The curious case of curiosity: An examination of key antecedents of innovation

Introduction and Study Objectives

While there is general agreement among researchers and practitioners regarding the critical role of innovation in economic development, there is little consensus regarding the key antecedents of innovation, especially in start-up firms. In this paper, we articulate an antecedental model of innovation which includes two key constructs vested in the entrepreneur: curiosity and growth aspirations; and two key firm level constructs: absorptive capacity and market orientation. This full antecedental model of innovation is illustrated in Figure 1. That is, the curiosity of the entrepreneur, both diversive and specific, and the growth aspirations the entrepreneur (small business growth venture or accelerated/scalable growth venture) has for the venture are directly related to the venture's absorptive capacity and market orientation, which in turn informs innovation.

We begin by articulating a proposed full antecedental model of innovation. Curiosity is the starting point of innovation. On a direct level, we suggest that entrepreneurs engaging in high levels of curiosity prompt their startup ventures to engage in higher levels of market orientated behavior and have higher absorptive capacity, both which are indicators of organizational level external knowledge transfer behaviors and capabilities. Market orientation, an extensively studied marketing concept, is the organization wide behavior of generating and disseminating market intelligence and the responsiveness to such intelligence in order to serve customer needs (Kohli and Jaworski, 1990). Absorptive capacity on the other hand, refers to an organization's ability to recognize, value, assimilate and apply new knowledge (Cohen and Levinthal, 1990).

Additionally, we suggest that an entrepreneur's growth aspirations for the venture directly impact market orientation and absorptive capacity. That is, startups with accelerated/scalable growth aspirations (ASGV) vs. startups with small business growth aspirations (SBGV), will have a direct effect on both market orientation and absorptive capacity relationships. Finally, we suggest that venture wide market orientation and absorptive capacity directly inform the venture's ability to continuously innovate. Innovation is defined as the adoption of products, services, programs, policy, systems that are new to the organization (Daft, 1982). Continuous innovation includes both incremental and radical adoption of these new aspects mentioned above (Dewar and Dutton, 1986).

Essentially, this research is guided by six overarching research questions**:**

1) Does entrepreneur curiosity lead to market oriented behaviors?
2) Does entrepreneur curiosity lead to greater absorptive capacity?
3) Does growth aspiration (small business growth aspiration vs. accelerated scalable growth aspiration) of the entrepreneur influence the market orientation of the venture?
4) Does growth aspiration (small business growth aspiration vs. accelerated scalable growth aspiration) of the entrepreneur influence the level of absorptive capacity of the venture?
5) Do market oriented behaviors lead to continuous innovation?
6) Does greater absorptive capacity lead to continuous innovation?

Specifically, this study investigates one part of this proposed model. That is, we examine the role of an entrepreneur's curiosity and growth aspirations direct relationship with the venture's absorptive capacity. For the purpose of this paper, we focus our attention on research questions two and four and examine the relationships between entrepreneur curiosity, entrepreneur growth aspiration and absorptive capacity. In so doing, we set the foundation for our proposed model and begin the process of further investigation and propose additional data collection to test additional aspects of the proposed model. We suggest four

testable research propositions as we build this model and articulate two testable hypotheses which we test in this pilot study.

Literature Review and Hypotheses

Past research indicates that innovation plays a critical role in economic progress, productivity increase and living standard improvement (Abernathy and Clark, 1985). Given this critical role, it is essential to better understand what stimulates innovation. Among all the business organizations that contribute to the overall innovativeness of an economy, small firms are of particular interest. For example, small businesses make up the majority of all the firms in the U.S., with 28.2 million small businesses in the U.S. comparing to only 17,700 with more than 500 employees (U.S. Census Bureau, 2011).

While small businesses play an important role in innovation and economic development, and despite considerable overlap, there continues to be a need for a clear distinction between entrepreneurs who pursue limited growth (small business growth ventures) and entrepreneurs who pursue higher growth (accelerated/scalable growth ventures). (Carland, Hoy, Boulton and Carland, 1984). While the entrepreneur and the venture are two separate constructs, the entrepreneurs/founders are often times the sole party responsible for strategic decision makings throughout the firm. Examination of their individual characteristics would inform a more complete understanding of the outcomes at the firm level. Therefore in this study, we suggest that it is the curiosity of the entrepreneur that is the main antecedent which explains innovation, especially in start-ups. We further propose a model demonstrating relationships between entrepreneur curiosity, his or her growth aspiration for the venture, the venture's market orientation and absorptive capacity, and ultimately innovation in new venture start-ups.

