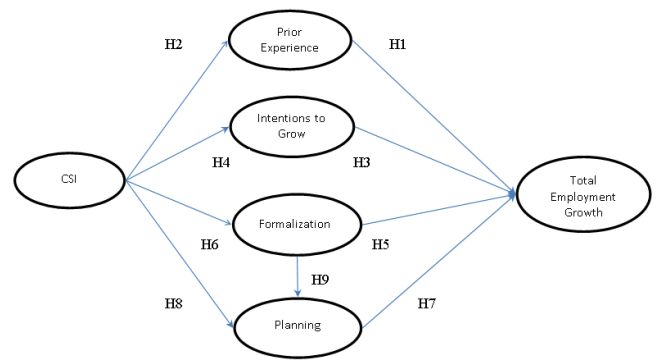
entrepreneurial equation through research on entrepreneurial cognition (Mitchell et al., 2007). Entrepreneurial cognitions are defined as the “knowledge structures used to make assessments, judgments, or decisions involving opportunity evaluation, venture creation, and growth,” and are fundamental to understanding entrepreneurial behavior (Mitchell, Busenitz, Lant, & McDougall, 2002, p. 97). A central tenet of the cognitive perspective is that individual differences in cognitive processing lead to differential entrepreneurial behaviors and outcomes.

Cognitive and Decision-Making Style

Recently, researchers have begun to explore the relationship of cognitive style, and more specifically decision-making style, with important entrepreneurial factors such as opportunity recognition (Corbett, 2005; 2007), habitual entrepreneurship (Ucbasaran, Wright, Westhead, & Busenitz, 2003), entrepreneurial intentions (Brigham, De Castro, & Shepherd, 2007) and entrepreneurial self-efficacy (Kickul, Gundry, Barbosa, & Whitcanack, 2009). In this paper, we extend the cognitive-style research stream by examining the impact of decision making style on the entrepreneurial outcome of firm growth. By utilizing this approach, we contribute to this stream by demonstrating how incorporating cognitive style into existing conceptualizations and models of firm growth may provide deeper understanding of some of its complexities.

Following Baum et al. (2001), we use structural equation modeling to investigate the web of direct and indirect relationships among the owner-manager’s decision-making style, prior entrepreneurial experience, growth intentions, levels of formalization and planning in his or her firm, and employment growth in technology-oriented SMEs. Our aims were to test whether our model, drawing from emerging research at the individual and organizational levels, would significantly predict firm growth, and to explore the dynamic relationships among individual and firm- level constructs. The overarching goal is to develop a better understanding of the role of the decision-making style of the owner-manager in the subsequent growth of his or her firm. The measurement model is presented in Figure 1.

FIGURE 1: Hypothesized Model of Venture Growth



Note: For enhanced readability, control variables are not depicted on this figure

In the following sections, we present theoretical foundations and develop several hypotheses, present the results of the empirical tests, and discuss the implications of our findings and avenues for future research.

Theory and Hypotheses

Individual Cognitive Style

The concept of cognitive style has developed as a way of describing the highly-stable thinking choices that individuals make between strict economic rationality (e.g. Mill, 1836) and more intuitive approaches. Researchers have long recognized that individuals may not follow purely rational and logical approaches to decision making (e.g., Barnard, 1938; Simon, 1976). For example, Mintzberg (1994) argues that, for managers, too much emphasis has been placed on rational analysis; and in response to this, there has developed a growing recognition that effective managerial decision-making requires both rational and intuitive modes of decision-making (Akinci & Sadler-Smith, 2012; Miller & Ireland, 2005).

This view is consistent with theories of cognitive style which suggest that particular style preferences are presumed to be value free and that the utility of a particular style will depend on the information processing demands of the situation or context. Thus, as the notion of stable individual cognitive styles has developed, Khatri and Ng (2000), for example, have proposed that “intuitive synthesis” is more beneficial when a manager is dealing with strategic (non-routine) decisions than with day-to-day (routine) decisions; and that intuitive synthesis is more effective in unstable versus stable environments; or that intuition is more appropriate when there is little precedent for action,

higher uncertainty, limited data, and multiple options (Agor, 1990). Therefore, the use of a less rational, more intuitive approach to decision-making may be advantageous in some situations, particularly those that are more unstructured, but a liability in others (Dane & Pratt, 2007).

Biases and Heuristics

With respect to entrepreneurship in particular, a growing body of research suggests that entrepreneurs are more prone to use biases and heuristics in their decision-making than managers, and that this tendency plays a role in their decisions to engage in entrepreneurship (Baron, 1998; 2004; Busenitz & Barney, 1997; Forbes, 1999). However, while the use of biases and heuristics is often associated with non-rational processing and sub-optimal outcomes (Kahneman, Slovic, & Tversky, 1982), employing a heuristic-based logic may be more prevalent and advantageous among entrepreneurs who tend to operate in more time-sensitive, uncertain, and complex contexts (Busenitz & Barney, 1997; Mitchell et al., 2007).

Thus, for example, Allinson, Chell, & Hayes (2000) assert that an intuitive cognitive style is more compatible with entrepreneurial activity than with rational approaches. Accordingly, the investigation of individual cognitive style as an important influencer of behavior (Sadler-Smith & Badger, 1998) appears to be important to the exploration of the impact of entrepreneurs on the growth of their ventures. In a recent review of the cognitive style construct, Armstrong, Cools, & Sadler-Smith (2012) highlighted entrepreneurship as a high potential area for future research.

