



**Queensland University of Technology**  
Brisbane Australia

This is the author's version of a work that was submitted/accepted for publication in the following source:

Senyard, Julienne M., Baker, Ted, & Davidsson, Per (2009) Entrepreneurial bricolage : towards systematic empirical testing. In *Babson College Entrepreneurship Research Conference (BCERC)*, 4-6 June 2009, Boston, Massachusetts. (Unpublished)

This file was downloaded from: <http://eprints.qut.edu.au/26406/>

© Copyright 2009 Please consult the authors.

**Notice:** *Changes introduced as a result of publishing processes such as copy-editing and formatting may not be reflected in this document. For a definitive version of this work, please refer to the published source:*

# ENTREPRENEURIAL BRICOLAGE: TOWARDS SYSTEMATIC EMPIRICAL TESTING

*Julienne Senyard, School of Management, QUT*  
*Ted Baker, University of North Carolina*  
*Per Davidsson, Brisbane Graduate School of Business, QUT*

## ABSTRACT

The behavioral theory of “entrepreneurial bricolage” attempts to understand what entrepreneurs do when faced with resource 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 innovativeness may play an important role in shaping the outcomes of bricolage (Anderson 2008). In this paper, we theorize and provide preliminary test of the bricolage-performance relationship and how it is affected by firm innovativeness.

## INTRODUCTION

Most entrepreneurs face substantial resource constraints (Shepherd et al., 2000). As Aldrich (1999:41) noted ruefully, most firms in creation... “can’t always get what they want, and certainly don’t always get what they need.” The modal firm is created with inadequate financial, social, temporal and other resource buffers (Wiklund, Baker & Shepherd, 2009; Bruderl, Prinsendorfer & Ziegler, 1992; Bourgeois & Eisenhardt, 1988). Bricolage behaviors have been identified as a way that some entrepreneurs “make do” by applying combinations of the resources at hand to new challenges (Baker & Nelson 2005). Successful bricolage behaviors may assist in the development of firms that are better able to manage market uncertainties, survive and perhaps even flourish despite resource constraints.

The relationship between bricolage and performance, however, is far from straightforward. In particular, prior research indicates that 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. Garud and Karnoe’s (2003) study of the emergence of the Danish wind turbine industry showed that firms benefitted in several ways from reliance on bricolage rather than “breakthrough” strategies. Hatton’s (1989) studies of bricolage by Australian school teachers documented primarily negative outcomes for students. Baker & Nelson (2005) suggested that bricolage may be harmful at very high levels, but more helpful if used judiciously. Prior case research in bricolage has predominantly been tested in high innovative contexts (e.g. Ali & Bailur, 2007; Ciborra, 2002) with mixed results. Little is known, however, about how innovativeness affects the relationship between bricolage and firm performance.

The paper is structured as follows. We first develop hypothesis concerning the bricolage-performance relationship and the contingent effect of innovativeness. We then test our hypotheses using data from the Comprehensive Australian Study of Entrepreneurial Emergence (CAUSEE) project (Davidsson, Steffens, Gordon, & Reynolds, 2008), including 625 nascent (pre-operational) firms and 561 young firms that are operational but less than four years old. In our tests, we make use of the new Davidsson-Baker survey measure of bricolage behavior. We conclude by discussing the theoretical implications of our findings.

### **Bricolage and Performance**

Entrepreneurs often attempt to overcome resource constraints by engaging in resource-seeking behaviors, for example by engaging in sometimes time-consuming processes of trying to attract new investments into their firms (Brush, Greene & Hart, 2001). They may also respond to resource constraints by deciding that now is not a good time to pursue a new opportunity. Such time consuming delays may be particularly common among nascent entrepreneurs, who, because they don't face the pressures of day-to-day operations may find it easier to wait for a "better time" or to control more resources before acting. In bricolage, however, "making do" includes a bias for action (Baker & Nelson, 2005; Stark, 1989), suggesting that entrepreneurs construct and pursue opportunities without potentially delaying attempts to pursue the "right" resources for the challenge. Therefore, we hypothesize that:

H1: Bricolage has a positive effect on making progress in the emerging stage of firm creation.