Historically, curiosity has been defined by philosophers such as Aristotle as an intrinsic desire, or an appetite for new knowledge without utilitarian motives (Blumenberg, 1983). More recently, there has been evidence supporting the multi-dimensionality of this construct. Berlyne notes that there are two dimensions of human curiosity: specific curiosity refers to the desire for a particular piece of information; and diversive curiosity refers to a more general drive aroused by novel stimuli and reduced by continued exposure to those stimuli (Berlyne, 1954). Research suggests that the two dimensions work in tandem as diversive curiosity fosters contact with new stimuli and opportunities while specific curiosity is activated by stimuli with inherent uncertainty and complexity that can be further enjoyed through acquisition of more information (Krapp, 1999, Collins, Litman and Spielberger, 2004).

When it comes to understanding how curiosity influences entrepreneurship behaviors, however, the research has been scarce. There is some evidence to support the finding that diversive curiosity entails scanning, recognizing, pursuing and allocating one's attention to novel and challenging experiences while involvement in well-defined activity brings it specific curiosity and targeted absorption and investigation (Kashdan, Rose and Fincham, 2004).

Extant research is relatively silent concerning the proposed positive relationship between curiosity, market orientation and absorptive capability. However, based on Kashdan, Rose and Fincham (2004), diversive curiosity behaviors such as scanning, recognizing, pursuing and allocating one's attention to novel and challenging experiences fall in line with the behavior of market orientation in a venture setting. Additionally, the established positive relationship between targeted absorption and investigation and specific curiosity prompted us to theorize that specific curiosity lead to the recognition, understanding and application of new knowledge. Therefore, we propose that:

P1a: Entrepreneur curiosity is positively related to venture level market oriented behaviors.
In addition, we hypothesize that:

H1a: Entrepreneur curiosity is positively related to venture level absorptive capacity.

We also theorize that the growth aspiration of the entrepreneur, distinguished by whether the entrepreneur has the goal of growing the business to be as large as possible, or the goal of growing the business to be manageable by a few key employees, also plays a role as antecedent of absorptive capacity. Echoing the call for the distinction mentioned earlier (Carland, Hoy, Boulton and Carland, 1984), recent research has continued to suggest that ventures should be differentially treated based on whether the founder wants to grow the business as large as possible (accelerated/scalable growth venture) or to stay manageable by a few key employees (small business growth venture). (Ensley, Pearson & Pearce, 2003). A venture aiming to achieve scalable growth can be identified by its strategic behavior (Schumpeter, 1934) as the venture engages in either introduction of new products or method of production, opening new markets or sources of supply, or re-organization of the industry (Vesper, 1980). We theorize that the founder of a small business growth aspiration is less likely to engage in market oriented behaviors or have high absorptive capacity because he or she is not motivated to grow their business through strategic behavior. Therefore, we propose that:

P2a: An entrepreneur's SBGV growth aspiration is negatively related to venture market orientation.

In addition, we hypothesize that:

H2a: An entrepreneur's SBGV growth aspiration is negatively related to the level of venture absorptive capacity.

Innovation covers a broad base of constructs and phenomena and could be examined at many different levels, which makes our scientific inquiry about it difficult. For the purpose of this paper, we operationalize firm level innovation as the generation, development, and implementation of new ideas or behaviors (Damanpour, 1991), echoing the idea established by previous research that suggests innovation encompasses the adoption of products, services, programs, policy, systems that are new to the organization (Daft, 1982; Damanpour and Evan, 1984). Innovation is further dichotomized into innovations based on sustaining or disruptive technology change (Christensen, 1997), administrative innovation versus technological innovation (Daft, 1978), product or process innovation (Utterback and Abernathy, 1975). For the purpose of this study, we are not interested in the specific areas where innovation occur, we are interested the consistency in the innovation, which is characterized by being both radical and incremental (Dawar and Dutton, 1986).

Considering the relationship between market orientation and innovation, it is argued that market orientation, along with entrepreneurship orientation drives innovation (Atuahene-Gima and Ko, 2001). Prior evidence suggests the beneficial effects of market orientation on organizational level innovation, both in terms of innovation projects' immediate impact performance (Atuahene-Gima, 1996) and longer term innovation strategy and innovation activities (Han, Kim and Srivastava, 1998, Vázquez, Santos, and Álvarez, 2001). Therefore, we propose that:

P3: Greater market orientation is positively related to continuous innovation.