Cognitive style has been defined as an individual's preferred and consistent approach to gathering, processing, and evaluating information (Riding & Rayner, 1998; Streufert & Nogami, 1989); perceptual attitudes that regulate cognitive functioning (Klein, 1951); and stable modes of perceiving, remembering, thinking, and problem solving (Messick, 1976). Cognitive style has been conceptualized as a high-order heuristic that individuals use to collect and process information (Kozhevnikov, 2007; Messick, 1976), and to integrate this information into the theories, models, and schemas that shape their decision-making and behaviors (Hayes & Allinson, 1998). Accordingly in this study, we have defined cognitive style to be: *an individual's stable and preferred mode of information collection and processing that shapes decision-making*

and behavior.

Cognitive styles include a broad grouping of conceptualizations, labels, models, and measures. Consistent with conceptualizations relating cognitive style to tradeoffs along the rationality/ intuition continuum, Allinson and Hayes (1996) theorized that while there are a number of dimensions on which cognitive style has been differentiated, they all fall within the generic and superordinate dimension of intuition as distinct from rational analysis. This conceptualization therefore places individuals along a bipolar continuum anchored at one end by a more holistic and heuristic-based logic labeled *intuitive*, and at the other end by more analytic and rational-based logic labeled *analytic*.

Extensive evidence supports such a unitary dimension of cognitive style: the Cognitive Style Index has been gathered and published under separate cover (e.g. Allinson and Hayes, 1996; Allinson et al., 2000; Allinson & Hayes, 2012.). For example, the mean CSI score for Scottish entrepreneurs (high growth owner-managers) was significantly more intuitive than the mean CSI score from previous samples of managers in general (Allinson et al., 2000). Khatri and Ng (2000) reported that senior managers in the computer industry relied more on intuition than did their counterparts in more stable industries, and that intuitive synthesis was significantly positively associated with firm performance measures in the less stable computer industry and significantly negatively associated with measures of performance in the more stable utilities industry. Sadler-Smith (2004) reported that a more intuitive style (using the General Decision-Making Style Questionnaire) was a significant predictor of employee growth for a sample of owner-managers of U. K. SMEs.

Technology-oriented SMEs often operate in "high velocity" entrepreneurial contexts where decisions need to be made quickly with limited data or precedent (Eisenhardt, 1989). Accordingly, we theorize (as suggested in Figure 1) that there is strong theoretical and empirical support for the idea that variations in individuals' cognitive style along the intuitive – analytical dimension may be useful in helping to better understand variations in possible firm growth-stimulating variables such as prior ownership experience, growth intentions, formalization, and planning, as well as venture growth itself.

Prior Ownership Experience

Researchers have differentiated between entrepreneurs with no previous entrepreneurial experience (novice entrepreneurs) and those who have pursued entrepreneurship prior to their current venture (habitual entrepreneurs) (e.g., MacMillan, 1986; Westhead & Wright, 1998). Researchers studying novice, habitual, and portfolio (defined as concurrent ownership) entrepreneurship have proposed that these different types of entrepreneurs may think and process information differently, which may help explain the motivations underlying habitual behavior (Ucbasaran et al., 2003; Westhead, Ucbasaran, & Wright, 2005a; Westhead, Ucbasaran, & Wright, 2005b). In their initial validation study, Allinson & Hayes (1996) did note that more senior managers did have more intuitive styles than junior managers across two of their samples. This introduces the idea that while cognitive style is theorized to be a stable dimension, more senior managers (Mintzberg, 1976) or experts may use intuition more than novices experts may use intuition more than novices (e.g., Chase & Simon, 1973) and the causal path between style and certain expert behaviors may possibly be recursive.

However, following the theoretical assumptions behind decision-making models, we posit that in that prior ownership experience is being driven more by selection and the fit between an intuitive style and the more congruent environment of entrepreneurial contexts (e.g., Brigham et al., 2007) Ucbasaran et al. (2003) argued that habitual entrepreneurs can be differentiated from novice entrepreneurs based on their greater use of heuristic-based thinking. Buttner and Gryskiewicz (1993), employing the Kirton Adaption-Innovation Theory and Measure of decision-making style (Kirton, 1976), reported that habitual entrepreneurs possessed more innovative (non-rational) styles than novice entrepreneurs. Ucbasaran et al. (2003) proposed that the CSI could be a particularly useful measure for differentiating levels of entrepreneurial cognition among novice, serial, and portfolio entrepreneurs. Consistent with Ucbasaran et al. (2003), we theorize that individuals would be more inclined toward habitual entrepreneurship, indicated by prior ownership, based on levels of intuitive cognitions.

Hypothesis 1: The more intuitive the owner-manager's cognitive style, the more likely he or she has prior ownership experience.