Used as a stop-gap tactic, as a way of getting by temporarily, or as a form of inexpensive "forward looking probe" (Brown & Eisenhardt, 1997), bricolage may be a useful way to make do when the only other choice is to wait or do nothing. However, to the extent that solutions built through bricolage tend to be imperfect, and to the extent that customers for products and services built through bricolage may tend themselves to be resource constrained and relatively undemanding, firms that engage in high levels of bricolage may find it difficult to learn to meet the higher quality and performance demands of other less resource constrained and demanding customers. As Baker & Nelson (2005) suggest, firms that engage non-selectively in bricolage may find it difficult to grow. We extend this logic to argue that to the extent that entrepreneurs engage in very high levels of bricolage, they may find it difficult to move beyond the "good enough" solutions they offer initially in order to appeal to a larger group of customers. Therefore, we hypothesize:

H2: Bricolage has a negative effect on performance once the firm is up-and-running.

## **Bricolage and Innovation**

The literature on radical innovation suggests that such innovations may emerge from complex combinations of existing resources (Green & Welsh, 2003; Olson, Walker & Ruekert, 1995; Schoonhoven, Eisenhardt, & Lyman, 1990) and require skills and capabilities across varied domains (Swink, Sandvig & Mabert, 2003). In the absence of severe resource and skills constraints and if firms adopt very high standards for what is “good enough,” bricolage behaviors might be one mechanism of radical innovation. Levi-Strauss (1967) and others have suggested that bricolage can occasionally produce highly innovative outcomes.

Indeed, because bricolage involves the creation of novel solutions to problems and opportunities, the products of bricolage are typically innovations in the sense of an innovation as simply the introduction of something new and potentially useful (Gopalakrishnan & Damanpour, 1994). The prior literature suggests, however, that innovations produced through bricolage (as through most innovation processes) are typically relatively mundane. Even the most valuable innovations documented as outcomes of bricolage – such as the wind turbines described in Garud and Karnoe (2003) – are often not “breakthroughs” or radical departures, but are instead more likely to be largely incremental, or even stopgaps. For example, the bricolage that famously saved the lives of three Apollo 13 astronauts was not then adopted as an engineered solution to the original problem (Rerup, 2001).

Under more typical conditions, we expect entrepreneurs engaged in bricolage to be doing so in the face of substantial resource constraints and to be focused on doing work that is “good enough.” Because of this, we expect that attempts to produce radical innovations through bricolage under resource constraints may be unlikely to succeed but also likely to undermine some of the advantages that may otherwise accrue from entrepreneurs’ selective engagement in bricolage. In particular, the attempt to produce radical innovations from combinations of the resources at hand, including reliance on self-taught and amateur skills that are typical of bricolage, is likely to be a slow going process of trial and error experimentation and very gradual accumulation of skills. The combination of bricolage and the attempt to engage in high levels of innovation may therefore result in a slow pace of progress. We therefore hypothesize:

H3 Firms (both emerging and those firms that have recently been established) that combine bricolage behaviors with high innovativeness will attain lower firm performance.

## **METHOD**

### **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, Steffens, Gordon, & Reynolds, 2008) administered through telephone surveys. 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, Shaver, Carter, & Reynolds, 2004; Reynolds & Curtin, 2008).

In the CAUSEE main study, 28,383 adults (with equal male/female representation) from randomly selected households completed a screening interview for eligibility. 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.

This process yielded 977 Nascent Firms (3.4%) and 1,011 Young Firms (3.6%). These were directed to the full length interview (40-60 minutes) either directly following the screener or later by appointment. The full length interviews were completed by 594 NF and 514 YF cases (representing response rates of 60.8% and 50.8% of eligible cases identified in the screener) that are used in our analyses.