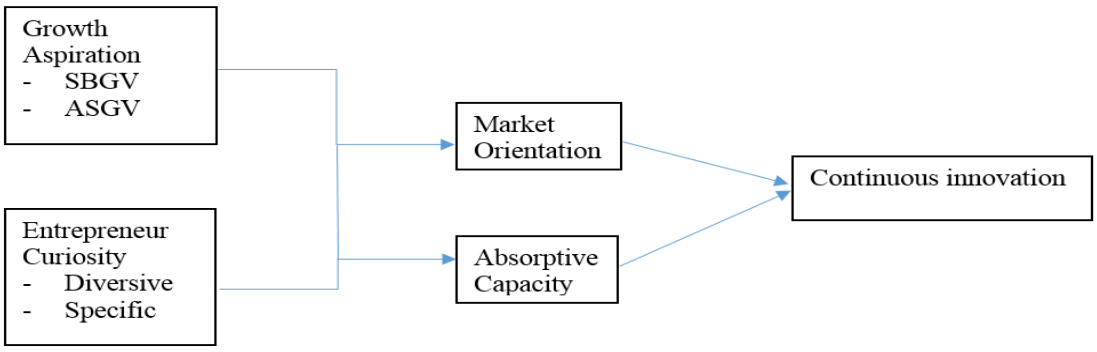
Examining different dimensions within the domain of absorptive capacity, Zahra and George (2002), note the potential component of absorptive capacity involves the acquisition and assimilation of new external knowledge while the realized component of absorptive capacity involves the transformation and exploitation of that knowledge. They further theorize that both those components lead to competitive advantage including the ability to innovate (Zahra and George, 2002). Absorptive capacity serves as a conduit that directs the inflow of external knowledge and facilitate innovative activities within a firm (Tsai, 2001). Additionally, there has been empirical support for the finding that absorptive capacity

contributes, directly and indirectly, to innovation and financial performance, but in different time spans (Kostopoulos, Papalexandris, Papachroni and Loannou, 2011). Although empirical support for absorptive capacity's impact on incremental and radical innovation specifically is not evident, we can theorize that the inflow and absorption of continuous external knowledge facilitated by absorptive capacity lead to continuous innovation that has both radical and incremental component. Therefore, we propose that:

P4: Greater absorptive capacity is positively related to continuous innovation.

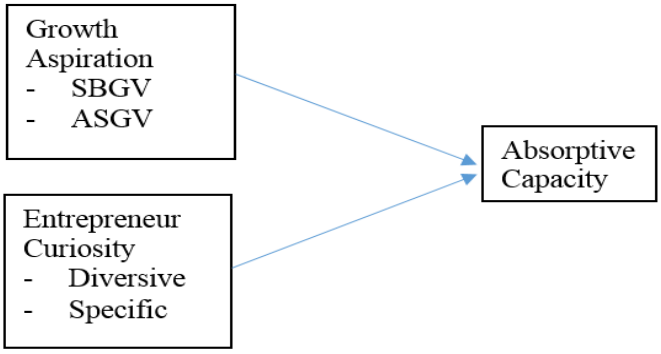
The above four research propositions and two hypotheses are illustrated in the figure below (figure 1):

Figure 1



The hypothesized relationships directly examined in this research paper are illustrated in the figure below (figure 2):

Figure 2



Approach/Method

In this pilot study, we test scale reliabilities and perform preliminary data analysis from a sample of upper-class and graduate students from a large Midwestern university. While most students are not yet entrepreneurs, many (69%) indicate interest in starting their venture in the future and 76% report growth aspirations when asked about the proposed venture growth (50% indicate they would pursue an SBGV, while 21% indicate they intend to pursue an ASGV) . While the student sample is sufficient for this pilot study, to address our six overarching research questions and test the full model, we survey a random

sample of entrepreneurs from a large Midwestern city in the United States. Both founders and key partners in the venture startup are surveyed.