Furthermore, drawing on human capital theory, Becker

(1975) posits that individuals with greater human capital will achieve higher performance on relevant tasks. In the extant entrepreneurship literature, prior ownership experience is frequently used as an indicator of specific human capital (e.g., Florin, Lubatkin, & Schulze, 2003, Wiklund & Shepherd, 2008), and the source of distinction between novice and habitual entrepreneurs (Ucbasaran, Wright & Westhead, 2003). Westhead and Wright (1998) proposed that firms owned and managed by habitual entrepreneurs would outperform novice-run firms. Starr and Bygrave (1991) propose that the acquired skills, networks, and expertise of habitual entrepreneurs should translate to greater business success. Davidsson and Honig (2003) concur, and propose that prior ownership experience and expertise will lead to enhanced performance. Thus, we offer the following hypothesis, where total employment growth represents success/ performance as is common in the literature:

Hypothesis 2: Prior ownership experience will be positively associated with total employment growth.

Growth Intentions

Entrepreneurial intentions are influenced by a number of individual and contextual factors (Bird, 1992; Hmieleski & Corbett, 2006). The decision to grow or not to grow one's business is a conscious choice of the entrepreneur (Sexton & Bowman, 1984). Furthermore, the decision to seek business growth is not purely motivated by economic factors, but is often the result of a variety of experiential, situational, and motivational factors (Kolvereid, 1992; Orser, Hogarth-Scott, & Riding, 2000). Sadler-Smith (2004) suggests that more intuitive owner-managers may have higher growth intentions than do more analytic owner-managers. Allinson et al. (2000) reported that the mean CSI score for Scottish entrepreneurs (high-growth owner-managers) was significantly more intuitive than the mean CSI scores from previous samples of managers. Brigham and De Castro (2003) reported that for a sample of owner-managers, more intuitive styles (using the CSI) were significantly correlated with growth intentions.

Hypothesis 3: The more intuitive the owner-manager's cognitive style, the greater his or her intentions to grow the firm.

In this connection, research has demonstrated that intentions are a reliable and highly effective predictor of

actual behavior across a variety of contexts (Ajzen, 1991; Ajzen & Fishbein, 1980; Krueger & Carsrud, 1993). Based on a meta-analysis, Kim & Hunter (1993) reported that intentions explain approximately 30 percent of the variance in behavior. This explanatory power compares favorably with trait measures, which explain approximately 10 percent of the variance in behavior (Ajzen, 1987; Kim & Hunter, 1993). In entrepreneurship, the research on intentions has primarily focused on the intention to become an entrepreneur (e.g., Bird, 1992; Krueger & Carsrud, 1993). In our model, we focus on the growth intentions of the owner-manager.

Owner's growth intentions have been found to be a significant predictor of firm growth (Orser et al., 2000) and are a key characteristic of entrepreneurial behavior (e.g., Stewart, Watson, Carland, & Carland, 1998). Growth intentions are heterogeneous among entrepreneurs, and firm growth is not always a desired outcome (Orser et al., 2000). For instance, Blatt (1993) reported that nearly half of the owners of newly registered businesses do not seek growth of their firms, and O'Farrell and Hitchens (1988) reported that a high proportion of small firms are more interested in maintaining current profitability than in growth. Accordingly we expect:

Hypothesis 4: The owner-manager's intentions to grow the business will be positively associated with total employment growth.

Formalization

In organizational settings, analytic individuals subscribe to the bureaucratic norm and prefer work settings that are oriented towards careful routines, governed by logic, and highly structured (e.g. Kirton, 1989; Scott, 1975). In contrast, intuitive individuals prefer freedom from rules and regulations, and an organizational setting that is flexible, and unstructured (Allinson & Hayes, 1996; Kirton, 1989). In their initial validation study of the CSI, Allinson and Hayes (1996) presented correlation evidence supporting the theorized link between an individual's dominant cognitive style and his or her preference for formal structure. Individuals with a more intuitive decision-making style preferred lower levels of structure and formalization, whereas individuals with a more intuitive decision-making style preferred higher levels of structure and formalization.

Brigham et al. (2007) proposed that an intuitive style was congruent with less formalized work contexts and found that owner-managers in "cognitive misfit" (analytic owners in less formalized firms and intuitive owners in more formalized firms) had lower satisfaction and higher intentions to exit. Thus, while formalization is correlated with increases in firm size (e.g., Dobrev & Barnett, 2005), we hypothesize that the intuitive owner-manager, based on the preferences associated with an intuitive style, will be more resistant to implementing formal structure in his or her firm.

Hypothesis 5: The more intuitive the owner manager's cognitive style, the lower the levels of formalization in his or her firm.

Firm size and levels of formalization within a firm are generally highly correlated (Child, 1973; Dobrev & Barnett, 2005; Katz & Kahn, 1978). As organizations mature and grow, systems, routines, and standardized operating procedures become more prevalent (Blau & Scott, 1962; Hanks, Watson, Jansen, & Chandler, 1994); formal structure increases (Dobrev & Barnett, 2005); and rational, bureaucratic forms emerge (Miller, 1983; Scott, 1975). Firm size is often viewed as leading to increases in firm structure, but we propose that, especially in SMEs, increased formalization may also be driving firm growth and, subsequently, size.

Firms in the start-up stage typically have simple organizational structures and very low levels of formalization (Greiner, 1972; Hanks et al., 1994). The growth stage is characterized by increased formalization, including written and established documentation, policies, procedures, and routines (Olson & Terpstra, 1992). Stevenson, Roberts, & Grousbeck (1993) proposed that a firm's general manager must make difficult choices regarding the levels of formalized controls. For a firm to reach the coordinated level of *Professional management* (the optimal type for growth), the manager must establish relatively high levels of formalized controls to complement higher delegation (Stevenson et al., 1993).

