Bricolage and Firm Performance: The moderating role of the environment.

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Abstract

The behavioral theory of "entrepreneurial bricolage" attempts to understand what entrepreneurs do when faced with challenges and constraints. Most research about bricolage, defined as "making do by applying combinations of the resources at hand to new problems and opportunities" (Baker & Nelson 2005: 333), has been qualitative and inductive (Garud & Karnoe, 2003). Although this has created a small body of rich descriptions and interesting insights, little deductive theory has been developed and the relationship between bricolage and firm performance has not been systematically tested. In particular, prior research has suggested bricolage can have both beneficial and harmful effects. Ciborra's (1996) study of Olivetti suggested that bricolage helped Olivetti to adapt, but simultaneously constrained firm effectiveness. Baker & Nelson (2005) suggested that bricolage may be harmful at very high levels, but more helpful if used judiciously. Other research suggests that firm environments may play an important role in shaping the outcomes of bricolage (Fisher, 2012). In this paper, we theorize and provide preliminary test of the bricolage-performance relationship and how it is affected by environmental dynamism.

Introduction

Bricolage is an emerging theory that provides one explanation of how early stage entrepreneurial firms emerge and grow despite the constraints and challenges they face (Baker & Nelson, 2005). The relationship between bricolage and performance, however, is far from straightforward. More often than not prior research describes how bricolage generates positive firm outcomes (Ciborra, 1996; Garud & Karnøe, 2003; Salunke et al., 2013). Others however, suggest an alternate scenario; entrepreneurs who use bricolage simply won't get the job done: their attempts or solutions are imperfect, substandard (Lanzara, 1999) creating poor performance and stagnation (Baker & Nelson, 2005; Hatton, 1989). Prior case research in bricolage has predominantly evaluated environmental munificence (Dess & Beard, 1984), i.e. abundance/scarcity arguments (Cunha et al., 2014), but little is known, about how dynamic environments affect the relationship between bricolage and firm performance. Complex, changing environments (Dess & Beard, 1984) typifies what many early stage firms now experience when they attempt to enter markets, making environmental dynamism critical to study.

The paper is structured as follows. We first develop hypothesis concerning the bricolage-performance relationship and the contingent effect of environmental dynamism. We then test our hypotheses using data from the Comprehensive Australian Study of Entrepreneurial Emergence (CAUSEE) project (Davidsson et al., 2011), including 282 nascent (pre-operational) firms and 247 young firms that are operational but less than four years old. In our tests, we make use of the recently established survey measure of bricolage behavior (Senyard et al., 2014). We conclude by discussing the theoretical implications of our findings.

Bricolage and Firm Performance

Despite the strong interest within entrepreneurship to study nascent venture emergence[78]

[78] We evaluate venture emergence thorough three potential outcomes (i.e. becoming operational, firms that persist in their efforts but have not yet reached operational stage, and terminated firms where all firm efforts have been dropped), where becoming operational is preferred over persisting or termination, and persisting is favoured over termination.

(Reynolds, 2007) this has, to the best of our knowledge, never been explicitly theorised or tested in bricolage literature. Limited work also exists evaluating bricolage and firm sales[79]. Most of the prior inductive case research suggests a positive relationship between bricolage and firm performance typically considering outcomes evaluating innovation (Ciborra, 1996; Lévi-Strauss, 1966), dominant industry design (Garud & Karnoe, 2003), or future growth (if used judiciously e.g. Baker & Nelson, 2005). Similarly, we theorise here three important (and interrelated) mechanisms found in new product development literature (NPD) to suggest a positive relationship between bricolage and firm performance: (a) speed of development; (b) co-creation and (c) innovativeness.

Speed of Development

Speed of development i.e. the ability to move quickly from ideas to actual products or solutions (Kessler & Bierly, 2002) is an important process that influences firm performance. Several new product development (NPD) theorists contend that faster development allows firms to establish a competitive edge over competitors (Chen et al., 2005), secure favourable market positions (Smith & Reinertsen, 1991) and as a result, contribute significantly to firm performance. Bricoleurs, through a bias for action, create "momentum" (Garud & Karnøe, 2003, pg 277), through remaining engaged in action (Lanzara, 1999). Such actions rely on the broad skills (Baker & Nelson, 2005) and improvisational flexibility in bricolage actions (Lévi-Strauss, 1966). This enables them to experience fewer delays, increasing the speed of development, and as a result generate positive firm performance (Banerjee & Campbell, 2009).

Co-Creation

Recent literature in NPD and service innovation indicates the importance of customer co-creation activities (Prahalad & Ramaswamy, 2004; Salunke et al., 2013). This research suggests customer collaboration creates several benefits: first, customer involvement including active input into design creates better solutions (Hoyer et al., 2010), increasing customer satisfaction. A second argument suggests collaboration provides access to valuable relevant resources at reduced or no cost (Campbell & Cooper, 1999). This process reduces the cost of development, as firms typically don't pay customers for their contributions. Such collaboration has the potential to contribute significantly to firm performance (Gruner & Homburg, 2000).