As CAUSEE is a 4 year longitudinal survey it enables us to study nascent and firm development as it happens. This paper however analyses data from the first of these four years, and owing to this, may be considered cross-sectional in nature. Additional longitudinal analysis is expected in future research to evaluate bricolage processes and firm performance over time: the first year data was used here for initial tests of bricolage and performance using both nascent and young firms to illustrate firms at the different stages of development.

### **Measuring Bricolage**

We used a newly developed bricolage instrument and scale to measure bricolage. As a new instrument, this required extensive development based on prior grounded research and the multidimensional Baker and Nelson (2005) definition. Its development followed standard protocols for scale development (Brown, Davidsson & Wiklund, 2001; DeVellis, 2003).

One key challenge was the need to design the construct to enable its applicability across multiple industries and its use in heterogeneous firms and stages of firm growth. We began by writing a large number of items based on the literature. We then reduced the number of items through a variety of processes, including review by other scholars familiar with the entrepreneurship and bricolage literatures and by two rounds of pilot testing using a questionnaire. After extensive pretesting and screening 9 items were developed to tap each element of the Baker and Nelson's (2005: 333) definition of the bricolage: "making do by applying combinations of the resources at hand to new problems and opportunities." In the questions we used a response scale where 1 means "never" and 5 means "always" (rather than levels of agreement) in order to reflect the behavioral nature of the phenomenon.

In choosing, developing and adapting the new bricolage measure, we considered the appropriateness of it being either a reflective measure or formative measure (MacKenzie, Podsakoff, & Jarvis, 2005). During this evaluation, we performed a Cronbach alpha on the bricolage measures. If we were to proceed with reflective modeling, the results revealed Cronbach alphas that were above Nunnally's recommended level for consistency ( $\alpha = .823$ ). However, further assessment and consideration of bricolage, discussion with scholars, and the use of decision criteria by Mackenzie et al. (2005) indicated that we should treat the measure as formative and also resulted in dropping one item as inconsistent with the Baker and Nelson (2005) definition. Unlike reflective measures, formative models do not assume that the measures are all caused by a single underlying construct: it assumes that the measures all have an impact on (or cause) a single construct. Our final instrument consists of 8 items.

### **Innovation Measure**

Twelve questions were developed for the innovation measure. We use a 4 item scale which is an elaboration of the scale developed by Dahlqvist (2007) to measure the innovativeness of the venture idea. This scale identifies four categories of the venture idea newness: (1) new to the world, (2) new to the market (3) ideas substantially improved and or (4) imitative venture ideas. These categories are then defined through four classifications of venture ideas; (1) product, (2) method of production, (3) method of promotion and (4) type target market/customer. A continuous variable was computed for these responses and summated to develop the overall newness measure used in this research. This newness measure has a theoretical range of 0 to 12. The actual range in the data is 0 to 12 with a mean value of 3.88.

### **Performance Measures**

Early performance assessment in nascent and young firms is difficult (Davidsson 2008). For the nascent firms we follow recent nascent entrepreneurship literature that measures performance through speed of making progress (Liao and Welsch 2003), calculated through the number of gestation activities completed. The firm outcome variable of prior 12 month sales is used in this research for newly established young firms. To reduce skewness in the sales response, the data was categorised into 4 classes after removing outliers.

## Controls

We use three categories of control variables. The first category aims to capture the overall level of resources – time and money - that have been invested in the firm. Specific variables include amount of loans accessed by firm (log), time since the first business activity commenced, if the business is being run as a parallel firm i.e. running more than one firm at the same time.

The second group of control variables aims to capture some of the heterogeneity concerning the ability the firm has to acquire 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: team (versus solo dummy); spouse and other type of team (dummy); service (versus product dummy) and industry controls.