In their study of life-cycles and technology-oriented SMEs, Hanks et al. (1994) identified a cluster of firms that were not growing, and they suggested that this might be a case where the owners' unwillingness to institute formal controls effectively arrested the development of these firms. Increased formalization is typically associated with efficiency gains that may allow

the firm to survive, increase profits, and reinvest in future growth (Stevenson et al., 1993). The increase of formalization would not be expected to be positively related to firm performance in all situations. However, in the context of owner-managed SMEs, the willingness of the founding owner-manager to adopt some formalization and move towards a more professionally managed firm may be a key step in promoting future growth. Thus, we offer the following hypothesis:

Hypothesis 6: Level of formalization will be positively associated with subsequent employment growth.

Planning

Mintzberg (1976) highlighted the dual cognitive demands of managerial work. He used a split-brain metaphor to highlight the contrasting nature of planning and routine work associated with the left hemisphere and demanding more rational processing and managing through the development of creative and integrated strategies which requires more holistic and less rational processing and is associated with the right hemisphere. Planning activities involve sequential, rational, left-brain processing (Mintzberg, 1976) and this type of processing is consistent with the analytic dimension of cognitive style (Allinson & Hayes, 1996).

In the entrepreneurship literature, several authors have suggested that a more rational, analytic cognitive style is better suited to dealing with planning activities in the entrepreneurial process (e.g., Miller, 1983; Olson, 1985). More specifically, Kickul et al. (2009) examined the relationship between cognitive style and self-efficacy on number of key activities in the venture creation process. They proposed that an analytic style corresponded to entrepreneurial planning activities and, using the CSI measure, found that analytic respondents were much more confident in their ability to plan. An implication of this finding is that intuitive entrepreneurs, having lower efficacy in their planning abilities, may be less likely to apply planning in the entrepreneurial process. Thus, we offer the following hypothesis:

Hypothesis 7: The more intuitive the owner-manager's cognitive style, the lower the levels of planning in his or her firm.

Drawing on the work of Mintzberg (1973; 1979), Miller (1983) proposed a typology of firms that included *simple*, *planning*, and *organic* firms. Simple firms are characterized by low levels of structure and "there is

generally little planning." This is in contrast to planning firms which have "elaborate control and planning systems." Organic firms incorporate more structure and planning than simple firms, but are not as dependent on planning as planning firms. Miller's (1983) typology suggests that for firms to grow and evolve beyond a simple structure - where one key individual usually exerts and maintains control, planning is minimal, and potential growth is limited - increased planning may be a necessary requirement.

Regarding planning in the entrepreneurial process, Olson (1985) proposes that in later phases of the process the entrepreneur must focus more on market opportunities and the development of plans for financing, production, and distribution. Recognizing the potentially important role of planning on entrepreneurial firm growth, researchers have incorporated measures of planning in their models and reported significant positive associations between planning and firm growth (Duchesneau & Gartner, 1985; Orser et al., 2000). Accordingly, we expect:

Hypothesis 8: Level of planning will be positively associated with subsequent firm growth.

Also, as is evident in our previous discussion of formalization and planning, the two constructs are likely related and positively correlated. Miller (1983) notes that planning firms are characterized by highly formalized mechanistic structures and machine bureaucracies (Mintzberg, 1979). Mechanistic structures can serve to enhance both the development and successful implementation of plans (Slevin & Covin, 1997). Thus, we offer our final hypothesis:

Hypothesis 9: Level of formalization will be positively associated with planning.

Methods

Sample

We sampled companies listed in the 2000 Colorado High Technology Directory. The firms included are: "Companies have been included if they develop and/or manufacture proprietary products that incorporate state of the art technology. In addition software firms, research, development and testing companies and laboratories have been included as have certain consulting and engineering firms that have significant

technical expertise (p. 3).” Eliminating non-profits, subsidiaries, and non-contactable firms, there were a total of 1,207 firms in the sampling frame. Following a pretest, a 58-item questionnaire was mailed to principals (e.g.

CEOs, founders, presidents) in the remaining firms, and a total of four contacts were attempted to obtain responses. The 267 usable returned questionnaires represent a 22.1 percent return rate, which was deemed to be acceptable and typical number for this type of research (Hanks &

Chandler, 1994). We tested for non-response bias by examining means for firm age, sales, and size among responding and non-responding firms and comparing early and late responders using a time-trend exploitation test (Armstrong & Overton, 1977). Statistically non-significant results for both of these tests suggest that non-response bias was not a major concern.

We conducted a follow-up on the status of the firms five years later. Using the 2005

Colorado High Technology Directory, data were collected to track employee growth, identify firms that were still listed, and to ascertain whether the survey respondent was still listed as a principal manager of the company. Direct phone calls to the firms were made to verify the employment and principal status of the respondents. There were 171 of the original 267 firms still listed in the 2005 Directory that reported number of employees. Due to the departure of some original respondents, and removal of additional cases where respondents did not meet our definition of an owner-manager (involved in the day-to-day operations and at least 5 percent ownership in their firm in the 2001 survey) we had 150 owner-manager respondents and their firms constituting the sub sample for our study. In the sub sample, 90 percent of the respondents were male, and the median company age was 15 years with 36 full-time employees.