Innovativeness

A third argument provided in the literature suggests that bricoleurs are more likely to generate innovative solutions than firms not engaging in bricolage because their bias for action leads them to tinker extensively with existing resources. Bricolage may contribute to the development of firms which are better able to manage the processes of early stage firm development through generating "brilliant unforseen results" (Lévi-Strauss, 1966, pg 17). These unique solutions, though often imperfect, enable the firm to continue to develop through "good enough" solutions (Gundry et al., 2011, p 4). The three arguments, following prior literature, suggest positive effects of applying bricolage behaviours to firm performance.

Hypothesis 1(a): Bricolage has an overall positive effect on the performance of nascent firms. That is, firms using more bricolage are more likely to become operational than persist in their venture creation efforts.

Hypothesis 1(b): Bricolage has an overall positive effect on the performance of nascent firms. That is, bricoleurs are less likely to terminate than persist in their venture creation efforts.

[79] for an exception refer Stinchfield et al., 2013

Hypothesis 2: Bricolage has an overall positive effect on young firm sales.

Moderating Effect of Environmental Dynamism

Environmental dynamism refers to the rate of change, absence of pattern and unpredictability of the environment (Dess & Beard, 1984). Firms engaging in bricolage in such contexts may be well placed to address the challenges presented by these uncertain environments. Baker and Nelson (2005) suggest bricoleurs typically possess broad skills which are often applied flexibly in improvisational actions (Baker et al., 2003). The benefits of flexible responses using improvisational bricolage actions may assist in shorter timeframes, increasing the speed of development which is valued in increasingly dynamic environments (Miles et al., 2000), enhancing firm performance (Priem et al., 1995).

Salunke et al. (2013) ascribed the benefits of collaborating with existing customers through acts of bricolage. In contexts of increasing environmental dynamism, customers who are collaborating with early stage firms may be more willing to accept and tolerate the often imperfect solutions generated through bricolage by attributing the barely "good enough" (Gundry et al., 2011, p 4) solution to the environmental uncertainty, strengthening firm performance.

In dynamic environments, markets reconfigure in unexpected ways which provides improved and different types of opportunities for bricoleurs to scavenge idiosyncratic and valuable resources. Increasing resource scope provides different tools and objects to use in recombination activities and the trove[80], increasing firm innovativeness which in turn may strengthen the relationship between bricolage and firm performance. Increasingly dynamic environments celebrate and seek innovations, with markets willing to try new offerings in comparison to more stable environments. Based on these arguments we therefore hypothesise:

Hypothesis 3(a): Environmental dynamism positively moderates the relationship between bricolage and the performance of nascent firms. That is, the more dynamic the environment, the greater the likelihood that firm using more bricolage are operational, than persist in their venture creation efforts.

Hypothesis 3(b): Environmental dynamism positively moderates the relationship between bricolage and the performance of nascent firms. That is, the more dynamic the environment, there is less likelihood that firm using more bricolage will terminate, than persist in their venture creation efforts.

Hypothesis 4: Young firms that apply bricolage behaviors in more dynamic environments will attain higher firm performance.

Methods

Sample and Data

The main sample

The data for this research was drawn from the CAUSEE project, a 4-year longitudinal study studying firm emergence (Davidsson et al., 2011) administered through telephone surveys over 3 years. This study builds on the general empirical approach, some contents and lessons learned from the Panel Study of Entrepreneurial Dynamics (PSED) studies in the US (Gartner

[8080] A trove is defined as a collection of valuable objects for use in resource activities by entrepreneurs and entrepreneurial teams (Baker & Nelson, 2005; Stinchfield et al., 2013).

et al., 2004; Reynolds & Curtin, 2008). Like the PSED, in order to qualify for inclusion as nascent and young firm in the survey, the respondent first had to answer affirmatively to at least one of the following questions:

1. Are you, alone or with others, currently trying to start a new business, including any self-employment or selling any goods or services to others?
2. Are you, alone or with others, currently trying to start a new business or a new venture for your employer, an effort that is part of your normal work?
3. Are you, alone or with others currently the owner of a business you help manage, including self-employment or selling any goods or services to others?

The nascent respondents to be eligible also had to confirm that:

- They were (or intended to be) owners or part owners of the nascent firm.
- They had undertaken some tangible "start-up behavior" e.g looking for equipment or a location organizing a start-up team within the last 12 months.

If respondents did not answer affirmatively to the above questions they were deemed under qualified and did not continue to the full survey. Further, if nascent confirmed that revenues had exceeded expenses for six of the past 12 months they were deemed overqualified and screened as a young firm.

Young firm respondents also had to confirm that:

- They were owners or part owners of the young firm.
- They confirmed that they started "trading in the market doing the type of business you are currently doing" in 2004 or later.