## Results

Table 1 and 2 reports the result of the regression analysis that models bricolage in relationship to firm performance. Hypothesis 1 proposed bricolage has a positive effect on performance in the emerging stage of firm creation. The results indicate that bricolage has a statistically significant positive relationship ( $p < 0.05$ ) to number of relevant gestation activities completed in the emerging stage of firm creation. Hypothesis 2 stated bricolage has a negative effect on performance once the firm is up-and-running owing to difficulty in meeting quality and performance market demands through potentially imperfect bricolage offerings. The results show bricolage has a significant negative relationship ( $p < 0.05$ ) to sales, confirming hypothesis 2. Both Hypothesis 1 and Hypothesis 2 were therefore supported.

Hypothesis 3 proposed firms (both emerging and those firms that have recently been established) that combine bricolage behaviors with high innovation will attain lower firm performance. Table 3 provides the results for the moderated regression. Hypothesis 3 was not supported in nascent firms: innovativeness did not significantly moderate the bricolage-performance relationship. However, there was a significant negative moderation effect of innovativeness on the relationship between bricolage and venture performance ( $\beta = -0.011$ ,  $p < 0.05$ ) in young firms thereby confirming, in part, Hypothesis 3. Figure 2A illustrates this relationship. Sales have been assigned into 4 equal categories after removing outliers. Thus the effect of bricolage on venture performance (sales) becomes significantly stronger if firms make limited use of innovativeness.

Following Venkataraman's (1989) expanded perspective on fit and co-alignment and recent work by Edelman, Brush and Manolova (2005), did preliminary tests of mediating effects of innovativeness on the bricolage-performance relationship was tested in nascent firms. Mediation tests specify the existence of a significant intervening mechanism (e.g., innovativeness) between an antecedent variable (e.g., bricolage) and the consequent variable (e.g., firm performance).

As such, the mediator variable (e.g., innovativeness) accounts for a proportion of the relationship between the predictor and the criterion variables. Figure 1 provides a schematic representation of the mediated “bricolage→newness →performance” model.

Figure 1

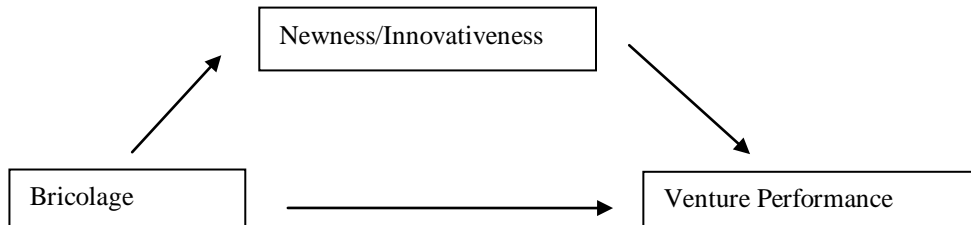


Fig. 1 The “bricolage→newness →performance” model. (a) The model above is of an indirect model, in that the antecedent variable  $Z$  (i.e., bricolage) has a direct relationship with the dependent variable  $Y$  (i.e., performance) as well as an indirect relationship with the dependent variable  $Y$  (i.e., performance) through the intervening variable  $X$  (i.e., Newness/Innovativeness). (b) The model above can be written as a set of equations where  $Y=a_0+a_1Z+a_2X+e$ ; and  $X=b_0+b_1Z+e$ .

Following recommendations in Baron and Kenny (1986) we ran separate regression models to test the relationships between bricolage and newness, newness and firm performance and bricolage and performance. Our preliminary tests found that innovativeness has a partial mediating effect on the interaction between bricolage and nascent firm performance.

## 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 new survey measure of bricolage and samples of nascent and young firms. As hypothesized, the main effect of bricolage on nascent firm performance was positive. Bricolage led to the completion of a higher number of gestation activities completed for nascent firms. Also as hypothesized, bricolage appears to lead to lower reported sales for new firms. Contrary to our theory, innovativeness did not have a moderating effect on the impact of bricolage in nascent firms; innovativeness did, however, moderate the bricolage-performance relationship in young firms.