Latent Constructs and Measures

Total Employee Growth

Following Hanks et al. (1994), who measured growth in the number of employees for a similar sample, we used full-time employee data from the 2000 and 2005 directory, and computed the growth percentage by taking the difference between the 2000 and 2005

employment levels, dividing the difference by the 2000 level. Because the results of this process were heavily right-skewed we used the natural logarithm to transform the data. To account for a potential survivor bias in our sub-sample, we used the Heckman correction procedure (Johnston & DiNardo, 1996). Using the qualitative and limited dependent model procedures in SAS 9.1 and the full data set, we next computed the inverse Mills ratio based on whether a firm in the full data set “survived” to our sub-sample. We then regressed the inverse Mills ratio, which is an outcome of a probit regression that accounts for selection bias, on our transformed employee growth percentages. We used the residuals of this regression, which partial out the influence of the selection bias on employee growth, as our measure of employee growth in our structural equation model.

Intentions to Grow

Using two indicators employed by Westhead and Wright (1998), the 2001 survey asked the respondent about intentions to grow the organization in terms of number of

employees and sales. Respondents were asked, “How would you prefer for the number of employees in the business to change over the next TWO years?” and “How would you prefer for the sales for the business to increase or decrease over the next TWO years?” For both of these items, participants indicated their response using the same 7-point Likert-type scale ranging from 1 = 20% or more decrease, to 7 = More than double. The composite reliability of the measure, which is derived from the confirmatory factor analysis, is a satisfactory .77 (Bollen, 1989).

Formalization

Formalization addresses the clarity, standardization and maturity of organizational practices. The 2001 survey used 7 items previously employed by Hanks et al. (1994) that focused on reporting relationships, internal communications format, and specificity of job descriptions to measure formalization. These items again used a 7-point Likert-type response format anchored by “strongly disagree” and “strongly agree.” For our sub sample, the composite reliability is .86.

Planning

We used three items from the Hanks et al. (1994) scale to measure planning. These items indicated the level of

forward-looking plans and planned expenditures. An example of a planning item is “Capital expenditures are planned well in advance.” Because planning and formalization are related we conducted a factor analysis on the 10 items using SAS 9.1 to support our conceptualization (SAS Institute, 2003). Employing the ML method, the evaluation suggested two factors using the proportion criterion. The first factor accounted for 86 percent of the variance, with the second factor accounting for virtually all of the remaining variance. As anticipated, the results suggest that only the planning indicators significantly load on the second factor. The composite reliability of the planning items is .77.

Prior Ownership Experience

Following Westhead & Wright (1998), in the 2001 survey respondents indicated if they had ever been a founder, owner, or partner in a previous venture. For the current sub sample, 85 respondents (56 percent) indicated previous ownership experience which was coded as a 1, and no prior ownership experience was coded as a 0. This percentage is consistent with reported rates of habitual ownership among owner-managers.

Cognitive Style Index (CSI)

The measure of cognitive style used in this study, the Cognitive Style Index (CSI), is classified under the Holistic-Analytic family of decision-making styles (Sadler-Smith & Badger, 1998). Allinson and Hayes (1996) presented the initial theoretical development and validation study for the Cognitive Style Index (CSI). The CSI is a 38-item summative measure, with the responses being true, false, or uncertain, and scored as a 2, 1, or 0. For 21 items, an answer of true is scored as a 2; the other 17 items are reverse scored. Therefore, the maximum score is 76. A lower score (closer to 0) represents a more intuitive style with a higher score (close to 76) suggesting a more analytic style. Allison and Hayes (1996) validated the measure across seven samples involving almost 1,000 subjects. These trials suggested a normal response distribution and good internal consistency, with Cronbach alphas between .84 and .92. A test-retest protocol was used for one sample, with a coefficient of .90 suggesting acceptable temporal stability. Several subsequent studies have also reported high test-retest correlations and high Cronbach alphas (Allinson & Hayes, 2012). For our sub sample, Cronbach's alpha is .86. Thus, we offer that CSI is a

sufficiently effective measure of an individual's decision-making style orientation on the intuitive-analytical continuum.

Control Variables

To control for possible effects of firm size and firm age (e.g., Baum & Locke, 2004) we operationalized firm size as the number of firm full-time employees reported in the 2000 Directory and extracted company age from the directory. Because the distribution of both variables is significantly right skewed, we transformed them using the natural logarithm. Using the 2001 survey data, we also controlled for whether the respondent was a founder of his or her firm as CEO founder status has been linked to firm performance (e.g., Jayaraman, Khorana, Nelling, & Covin, 2000). Finally, following Baum et al. (2001) we controlled for prior firm performance. We used three subjective indicators from the 2001 survey including items asking the respondent to rate the firm's performance vis-à-vis the competition, the perceived level of profitability, and the respondent's standard of living. Subjective measures of firm performance are common in the entrepreneurship literature and may even hold advantages over objective measures when the study population consists of smaller private firms (Covin & Slevin, 1989). For our sub sample, the composite reliability is .74.