As CAUSEE is a longitudinal survey, it enables us to study firm performance over time. We use Wave 2 (W2) and Wave 3 (W3) data for the dependent variables in all hypothesis testing and time-separate the independent variable Wave 1 (W1), bricolage, from the dependent variables i.e. nascent venture emergence and young firm (sales revenue).

Measures

Independent Variable Bricolage. We use the bricolage instrument developed in the CAUSEE study to measure bricolage (Senyard et al., 2014). The questions were designed to tap into the entrepreneurial bricolage definition in Baker and Nelson (2005: 333): "making do by applying combinations of the resources at hand to new problems and opportunities." The items use a 5-point response scale ranging from 1: *never* to 5: *always*, rather than levels of agreement in order to reflect the behavioural nature of the phenomenon. Reliability testing indicates that the scale has is good reliability.[81] The reader is referred to Senyard et al. (2014) for further discussion of the bricolage measure.

Moderator Variables: Environmental Dynamism.

To conduct the regressions, time (2004–2007) commencing from quarter 2 April 2004 was entered as independent variables and quarterly sales as dependent variables for each industry category according to the Australian Bureau of Statistics ANZSIC code. Next, the standard

[81] Cronbach = .821 (Random Digit Dial Nascent Firm, Wave 2); Cronbach =.829 (Random Digit Dial Young Firm Wave 2).

errors of the regression coefficients were divided by the mean sales values of the 3 years. The result was used as the measure of industry-level environmental dynamism in the CAUSEE study, and reflects the extent to which sales were dynamic (i.e., changing) in each industry. This measurement approach has been used in several previous studies (e.g. Baron & Tang, 2011; Boyd, 1995; Hmieleski & Baron, 2009). The environmental dynamism variable range was 0-1 with the mean of .032, indicating moderate-low levels of change in average quarterly sales volumes across industries. The communication industry illustrated the highest level of dynamism, and manufacturing illustrated the lowest level of dynamism.

Controls

We use three categories of control variables. The first category aims to capture the overall level of resources e.g. money invested into the firm via loans (log), employees (presence or absence), teams (or solo), past performance (we control for the number of gestation activities completed in Wave 1, and for the young firms, we control for sales from the year immediately preceding the measurement of firm sales) and number of members in the team.

The second group of control variables aims to capture some of the heterogeneity concerning the ability the firm has to access and develop resources. We include three measures of the human capital of the start-up team: education (number of owners with a university degree); industry experience (number of years); management experience (number of years). The third group of variables account for various characteristics. These include: high-tech; growth intention, service (versus product) and gender of entrepreneur.

Performance: Nascent Firms. Early performance assessment in nascent and young firms is difficult (Davidsson 2008). For the nascent sample, we use a measure of the venture emergence in wave 2 and wave 3. In this study we use the trichotomous stage-of-firm variable generated for the CAUSEE survey (*reaching operational stage*, *persisting in the firm creation process* or *terminated*; e.g. Davidsson & Gordon, 2012).

Performance: Young Firms. Given that performance has been measured in various ways in new firms (Cameron & Whetton, 1983), there is little agreement in the literature regarding appropriate performance variables for new firm research (Bamford et al., 2000; Brush & Vanderwerf, 1992). We use wave 2 and wave 3 absolute sales (log) as performance measures as sales are often considered important for the young firm cohort; they enable the firm to gain visibility, which increases market legitimacy (Carter et al., 1996; Schoonhoven et al., 1990) shaping firm performance.

We employ various techniques in this analysis. First, we formally test Hypothesis 1 (a) and (b) and 3 (a) and (b) using moderator binary logistic models to test comparisons of the dependent variables i.e. operational versus persist, persist versus terminate. In assessing the overall appropriateness of the model as well as the individual variables and their significance, we followed the process outlined in Hosmer and Lemeshow (2000). For Hypothesis 2 and 4, we used hierarchical moderated regression analysis. The independent variable and interactions were mean-centred prior to the formation of interaction terms (Aiken & West, 1991). Tables 4.3 and 4.4 provide the means, standard deviations and correlations for both the nascent and the young firm samples of the variables under analysis.

Results

Nascents and Firm Performance

On balance, the nascent firm wave 2 results indicate that increasing levels of bricolage behaviours increases the odds the firm will persist in their efforts, i.e. they remain in the venture creation process versus becoming operational or terminating. Hypothesis 1(a) predicted that bricoleurs would be more likely to become operational versus persisting. In this analysis, becoming operational was coded as the default category. A positive sign on the coefficient would demonstrate support for the hypothesis. We find a statistically weak significant relationship ($\beta = -.050$, $p < 0.05$) but the results indicate a greater likelihood to persist than become operational providing no directional support (Table 1). Hypothesis 1(b) predicted that bricoleurs would be more likely to persist than terminate. We find support for this hypothesis: for every every single-unit increase in the bricolage score, we expect that generally, controlling for the other variables in the model, a 1.066 increase in the log odds of persisting rather than terminating ($\beta = .064$, $p < 0.05$). Table 2 provides the results. Wave 3[82] test results do not reveal a statistically significant relationship between bricolage and venture emergence in both of the binomial logistic regression tests that were conducted.