In general, our results are supportive of the general theoretical thrust of prior theory about bricolage, which we take to suggest that because most new organizations are resource-constrained in important ways, resourceful behaviors – including bricolage – are likely to be play a key role in shaping entrepreneurial outcomes, *for better or for worse*. Importantly, our results support the theme from prior research that entrepreneurial bricolage is neither all good nor all bad. To the extent that bricolage in the face of resource constraints is very common, we believe that understanding patterns and results of bricolage is a central theoretical and research frontier for entrepreneurship. Our unexpected finding that innovativeness may mediate some of the effects of bricolage in nascent firms opens up additional important theoretical questions about bricolage and innovative behaviors.



At the most general level, the body of work on bricolage, ours included, suggests that within poorly understood bounds, what entrepreneurial firms do with the resources at hand may matter at least as much as what those resources are. Stated somewhat more strongly: resources are what entrepreneurs make of them. This research complements and also challenges the commonplace models of near resource-determinism that have dominated organizational research about entrepreneurship.

## **Conclusion**

We believe that ours are the first systematic empirical tests evaluating bricolage and firm performance and the results underline the interconnectedness of innovativeness and bricolage on nascent firm performance. Although our results have important implications for the further development of bricolage theory, we stress that these results represent only tentative first steps in providing a greater understanding of bricolage and its influence in venture creation and firm performance. As we continue our longitudinal study of bricolage, and also begin to examine our sub-sample of “high potential” firms, we will be able to develop and test much more nuanced theories of the interplay of bricolage behaviours, processes and outcomes. Future research should also examine a more comprehensive range of outcomes including other elements of firm performance and other theoretically relevant contingencies such as, for example, the role of environmental dynamism. Finally, the new measure of bricolage we have introduced provides an important tool for our own and other researchers’ continued investigations of entrepreneurial bricolage.