Independent Variables

Curiosity. The six-item curiosity measure was adapted from Kashdan, Rose and Fincham's 2004 curiosity and exploration Inventory. Responses are made on a five point Likert scale ranging from "strongly disagree" to "strongly agree." Respondents are asked to evaluate themselves against statements such as "I would describe myself as someone who actively seeks as much information as I can in a new situation"; as well as "When I am actively interested in something, it takes a great deal to interrupt me." Because the original scale didn't specify its reliability, a confirmatory factor analysis was conducted using LISREL VI with pilot student data (Jöreskog and Sörbom, 1986). With a RMSEA of 0.0 and an AGFI of .943, this scale is reliable.

Growth Aspirations. To measure growth aspirations among our sample, respondents were asked "If you plan on start your own business after graduation, what type of venture do you want to start?" Respondents who selected "A small business manageable by yourself or a few key employees" were coded "0" for SBGV; and respondents who selected "A scalable venture with the goal to be as large as possible" were coded "1" for ASGV.

Dependent Variable

Absorptive Capacity. The five-item absorptive capacity scale, which was adopted from Flatten, Engelen and Zahra's original scale that contained 36 items (Flatten, Engelen and Zahra, 2011). The original scale has established reliability, but was designed for measuring absorptive capacity within a mature company context and had extensive intra-unit knowledge transfer content. To adapt this for the start-up context in which we are interested, we shortened the scale to five items. The five items cover the three key dimensions of absorptive capability: recognition, assimilation and application. Examples of those items are "my company quickly recognizes the usefulness of new external knowledge as an addition to our existing knowledge"; and "my company takes initiative to seize opportunities."

The data analysis for this investigation employs multivariate statistical techniques appropriate for examining the central research questions guiding this project. It is proposed that hierarchical multiple regression, multidimensional scaling, and path analysis be employed for the full model to be tested with the collection of additional data.

Results/Findings

A three way factorial ANOVA is employed to evaluate the effects of entrepreneur curiosity and entrepreneur growth aspiration (small business growth aspiration vs. accelerated scalable growth aspiration) on the venture level absorptive capacity and test H1a and H2a. Both relationships are found to be significant, supporting H1a, an entrepreneur's curiosity is positively related to venture level absorptive capacity; and H2a, an entrepreneur's SBGV growth aspiration is negatively related to venture level absorptive capacity. ($F(2, 99) = 9.308$, $p = .000$.) See Table 1. A correlation analysis was performed to ensure the two predictor variables entrepreneur curiosity and entrepreneur growth aspiration do not overlap, to eliminate the possibility of multicollinearity (correlation is not significant at -.108 with $p = .429$)

Table 1 – Results of Regression Analyses Predicting Absorptive Capacity

Model	1
Curiosity (1 = Strongly Disagree, 5 = Strongly Agree)	0.407***
Growth aspirations (0 = SBGVs, 1 = ASGVs)	(.306)*
F statistic	9.308***
R^2	0.264

† $p \leq .10$; * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$. Standardized betas shown.

Implications and Value

The result of this study provides us with a better understanding of the impact of entrepreneur curiosity, an individual level character on venture level outcomes, specifically knowledge transfer behaviors and capability as shown by curiosity and growth aspirations' relationship to absorptive capacity. We suggest that curiosity behaviors, both diversive and specific, are positively related to learning behaviors and abilities (absorptive capacity). Additionally, we suggest that venture type (small business growth venture vs. accelerated/scalable growth venture) also has a direct relationship to a venture's absorptive capacity, albeit a negative one.

Moreover, based on our findings in this pilot study, we have established a foundation for further research. Specifically, we suggest that future research that extends the model. First, we propose to test the additional articulated antecedental relationships. That is, what role does curiosity plays with regard to market orientation and ultimately innovation? In addition, there's need to further understand the source of entrepreneur curiosity, specifically, what are some internal and external factors helps entrepreneurs develop the type of curiosity that fertilizes knowledge transfer and exploitation, as well as innovation. For example, does having entrepreneurial roles model during personal development and nascent entrepreneurship stage prompt the entrepreneur to become more curious? Additionally, innovation as a construct could be examined more closely, are different types of innovation (i.e., product innovation, process innovation, administrative innovation) influenced differentially by curiosity, market orientation and absorptive capacity?

This study has wide practical implications for entrepreneurs and their investors, it is valuable to know the impact of their curiosity behavior as well as the dynamic between market orientation, absorptive capacity and continuous innovation. Additional, understanding of the role of the venture type play when it comes to curiosity and innovation provide constructive insights for the entrepreneurs and investors into the ventures' innovation.