Young Firm and Firm Performance

For the young firms, Hypothesis 2 predicted that increasing levels of bricolage would have a positive effect on early stage firm sales. I find no statistically significant relationship between bricolage and sales in wave 2. In wave 3, the results indicate a statistically significant relationship between bricolage and early stage firm performance (sales) in wave 3 sales ($\beta = .018$, $p < 0.05$), providing support for Hypothesis 2. Higher use of bricolage in young firms led to higher sales in wave 3.

Environmental Dynamism Moderation Results

Nascent Firms Wave 2, Wave 3

Hypothesis 3(a) and Hypothesis 3(b) predicted that environmental dynamism would strengthen the relationship between bricolage and firm emergence, and the results indicate a positive yet not statistically significant relationship was found in either wave 2 or wave 3.

Young Firms Wave 2, Wave 3

Hypothesis 4 proposed that for young firms, environmental dynamism would positively moderate the relationship between bricolage and sales. In wave 2 the results indicate that contrary to our theorising, environmental dynamism has a strong *negative* moderation effect on the relationship between bricolage and firm performance, but it is not statistically significant[83]. In wave 3 the moderation tests reveal a strong *negative* statistically significant moderation effect ($\beta = -.758$, $p < 0.05$), providing no directional support for Hypothesis 4. These results are illustrated in Table 3. Figure 1 graphs the moderation: dynamic environments have a significant negative effect on the relationship between bricolage and young firm sales. Thus the effect of bricolage on venture performance (sales) becomes significantly stronger if firms operate in more stable environments.

[82] Owing to space restrictions, Wave 3 results are not provided, but are available upon request. Similarly, Wave 2 and Wave 3 test results for operational versus terminated (the third test which was not specifically hypothesised in this paper) are also available upon request.

[83] Owing to space restrictions, these results are not provided, but are available upon request.

Discussion

In this paper, we developed testable hypotheses from prior descriptive and inductive research on the behavior theory of entrepreneurial bricolage, and tested them using a large representative sample of emerging firms. The results indicate that contrary to ideas around bricolage enabling faster speed of development, overall bricolage seems to slow nascent firms down. Bricolage increases the log odds of persistence versus becoming operational or termination[84]. As hypothesized, bricolage appears to lead to higher reported sales for new firms. This result is contradictory to the research of Stinchfield et al (2013)[85]. Contrary to our theorising, environmental dynamism did not have a positive moderating effect on the impact of bricolage in nascent firms[86]. The empirical tests evaluating the moderating effect of a dynamic environment on the bricolage–sales relationship unexpectedly indicate a statistically significant negative relationship in the young firms, using wave 3 data. This finding suggests that the association between environmental dynamism, bricolage, and sales is not as straightforward as previously thought and that other influences may have a greater impact on the relationship between bricolage and sales.

It could well be that dynamic conditions exacerbate inefficient reworkings of resources that create a "perfect storm" for early stage firms using bricolage in that the challenges are far too numerous, making it difficult to complete activities despite intentions or attempts at bricolage. The varying multiple challenges may require resources beyond those on hand, thus stretching the trove of resources to its limits (or potentially beyond its limits) which will create delays in resource combination attempts (Uzzell, 1990). As a result of these multiple and complex challenges, bricoleurs devote more time to scavenging resources or gathering resources via network bricolage (Baker et al., 2003), and incur delays as they wait for resources to become available or through attempts resources integrate new resources into the trove. As the market continues to shift, bricoleurs may find themselves constantly attempting to scavenge and pick up unused objects and tools which have the potential to be irrelevant by the time they are ready to be combined and used. Increasingly dynamic environments may require either a larger trove of resources or a trove with greater scope, which is problematic for early stage firms which are often still in the process of establishing a resource trove.

Another potential mechanism which may explain the negative moderation effect is that firms may attempt to pursue too many opportunities using bricolage. Such behaviours create a lack of focus as bricoleurs chase one opportunity after another in shifting markets. Constant tinkering and experimentation for these opportunities may result in a misallocation of financial and human resources (Ciborra, 2002; March, 1991; March & Simon, 1958) which early stage firms already dealing with tight resource constraints can ill afford. Applying resources through bricolage to pockets of opportunities which quickly change may also create confusion in the firm over resource selection, choice, and combinations (Ireland & Webb, 2007), increasing costs (Gallo & Gardiner, 2007) and potential market confusion.

[84] Using wave 2 data.

[85] These results were generated using case research of 2 firms that were much older (i.e. 14+ years).

[86] These non-significant results may not be surprising, given nascent firms typically are still in the process of completing gestational activities, and may not yet have fully entered the market.