**TABLE 1 REGRESSION ANALYSIS RESULTS**

| Dependent Variable                     | Gestation Activities Complete |          |                  |          | DV: Sales (12 months) n= 341 |          |                  |          |
|--|-------------------------------|----------|------------------|----------|------------------------------|----------|------------------|----------|
|  | Model 1<br>Coeff              | St error | Model 2<br>Coeff | St error | Model 1<br>Coeff             | St error | Model 2<br>Coeff | St error |
| <i>Level of Resources Controls</i>     |                               |          |                  |          |                              |          |                  |          |
| YearsActive                            | 0.025                         | 0.046    | 0.027            | 0.046    | -0.002                       | 0.017    | -0.011           | 0.016    |
| Team /Solo (Dummy)                     | -0.118†                       | 0.818    | -0.112†          | 0.815    | 0.048                        | 0.202    | 0.047            | 0.202    |
| Spouse Team                            | 0.129*                        | 0.869    | 0.122*           | 0.866    | 0.073                        | 0.208    | 0.086            | 0.208    |
| Log_Loans                              | 0.289***                      | 0.166    | 0.292***         | 0.165    | 0.238***                     | 0.030    | 0.238***         | 0.029    |
| Services/Products Dummy                | -0.048                        | 0.689    | -0.049           | 0.687    | -0.020                       | 0.160    | -0.029           | 0.160    |
| <i>Resource Heterogeneity Controls</i> |                               |          |                  |          |                              |          |                  |          |
| Serial Entrepreneur                    | 0.103*                        | 0.691    | 0.095†           | 0.690    | -0.008                       | 0.131    | 0.006            | 0.131    |
| Single/Parallel Entrep.                | 0.044                         | 0.745    | 0.048            | 0.742    | 0.022                        | 0.159    | 0.028            | 0.158    |
| Education Level                        | 0.049                         | 0.214    | 0.047            | 0.213    | 0.093                        | 0.048    | 0.091            | 0.048    |
| Industry Exp                           | 0.075                         | 0.019    | 0.073            | 0.018    | 0.281***                     | 0.004    | 0.291***         | 0.004    |
| General Manage.Exp                     | 0.000                         | 0.019    | -0.008           | 0.019    | -0.185*                      | 0.004    | -0.190           | 0.004    |
| <i>Industry Controls</i>               |                               |          |                  |          |                              |          |                  |          |
| Retail                                 | -0.058                        | 0.989    | -0.057           | 0.985    | -0.124*                      | 0.264    | -0.113 †         | 0.264    |
| Hospitality                            | -0.126**                      | 1.479    | -0.124**         | 1.474    | -0.017                       | 0.373    | -0.021           | 0.371    |
| Consumer_Services                      | 0.030                         | 1.007    | 0.026            | 1.004    | -0.114 †                     | 0.213    | -0.104 †         | 0.213    |
| Health, Education Social Services      | 0.028                         | 1.010    | 0.029            | 1.006    | -0.072                       | 0.222    | -0.068           | 0.222    |
| Manufacturing                          | -0.100*                       | 1.242    | -0.102*          | 1.237    | -0.044                       | 0.298    | -0.044           | 0.297    |
| Construction                           | -0.023                        | 1.289    | -0.026           | 1.284    | 0.097                        | 0.188    | 0.096            | 0.187    |
| Agriculture                            | -0.050                        | 1.472    | -0.058           | 1.470    | -0.097 †                     | 0.303    | -0.094 †         | 0.302    |
| Mining                                 | -0.036                        | 3.823    | -0.030           | 3.814    | 0.091 †                      | 0.630    | 0.094 †          | 0.627    |
| Transportation                         | -0.017                        | 2.300    | -0.017           | 2.291    | 0.013                        | 0.423    | 0.013            | 0.421    |
| Utilities                              | 0.033                         | 4.655    | 0.024            | 4.654    | 0.001                        | 0.487    | 0.010            | 0.486    |
| Communication                          | -0.013                        | 1.407    | -0.017           | 1.402    | -0.014                       | 0.323    | -0.004           | 0.323    |
| Real_Estate                            | -0.053                        | 2.718    | -0.060           | 2.714    | 0.051                        | 0.702    | 0.053            | 0.699    |
| Finance_Insurance                      | -0.021                        | 2.156    | -0.018           | 2.148    | -0.026                       | 0.372    | -0.022           | 0.371    |
| <i>Direct Effect</i>                   |                               |          |                  |          |                              |          |                  |          |
| Bricolage                              |                               |          | 0.097*           | 0.453    |                              |          | -0.105*          | 0.093    |
| F                                      |                               | 3.374    |                  | 3.476    |                              | 3.302    |                  | 3.350    |
| Change F                               |                               |          |                  |          |                              |          |                  | 0.048    |
| R2                                     |                               | 0.134    |                  | 0.143    |                              | 0.207    |                  | 0.217    |
| △ R2                                   |                               |          |                  | 0.009    |                              |          |                  | 0.010    |