Data Analysis and Results

We used the two-step process of analysis (Anderson & Gerbing, 1988; Kline, 2005) using LISREL 8.71 (Jöreskog & Sörbom, 2004). We evaluated and modified the measurement model via a confirmatory factor analysis (CFA) before evaluating the structural model. For the six single indicator constructs (employee growth, prior ownership experience, CSI, size, age, and founder status), the error variance was fixed at zero. We employed the ML estimation technique, and in all cases the models converged. The measurement model indicated good fit ($\chi^2 = 237.3$, $df = 164$, RMSEA = .055, CFI = .96, and SRMR = .062).¹ We moved from the measurement model to the structural model to evaluate our hypothesized relationships. CSI, firm size, firm age, and founder status are exogenous constructs, while the remaining six constructs are endogenous, with Employee Growth being the particular construct of interest. The structural model converged without complications, with the results suggesting a good fit ($\chi^2 = 237.2$, $df = 161$, RMSEA = .056, CFI = .95, and SRMR = .062). In general, as summarized in Table

1 (see appendix), the LISREL 8.71 employs the EM algorithm to derive starting values for the FIML process when there are missing data. The EM/FIML approach is the preferred approach in the presence of missing data (Newman, 2003) but generate only limited fit statistics. To generate a broader range of fit statistics to more fully evaluate fit, we imputed values when able using the recommended Mean_(person) technique with the Mean_(sample) technique used where needed (Roth, Switzer & Switzer, 1999). Due to small amount of missing data (.25) the fit differences between the two models was small; we report the χ^2 and RMSEA from the FIML process and the SRMR and CFI from this second, imputed value analysis.

multiple-item constructs appear to be reliable and to extract a significant portion of the observed variance. Descriptive statistics and correlations for both are reported in Table 2.

TABLE 1: Measurement Properties

Construct and Indicator	Standardized Loadings	Composite Reliability	Variance-Extracted Estimate
Intention to Grow		.77	.63
Indicator 1	.69		
Indicator 2	.89		
Performance		.74	.48
Indicator 1	.69		
Indicator 2	.74		
Indicator 3	.65		
Formalization		.86	.48

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Indicator 1	.56		
Indicator 2	.69		
Indicator 3	.75		
Indicator 4	.60		
Indicator 5	.83		
Indicator 6	.82		
Indicator 7	.53		
Planning		.77	.54
Indicator 1	.65		
Indicator 2	.87		
Indicator 3	.66		

TABLE 2: Means, Standard Deviations and Correlation Coefficients for Key Variables

Variable	Mean	S.D	1	2	3	4	5	6	7	8	9
1 Employee Growth	4.30	1.80	.19	.13							
2 Intention to Grow	4.30	1.80	.19	.35							

row																				
3	For	29.97	-.24	-.08	.26															
	mali93 zati on	2																		
4	Pla	12.40	-.06	-.01	.64	.48														
	nnin20 g	2																		
5	Hab	.56	.48	-.15	.03	-.04	.02													
	itual				.03															
6	CSI	33.58	.13	-.02	-.17	.16	.26	-.15												
	58 77																			
7	Fir	2.5	1.1	-.14	-.15	.47	.27	-.00	-.00											
	m S8 ize	7																		
8	Co	2.6	.69	-.17	-.39	.07	-.15	-.01	-.02	.29										
	mp 9 any Age																			
9	Perf	10.2	-.09	-.48	.12	.03	-.00	-.01	.29	.27										
	orm 19 5 anc e																			
10	Fou	.75	.44	.07	.21	-.12	-.07	.02	.05	-.12	-.10	-.36								
	nde r																			

For this table n = 150. Model R² for the endogenous constructs are in bold on the diagonal of the table.

Table 3 summarizes the tests of hypothesized relationships and the specified paths among the controls of firm age, firm size, founder status, and firm performance. We present the full model in Figure 2, complete with both significant and insignificant hypothesized paths to help illustrate and emphasize many of the indirect paths among variables. Due to the exploratory nature of the model and the numerous relationships among variables, we reported all significant relationships, including at the p < .10 level, (one-tailed test).

TABLE 3: Coefficients for Hypothesized

Relationships

	Affecti ng nstruc	Owners Cohip Experie	Intentio Expns Grow	Perfor tomance	Formali zation	Plannin g	Total E mploym ent Growth
CSI	-.15*	-.18**	--	.16**	.17**	--	
Intentio ns to Grow	--	--	--	--	--	--	.16 [†]
Owners hip Exp erience	--	--	--	--	--	--	-.16**
Formali zation	--	--	--	--	.60***	--	-.31**
Plannin g	--	--	--	--	--	--	.12
Firm Age	--	-.27***	.20*	-.11	-.23***	--	-.09
Founde r Status	.03	.08	.00	-.11	-.08	--	.01
Firm Size	--	.05	.23**	.49***	.05	--	.01
Perfor mance	--	-.41***	--	--	--	--	.04