Conclusion

A lack of agreement currently exists in mostly theorising of bricolage and firm performance with some scholars arguing its benefits (Bannerjee & Campbell, 2009; Baker & Nelson, 2005; Garud & Karnøe, 2003) yet others cautioning against its use (e.g. Lanzara, 1999). This work provides several novel contributions to the behavioural theory of bricolage. It provides the first empirical tests of bricolage using two different measures of performance: namely venture emergence in nascent firms, and sales in young firms. Overall, the results follow the more common suggestion that bricolage is a tool of persistence (Powell, 2011) and contrary to prior theorising of Stinchfield et al. (2011), increasing levels of bricolage creates higher sales in a large representative sample of early stage firms. This greatly extends and provides an empirical foundation for the body of much narrower prior inductive studies of entrepreneurial bricolage.

The second novel contribution tests environmental dynamism as a contingency effect shaping the bricolage and firm performance relationship. The surprising result of environmental dynamism negatively moderating the relationship between bricolage and sales may suggest that when firms possess or have access only to limited resources or resources which have limited scope, they should focus on doing "a few things very well" (West & Meyer, 1988, pg 395). Firms engaging in high levels of bricolage may find themselves overwhelmed in attempts to create multiple novel solutions in dynamic environments. These attempts place too great a demand on the resources in the trove, hindering recombination attempts, creating delays and limiting firm performance.

References

Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. London: Sage.

Baker, T., Miner, A. S., & Eesley, D. T. (2003). Improvising firms: bricolage, account giving and improvisational competencies in the founding process. *Research Policy*, *32*(2), 255-276.

Baker, T., & Nelson, R.E. (2005). Creating something from nothing: Resource construction through entrepreneurial bricolage. *Administrative Science Quarterly*, *50*(3), 329-366.

Bamford, C. E., Dean, T. J., & McDougall, P. P. (2000). An examination of the impact of initial founding conditions and decisions upon the performance of new bank start-ups. *Journal of Business Venturing*, *15*(3), 253-277.

Banerjee, P. M., & Campbell, B. A. (2009). Inventor bricolage and firm technology research and development. *R & D Management*, *39*(5), 473-487.

Baron, R. A., & Tang, J. (2011). The role of entrepreneurs in firm-level innovation: Joint effects of positive affect, creativity, and environmental dynamism. *Journal of Business Venturing*, *26*(1), 49-60.

Boyd, B. K. (1995). CEO duality and firm performance: A contingency model. *Strategic Management Journal*, *16*(4), 301-312.

Brush, C. G., & Vanderwerf, P. A. (1992). A comparison of methods and sources for obtaining estimates of new venture performance. *Journal of Business venturing*, *7*(2), 157-170.

Cameron, K. S., & Whetten, D. A. (Eds.). (1983). *Organizational effectiveness: A comparison of multiple models* (Vol. 733). Academic Press.

Campbell, A. J., & Cooper, R. G. (1999). Do customer partnerships improve new product success rates?. *Industrial Marketing Management*, *28*(5), 507-519.

Carter, N. M., Gartner, W. B., & Reynolds, P. D. (1996). Exploring start-up event sequences. *Journal of Business Venturing*, *11*(3), 151-166.

Chen, J., R. R. Reilly, & Lynn, G.S. (2005). The impacts of speed-to market on new product success: The moderating effects of uncertainty. *IEEE Transactions on Engineering Management* 52 (2): 199–212.
Ciborra, C. U. (1996). The platform organization: Recombining strategies, structures and surprises. *Organization Science, 7*(2), 103-118.
Cunha, P., Rego, A., Oliveira, P., Rosado, P., & Habib, N. (2014). Product Innovation in Resource-Poor Environments: Three Research Streams. *Journal of Product Innovation Management, 31*(2), 202-210.
Davidsson, P. (2008). *The entrepreneurship research challenge*. Cheltenham, UK: Edward Elgar Publishing.
Davidsson, P., & Gordon, S. R. (2012). Panel studies of new venture creation: a methods-focused review and suggestions for future research. *Small Business Economics, 39*(4), 853-876.
Davidsson, P., Steffens, P., & Gordon, S. R. (2011). Comprehensive Australian study of entrepreneurial emergence (CAUSEE): Design, data collection and descriptive results. *Handbook of Research on New Venture Creation*, 216-250 Cheltenham: Edward Elgar.
Dess, G. G., & Beard, D. W. (1984). Dimensions of organizational task environments. *Administrative Science Quarterly*, *29*(1), 52-73.
Fisher, G. (2012). Effectuation, causation, and bricolage: A behavioral comparison of emerging theories in entrepreneurship research. *Entrepreneurship Theory and Practice, 36*(5), 1019-1051.
Gallo, M., & Gardiner, P. D. (2007). Triggers for a flexible approach to project management within UK financial services. *International Journal of Project Management*, *25*(5), 446-456.
Gartner, W. B., Carter, N. M., & Reynolds, P. D. (2010). Entrepreneurial behavior: Firm organizing processes. In *Handbook of entrepreneurship research* (pp. 99-127). Springer New York,
Gartner, W.B., Shaver, K.G., Carter, N.M., & Reynolds, P.D. (2004). *Handbook of Entrepreneurial Dynamics: The Process of Business Creation*. Thousand Oaks, CA: Sage.
Garud, R., & Karnøe, P. (2003). Bricolage versus breakthrough: distributed and embedded agency in technology entrepreneurship. *Research Policy 32*(2), 277-300.
Gruner, K.E.& Homburg, C. (2000). 'Does Customer Interaction Enhance New Product Success? *Journal of Business Research, 49* (1), 1-14.
Gundry, L. K., Kickul, J. R., Griffiths, M. D., & Bacq, S. C. (2011). Creating social change out of nothing: the role of entrepreneurial bricolage in social entrepreneurs' catalytic innovations. *Advances in Entrepreneurship, Firm Emergence and Growth*, *13*, 1-24.
Hatton, E. (1989). Lévi-Strauss's Bricolage and Theorizing Teachers' Work. *Anthropology & Education Quarterly*, *20*(2), 74-96.
Homer D.W. & Lemeshow, S. (2000). Applied logistic regression. New York: Wiley.
Hoyer, W. D., Chandy, R., Dorotic, M., Krafft, M., & Singh, S. S. (2010). Consumer cocreation in new product development. *Journal of Service Research*, *13*(3), 283-296.
Hmieleski, K. M., & Baron, R. A. (2009). Entrepreneurs' optimism and new venture performance: A social cognitive perspective. *Academy of management Journal*, *52*(3), 473-488.
Ireland, R. D., & Webb, J. W. (2007). A multi-theoretic perspective on trust and power in strategic supply chains. *Journal of Operations Management*, *25*(2), 482-497.
Kessler, E. H. and P. E. Bierly III. (2002). Is faster really better? An empirical test of the implications of innovation speed. *IEEE Transactions on Engineering Management* 49 (1): 2–12.
Lanzara, G.F. (1999). Between transient constructs and persistent structures: Designing systems in action. *Journal of Strategic Information Systems,* 8(4), 331-349.