References

Abernathy, W. J., & Clark, K. B. (1985). Innovation: Mapping the winds of creative destruction. *Research policy*, *14*(1), 3-22.

Atuahene-Gima, K. (1996). Market orientation and innovation. *Journal of Business Research*, *35*(2), 93-103.

Atuahene-Gima, K., & Ko, A. (2001). An empirical investigation of the effect of market orientation and entrepreneurship orientation alignment on product innovation. *Organization science*, *12*(1), 54-74.

Berlyne, D. E. (1954). A theory of human curiosity. *British Journal of Psychology. General Section*, *45*(3), 180-191.

Blumenberg, H. (1985). *The legitimacy of the modern age*. Mit Press.

Carland, J. W., Hoy, F., Boulton, W. R., & Carland, J. A. C. (1984). Differentiating entrepreneurs from small business owners: A conceptualization.*Academy of management review*, *9*(2), 354-359.

Christensen, Clayton M. (1997). *The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail*. Boston: Harvard Business School Press.

Cohen, W. M., & Levinthal, D. A. (1990). Absorptive capacity: a new perspective on learning and innovation. *Administrative science quarterly*, 128-152.

Collins, R. P., Litman, J. A., & Spielberger, C. D. (2004). The measurement of perceptual curiosity. *Personality and individual differences*, *36*(5), 1127-1141.

Damanpour, F. (1991). Organizational innovation: A meta-analysis of effects of determinants and moderators. *Academy of management journal*, *34*(3), 555-590.

Damanpour, F., & Evan, W. M. (1984). Organizational innovation and performance: the problem of" organizational lag". *Administrative science quarterly*, 392-409.

Daft, R. L. (1982). Bureaucratic versus nonbureaucratic structure and the process of innovation and change. *Research in the Sociology of Organizations*, *1*, 129-166.

Dewar, R. D., & Dutton, J. E. (1986). The adoption of radical and incremental innovations: an empirical analysis. *Management science*, *32*(11), 1422-1433.

Ensley, M. D., Pearson, A., & Pearce, C. L. (2003). Top management team process, shared leadership, and new venture performance: A theoretical model and research agenda. *Human Resource Management Review*, *13*(2), 329-346.

Flatten, T. C., Engelen, A., Zahra, S. A., & Brettel, M. (2011). A measure of absorptive capacity: Scale development and validation. *European Management Journal*, *29*(2), 98-116.

Han, J. K., Kim, N., & Srivastava, R. K. (1998). Market orientation and organizational performance: is innovation a missing link?. *The Journal of marketing*, 30-45.

Jaworski, B. J., & Kohli, A. K. (1993). Market orientation: antecedents and consequences. *The Journal of marketing*, 53-70.

Jöreskog, K. G., & Sörbom, D. (1989). *LISREL 7 user's reference guide*. Scientific Software.
Kashdan, T. B., Rose, P., & Fincham, F. D. (2004). Curiosity and exploration: Facilitating positive subjective experiences and personal growth opportunities. *Journal of Personality Assessment*, *82*(3), 291-305.

Kostopoulos, K., Papalexandris, A., Papachroni, M., & Ioannou, G. (2011). Absorptive capacity, innovation, and financial performance. *Journal of Business Research*, *64*(12), 1335-1343.

Krapp, A. (1999). Interest, motivation and learning: An educational-psychological perspective. *European Journal of Psychology of Education*, *14*(1), 23-40.

Schumpeter, J. A. (1934). *The theory of economic development: An inquiry into profits, capital, credit, interest, and the business cycle* (Vol. 55). Transaction publishers.

Tsai, W. (2001). Knowledge transfer in intraorganizational networks: Effects of network position and absorptive capacity on business unit innovation and performance. *Academy of Management Journal*, *44*(5), 996-1004.

Utterback, J. M., & Abernathy, W. J. (1975). A dynamic model of process and product innovation. *Omega*, *3*(6), 639-656.

Vázquez, R., Santos, M. L., & Álvarez, L. I. (2001). Market orientation, innovation and competitive strategies in industrial firms. *Journal of strategic marketing*, *9*(1), 69-90.

Vesper, K. H. *New Venture Strategies.* Englewood Cliffs, N.J.: Prentice-Hall, 1980.

Zahra, S. A., & George, G. (2002). The net-enabled business innovation cycle and the evolution of dynamic capabilities. *Information Systems Research*, *13*(2), 147-150.