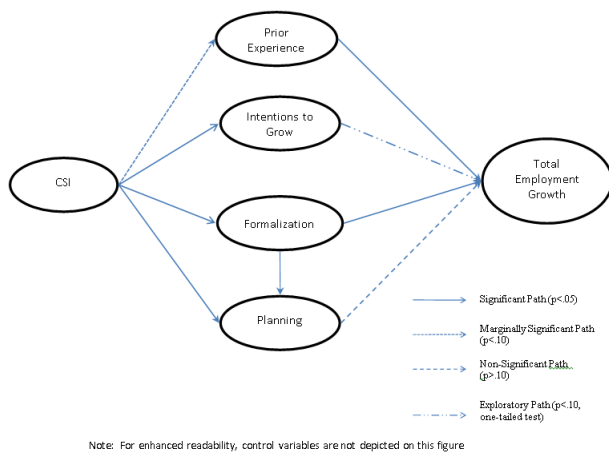
Notes: Factor loadings are depicted

* p < .10

** p < .05

*** p < .01

[†]p

FIGURE 2: Venture Growth Model with Significant Paths

We hypothesized that cognitive style would be related to several antecedents of total employment growth. As hypothesized, the results indicate that a more intuitive style (indicated by a lower score on the CSI) was significantly related ($p < .10$) to prior ownership experience ($H2, \lambda = -.15$), and significantly related ($p < .05$) to higher intentions to grow ($H4, \lambda = -.18$). Alternatively, as hypothesized, the paths from cognitive style to formalization ($H6, \lambda = .16$) and planning ($H8, \lambda = .17$) were both positive and significant ($p < .05$) indicating that a more analytic style was associated with higher firm levels of formalization and planning. Also, as hypothesized, formalization was significantly related to planning ($H9, \lambda = .60, p < .01$).

Hypotheses relating the four antecedents to the outcome of total employment growth were tested. Intentions to grow was positively associated with total employment growth ($H3, \lambda = .16$), but was significant only at the exploratory $p < .10$ (one tail test) level. Planning had a positive, but non-significant relationship with total employment growth ($H7, \lambda = .12$). Interestingly, the direct paths to venture growth from prior ownership experience ($H1, \lambda = -.16$) and formalization ($H5, \lambda = -.31$) were both significant ($p < .05$), but negative and in the opposite direction to our hypotheses.

We also tested whether the model would fit better if CSI had a direct relationship with employee growth. Although that model successfully converged and

evidenced good fit, the path between CSI and employee growth was non-significant and the χ^2 difference test between the two models ($\Delta \chi^2 = .05, \Delta df = 1$) indicated the more parsimonious model where the effects of CSI on employee growth were mediated through the endogenous constructs was an appropriate model.

Limitations

There are several limitations associated with our results. First, the sample consisted of small technology-oriented firms from a single state in the U.S. While this helped to control for broad industry or location effects, it also limits to some extent the generalizability of results to other more-dissimilar populations. Second, we only measured firm growth through total employment change at two points in time. We readily acknowledge that there are a number of alternative measures of firm growth and that such growth may be non-linear in certain respects (see Davidsson et al. 2006 for an excellent discussion of these and related measurement issues). Third, as is often the case with field surveys, common method bias is impossible to eliminate entirely. However, great care was taken to reduce such possible bias through question creation and ordering; and also the key outcome (venture growth) was in fact obtained from an external source at two different time periods. Threats to validity from common method bias have been further reduced because: (1) items asking for demographic information seldom exhibit effect-size inflation (Podsakoff & Organ, 1986) and (2) several of the items in our model, are demographic or factual in nature. Additionally, the threat of common method variance was further minimized by using structural equation modeling (Pedhazur & Schmelkin, 1991). Finally, as is the case with all structural models, it is possible that equivalent models other than those driven by our theorizing may also exist (Shook, Ketchen, Hult & Kacmar, 2004). Overall, however, we believe that the steps taken to both acknowledge and to minimize limitations provide a reasonable likelihood that we have been able to accomplish the purposes of this study.

Discussion

In summary, our task in this study has been to explore the extent to which the current understanding of entrepreneurial growth may be overly simplistic and also the extent to which firm growth as a more-complex construct includes the influence of individual entrepreneurs. In this exploration we have employed

tools from the entrepreneurial cognition literature, relating data on individual owner-managers' Cognitive Style Index (CSI) to the likely antecedents of (prior experience, intentions to grow, formalization, and planning) and to the total employment growth of their firms.

Cognitive Style and Growth

Based on our results we are able to note several theoretical and applied contributions from this study. One of the more interesting sets of findings is the role that an individual's cognitive style plays with respect to venture growth. Peterson and Meckler (2001) posit that intuitive cognitive style may be a particularly salient variable when included in more complex entrepreneurial models. We found that cognitive style was related to venture growth through several indirect paths. A more intuitive style was significantly ($p < .10$) related to prior ownership experience, which was significantly and negatively related to venture growth. A more intuitive style was significantly related to greater intentions to grow, which was at an exploratory level of significance ($p < .10$, one-tailed) positively related to venture growth. A more intuitive style was significantly and negatively related to formalization and planning. Interestingly, formalization was significantly and negatively related with venture growth, whereas planning was not significant, but positively related to venture growth.

These results with respect to cognitive style are consistent with previous findings with respect to individual level variables in multidimensional models of venture growth (Baum & Locke, 2004; Baum et al., 2001) in that individual level variables are important in explaining venture growth, but often operate through other variables via indirect paths. Sadler-Smith (2004, p. 174) concluded that an intuitive cognitive style "is associated positively with performance, but in a causally ambiguous way." Our model and results demonstrate that cognitive style operates through a complex set of relationships with other individual and firm-level constructs to influence venture growth.