Lévi-Strauss, C. (1966). *The Savage Mind*. University of Chicago Press.
March, J. G. (1991). Exploration and exploitation in organizational learning. *Organization Science*, *2*(1), 71-87
March, J.G., & Simon, H.A. (1958). Organizations. New York: Wiley.
Miles, M. P., Covin, J. G., & Heeley, M. B. (2000). The relationship between environmental dynamism and small firm structure, strategy, and performance. *Journal of Marketing Theory and Practice*, 63-78.
Prahalad, C. K. & Ramaswamy, R. (2004). ''Co-Creation Experiences: The Next Practice in Value Creation,'' Journal of Interactive Marketing, 18 (Summer), 5-14
Priem, R. L., Rasheed, A. M., & Kotulic, A. G. (1995). Rationality in strategic decision processes, environmental dynamism and firm performance. *Journal of Management*, *21*(5), 913-929.
Powell, E.E. (2011). *Weathering the gale: Toward a theory of entrepreneurial resourcefulness and resilience.* North Carolina State University Raleigh, NC.
Reynolds, P. D. (2007). New firm creation in the United States a PSED I overview. *Foundations and Trends (R) in Entrepreneurship*, *3*(1), 1-150.
Reynolds, P. D., & Curtain, R. (2008). Business Creation in the United States: Panel Study of Entrepreneurial Dynamics II Initial Assessment. *Foundations and Trends in Entrepreneurship*, *4*(3): 155-307.
Salunke, S., Weerawardena, J., & McColl-Kennedy, J. R. (2013). Competing through service innovation: The role of bricolage and entrepreneurship in project-oriented firms. *Journal of Business Research*, *66*(8), 1085-1097.
Schoonhoven, C. B., Eisenhardt, K. M., & Lyman, K. (1990). Speeding products to market: Waiting time to first product introduction in new firms. *Administrative Science Quarterly*, *35*(1), 177-207.
Senyard, J., Baker, T., Steffens, P., & Davidsson, P. (2014). Bricolage as a Path to Innovativeness for Resource-Constrained New Firms. *Journal of Product Innovation Management*, *31*(2), 211-230.
Smith, P. G.,&. Reinertsen, D.G. (1991). *Developing new products in half the time*. New York: Van Nostrand Reinhold.
Stinchfield, B. T., Nelson, R. E., & Wood, M. S. (2013). Learning From Lévi-Strauss ' Legacy: Art, Craft, Engineering, Bricolage, and Brokerage in Entrepreneurship. *Entrepreneurship Theory and Practice*, *37*(4), 889–921.
Uzzell, D. (1990). Dissonance of formal and informal planning styles, or can formal planners do bricolage? *City and Society* 4 (2): 114–30.
West III, G. P., & Meyer, G. D. (1998). To agree or not to agree? Consensus and performance in new ventures. *Journal of Business Venturing*, *13*(5), 395-422

Table 1 Nascent Firm Binomial Moderation: Environmental Dynamism (n=282) DV: Operational vs. Persist (Wave 2)

	Model 1				*Model 2*				*Model 3*				*Model 4*			
	β	*St.Err*	*Wald*	*Exp(β)*	β	*St.Err*	*Wald*	*Exp (β)*	β	*St.Err*	*Wald*	*Exp (β)*	β	*St.Err*	*Wald*	*Exp (β)*
Gestation	.086***	(.025)	11.415	.917	.087***	(.026)	11.734	.916	.087***	(.026)	11.698	.916	.088***	(.026)	11.75	.916
Financial Invest. (Log)	.049	(.080)	.382	.952	.055	(.080)	.462	.947	.055	(.080)	.476	.946	.054	(.080)	.457	.947
Services/Products	-.670*	(.287)	5.44	1.954	-.665**	(.289)	5.310	1.944	-.660**	(.290)	5.194	1.935	-.667**	(.291)	5.264	1.948
Gender	-.206	(.288)	.510	1.228	-.247	(.291)	.721	1.280	-.251	(.292)	.737	1.285	-.246	(.292)	.708	1.279
Education Level	-.024**	(.010)	6.186	1.024	-.025**	(.010)	6.609	1.025	-.025**	(.010)	6.633	1.025	-.025**	(.010)	6.715	1.026
Business Exp	.022	(.027)	.633	.979	.023	(.027)	.679	.978	.023	(.027)	.689	.978	.023	(.027)	.689	.977
General Manage.Exp	-.017	(.012)	2.169	1.017	-.015	(.012)	1.535	1.015	-.014	(.012)	1.390	1.014	-.014	(.012)	1.413	1.014
High Tech	.499	(.306)	2.655	.607	.469	(.309)	2.306	.625	.477	(.312)	2.334	.621	.473	(.313)	2.288	.623
Innovativeness	-.145*	(.062)	5.526	1.156	-.132*	(.062)	4.500	1.142	-.133*	(.062)	4.504	1.142	-.134*	(.063)	4.587	1.144
Fut. Expectation Rev	-.000	(.000)	.268	1.000	-.000	(.000)	.337	1.000	-.000	(.000)	.343	1.000	-.000	(.000)	.349	1.000
Serial	.620	(.704)	.777	.538	.620	(.711)	.763	.538	.625	(.711)	.773	.535	.620	(.712)	.756	.538
Team	-.580	(.440)	1.740	1.787	-.567	(.442)	1.642	1.763	-.570	(.443)	1.658	1.768	-.574	(.443)	1.682	1.776
Team Size	-.329	(.218)	2.262	1.389	-.333	(.220)	2.276	1.395	-.334	(.221)	2.297	1.397	-.338	(.221)	2.340	1.402
Employee	1.238*	(.565)	4.809	.290	1.244*	(.564)	4.861	.288	1.242*	(.565)	4.838	.289	1.233*	(.565)	4.764	.291
Direct Effect																
Bricolage					-.050*	(.029)	.091	1.051	-.050*	(.030	2.893	1.051	-.049*	(.030)	2.788	1.051
Dynamism									.624	(3.575)	.030	.536	.220	(3.787)	.003	.803
Moderating Effect																
Bricolage x Dynamism													.277	(.896)	.096	.758
Constant	.292	(1.013)			.222	(1.016)			.209	(1.018)			.229	(1.020)		
Model Chi-Squared [d.f.]	63.664***	[14]			66.588***	[15]			66.619	[16]			66.715	[17]		
Block Chi-Squared [d.f]					2.924†	[1]			.031	[1]			.096	[1]		
Nagelkerke R^2	.274				.286				.289				.286			
% Correct Predictions	69.5				70.6				70.6				69.9			

†P0.10 * P<0.05, **P<0.01, ***P<0.001 (two- tailed), with directional hypothesis entries (one tailed).

Table 2 Nascent Firm Binomial Moderation: Environmental Dynamism (n=217) DV: Persist vs. Termination (Wave 2)