Prior Ownership

The findings with respect to prior ownership experience are also of particular interest. Researchers have proposed that examining habitual entrepreneurs' cognitions (Westhead et al, 2005b) and specifically cognitive styles (Ucbasaran et al, 2003) may be a key to discriminating between novice and habitual entrepreneurs and in gaining a better understanding of

the larger phenomenon. Our results demonstrate that a more intuitive cognitive style is significantly related (though only at the $p < .10$ level) to prior business ownership and thus habitual entrepreneurship. This is the first study to offer empirical support for this phenomenon using the CSI measure.

In this study, our results not only failed to support the hypothesized positive relationship between prior ownership experience and a key measure of firm performance (employment growth), but, in fact we report a significant and negative path from prior ownership to subsequent venture growth. In retrospect, perhaps this counter finding should not be so surprising. Carter & Ram (2003) assert that based on a human capital perspective, researchers have often proposed that prior ownership experience should translate to improved venture growth for habitual entrepreneurs, but that most studies have failed to establish a direct empirical relationship. Starr and Bygrave (1991) argue that while prior business ownership may be an asset in subsequent ventures it could also be a liability.

An entrepreneur's dominant logic (Prahalad & Bettis, 1986) shaped in a previous successful venture, may be a liability in a new context (Baron, 2006; Wright, Westhead, & Sohl, 1998). Furthermore, there is evidence to suggest that prior entrepreneurial experience might translate into a diffusion of effort that might limit the growth of any given venture. We conducted a post hoc analysis and found that of the 56 percent of our sample with prior ownership experience, 46 percent of these owner-managers were also portfolio entrepreneurs (defined as having concurrent ownership in two or more firms: Westhead & Wright, 2001) in 2001. Portfolio ownership has the potential to draw an owner-managers' time, energy, and financial resources from one firm to another and the prevalence of portfolio entrepreneurs in our sample, though not completely out of line with other owner-manager samples (Carter & Ram, 2003), might offer an explanation for the counterintuitive relationship we report.

Besides the implications for research we have discussed, our findings regarding the relationships among an intuitive style, direct antecedents of growth, and subsequent venture growth have important applied applications. In making investment decisions, business angels and venture capitalists often weigh the prior ownership experience of the entrepreneur more heavily than other market or organizational factors and

essentially “bet on the jockey, not the horse.” Our results demonstrate that habitual entrepreneurs are more likely to have intuitive cognitive styles and that prior ownership experience is negatively related to subsequent firm growth. Thus, investors should be aware that a highly intuitive style may be advantageous in the early stages of a new venture, but is more incongruent with and potentially a liability later in the firm’s life cycle (Brigham et al, 2007, Olson, 1985). Additionally, investors who assume that prior ownership experience is positive predictor of subsequent venture growth may be making a costly error.

Formalization and Growth

Another intriguing result was the counterintuitive path between formalization and venture growth. The indicators of formalization focused primarily on organizational structural controls such as written memos between departments, job descriptions and lines of authority, and formal policies and standard operating procedures. Owner-managers are faced with trade-off decisions regarding the level of control in their firms with respect to formalization and delegation (Stevenson et al., 1993). We speculate that one possible reason for the negative relationship of formalization to total employment growth might be the imbalance suggested by Stevenson et al. (1993): that formalization without concomitant delegation might result in growth-constricting bureaucracy. It may be that decisions regarding formalization are more complex than previously thought and owner-managers should consider exerting control through formal planning, but not by increasing formal structure. Future studies might productively take this possibility into account.

Prior research has established a strong positive correlation between firm size and levels of formalization (e.g., Dobrev & Barnett, 2005). In our model, the path from the firm size to formalization ($\lambda = .49$) was positive and significant ($p < .01$) whereas the path from firm size to planning ($\lambda = .05$) was non-significant ($p > .10$). This suggests that formalization and planning, while positively correlated and significantly related are distinct constructs and should be modeled separately. This is a potentially fruitful area for researchers to examine in the future.

Conclusion

Following the assertion that deeper insight into

entrepreneurship and firm growth will require multi-theoretic and multi-level models (Baum et al., 2001; Leitch, Hill, & Neergaard, 2010; Shane and Venkataraman, 2000), we have tested a model of venture growth drawing from a range of theoretical backgrounds and incorporating both individual and firm level constructs. Incorporating the cognitive style of principal owner-managers of SME’s, we offer insights related to the central question in entrepreneurial cognition research: How do entrepreneurs think? (Mitchell et al., 2007), as it bears upon the question of venture growth complexity. Our findings also represent an important “next step” in entrepreneurial cognition research, demonstrating that differences in how entrepreneurs think, based on the intuitive-analytic dimension, are directly related to an important individual-level behavior (habitual entrepreneurship) and indirectly through other constructs to a critical firm-level outcome (firm total employee growth).

The extent of influence of the owner-manager relative to other potential antecedents of venture growth is still being mapped. Like many mapping projects, the exploration required results in a sometimes surprising assembly of new information, such that the portrayal’s accuracy and utility continues to improve. This study suggests a number of potential anomalies – at least unanticipated findings – for future researchers to investigate.

Our analysis, in particular, has contributed to further dimensionalizing at least one key facet in the maturation of our understanding the determinants of and constraints on new venture growth. Our findings lead us to agree with those who suggest that an overly-simplistic view of entrepreneurial growth fails to capture the rich and multi-faceted nature of the venture growth process - especially as it applies to owner-manager effects. It is our hope that the findings reported herein can therefore assist with this deepening of understandings, specifically as applied in the technology-oriented SME setting.

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