	Model 1				*Model 2*				*Model 3*				*Model 4*			
	β	*St.Err*	*Wald*	*Exp β)*	β	*St.Err*	*Wald*	*Exp (β)*	β	*St.Err*	*Wald*	*Exp (β)*	β	*St.Err*	*Wald*	*Exp (β)*
Gestation	.041	(.026)	2.605	1.042	.043†	(.026)	2.802	1.044	.041	(.026)	2.465	1.042	.041	(.026)	2.466	1.042
Financial Invest. (Log)	-.058	(.087)	.446	.943	-.054	(.088)	.382	.947	-.050	(.088)	.317	.952	-.042	(.088)	.223	.959
Services/Products	-.083	(.294)	.080	.920	-.140	(.299)	.219	.869	-.120	(.302)	.159	.887	-.126	(.303)	.173	.882
Gender	.202	(.299)	.454	1.224	.255	(.304)	.705	1.291	.273	(.306)	.796	1.314	.284	(.307)	.855	1.328
Education Level	.016	(.010)	2.651	1.016	.017†	(.010)	2.998	1.018	.017†	(.010)	2.850	1.017	.017	(.010)	2.694	1.017
Business Exp	.001	(.028)	.002	1.001	-.002	(.028)	.004	.998	.000	(.028)	.000	1.000	-.003	(.028)	.011	.997
General Manage.Exp	.017	(.012)	1.819	1.017	.009	(.013)	.510	1.009	.010	(.013)	.541	1.010	.012	(.013)	.865	1.012
High Tech	-.447	(.337)	1.761	.640	-.378	(.341)	1.230	.685	-.355	(.344)	1.063	.701	-.390	(.349)	1.254	.677
Innovativeness	.078	(.067)	1.367	1.081	.065	(.068)	.927	1.067	.067	(.068)	.985	1.070	.066	(.068)	.951	1.068
Fut. Expectation Rev	.000	(.000)	.500	1.000	.000	(.000)	.733	1.000	.000	(.000)	.742	1.000	.000	(.000)	.563	1.000
Serial	.307	(.704)	.190	1.359	.209	(.716)	.085	1.232	.239	(.719)	.111	1.270	.159	(.725)	.048	1.173
Team	.225	(.345)	.425	1.252	.162	(.350)	.214	1.176	.193	(.355)	.294	1.212	.228	(.359)	.404	1.256
Team Size	-.016	(.079)	.044	.984	-.023	(.078)	.087	.977	-.023	(.079)	.088	.977	-.020	(.079)	.064	.980
Employee	.026	(.829)	.001	1.026	-.079	(.839)	.009	.924	-.115	(.846)	.019	.891	-.151	(.853)	.031	.860
Direct Effect																
Bricolage					.064*	(.030)	4.602	1.066	.064*	(.030)	4.649	1.067	.066*	(.031)	4.611	1.068
Dynamism									2.210	(4.184)	.279	9.118	2.484	(4.572)	.295	11.984
Moderating Effect																
Bricolage x Dynamism													1.434	(1.181)	1.475	4.197
Constant	-1.456	(.926)			-1.245	(.941)			-1.313	(.950)			-1.273	(.950)		
Model Chi-Squared [d.f.]	18.937	[14]			23.763†	[15]			24.045†	[16]			26.039†	[17]		
Block Chi-Squared [d.f]					4.827*	[1]			.289	[1]			1.993	[1]		
Nagelkerke R^2		.111				.138				.140				.151		
% Correct Predictions		58.1				58.5				59.4				60.4		

†P0.10 * P<0.05, **P<0.01, ***P<0.001 (two- tailed), with directional hypothesis entries (one tailed).

Table 3 Young Firm Dynamism (n=247) (Wave 3)

	Model 1		*Model 2*		*Model 3*		*Model 4*	
Years Active	-.023	(.046)	-.019	(.047)	-.021	(.047)	-.012	(.047)
Fin Invest. (Log)	.192***	(.023)***	.190	(.023)	.183***	(.023)	.188***	(.023)
Prior Sales (W2)	-.020	(.000)	-.031	(.000)	-.024	(.000)	-.024	(.000)
Services/Product Dummy	.010	(.117)	.024	(.118)	.029	(.120)	.024	(.120)
Education Level	-.031	(.003)	-.058	(.004)	-.057	(.004)	-.061	(.004)
Business Exp	.021	(.010)	.011	(.010)	.008	(.010)	.002	(.010)
Gen. Manage.Exp	.079	(.004)	.074	(.004)	.081	(.004)	.091	(.004)
High Tech	.032	(.117)	.031	(.118)	.034	(.119)	.033	(.119)
Gender	.382	(.105)	.387	(.105)	.383	(.105)	.400	(.105)
Fut. Expectation Rev	-.086*	(.000)	-.086*	(.000)	-.080*	(.000)	-.099*	(.000)
Innovativeness	-.078	(.025)	-.095	(.026)	-.096†	(.026)	-.096†	(.026)
Serial	.061	(.244)	.074	(.245)	.070*	(.245)	.072*	(.245)
Team	-.066	(.187)	-.080	(.187)	-.079	(.187)	-.099	(.188)
Team Size	.189†	(.136)†	.200	(.136)	.193†	(.136)	.199†	(.137)
Employee	.327***	(.110)	.328	(.110)	.338	(.112)	.335	(.112)
Direct Effect								
Bricolage			.100*	(.010)	.103*	(.010)	.094*	(.010)
Dynamism					-.050	(1.637)	-.034	(1.813)
Moderating Effect								
Bricolage x Dynamism							-.113*	(.383)
Change F		9.127***		1.068		.785		1.107
R2 (Adj.)		.331		.338		.337		.347
Change R2				.009		.002		.012

Entries represent standardized regression coefficients. †P0.10 * P<0.05, **P<0.01, ***P<0.001 (two-tailed),

With directional hypothesis entries (one tailed).

Figure 1 Moderating Effect of Dynamism on Bricolage and Young Firm Sales (Wave 3)