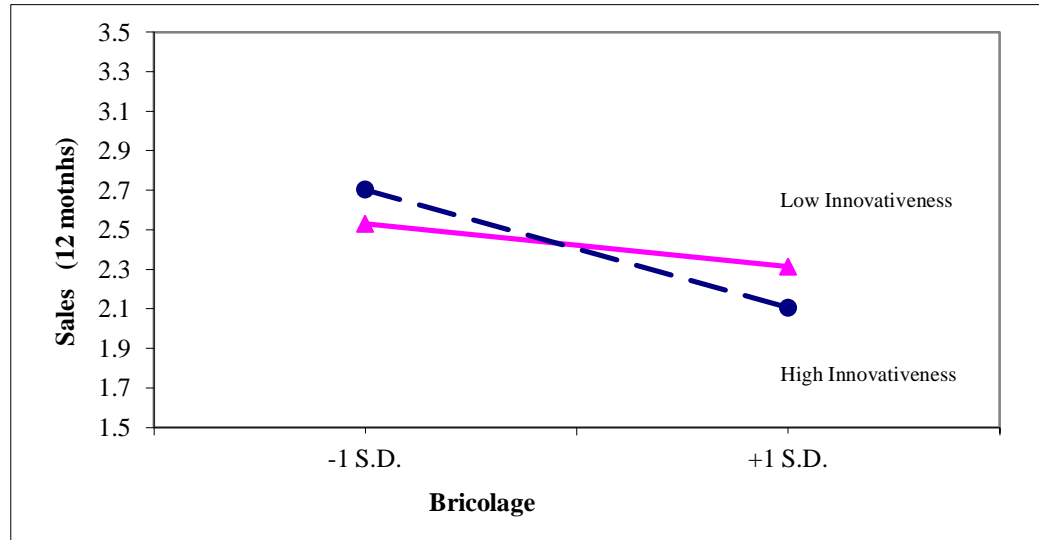
Control entries represent standardized regression coefficients. \* P<0.05, \*\*P<0.01, \*\*\*P<0.001, †P0.10 (two-tailed), with directional hypothesis entry (one tailed).

**TABLE 2 MODERATION RESULTS**

| Dependent Variable                     | DV: Gestation Activities Complete n= 525 |          |          |          | DV: Sales (12 months) n= 341 |          |          |          |
|--|--|----------|----------|----------|------------------------------|----------|----------|----------|
|  | Model 1                                  | Model 2  | Model 3  | Model 4  | Model 1                      | Model 2  | Model 3  | Model 4  |
| <i>Level of Resources Controls</i>     |  |          |          |          |                              |          |          |          |
| YearsActive                            | 0.025                                    | 0.027    | 0.021    | 0.020    | -0.002                       | -0.011   | -0.011   | -0.012   |
| Team /Solo (Dummy)                     | -0.118†                                  | -0.112†  | -0.121*  | -0.130*  | 0.048                        | 0.047    | 0.050    | 0.045    |
| Spouse Team                            | 0.129*                                   | 0.122*   | 0.132*   | 0.138*   | 0.073                        | 0.086    | 0.083    | 0.086    |
| Log_Loans                              | 0.289***                                 | 0.292*** | 0.294*** | 0.294*** | 0.238***                     | 0.238*** | 0.238*** | 0.231*** |
| Services/Products Dummy                | -0.048                                   | -0.049   | -0.033   | -0.032   | -0.020                       | -0.029   | -0.031   | -0.039   |
| <i>Resource Heterogeneity Controls</i> |  |          |          |          |                              |          |          |          |
| Serial Entrepreneur                    | 0.044                                    | 0.048    | 0.055    | 0.056    | 0.022                        | 0.028    | 0.029    | 0.027    |
| Single/Parallel Entrep.                | 0.103*                                   | 0.095†   | 0.083    | 0.078    | -0.008                       | 0.006    | 0.008    | 0.007    |
| Education Level                        | 0.049                                    | 0.047    | 0.049    | 0.048    | 0.093                        | 0.091    | 0.092    | 0.084    |
| Industry Exp                           | 0.075                                    | 0.073    | 0.069    | 0.073    | 0.281***                     | 0.291*** | 0.288*** | 0.289*** |
| General Manage.Exp                     | 0.000                                    | -0.008   | 0.006    | 0.008    | -0.185*                      | -0.190*  | -0.189*  | -0.191*  |
| <i>Industry Controls</i>               |  |          |          |          |                              |          |          |          |
| Retail                                 | -0.058                                   | -0.057   | -0.048   | -0.047   | -0.124*                      | -0.113†  | -0.114†  | -0.117†  |
| Hospitality                            | -0.126**                                 | -0.124** | -0.116*  | -0.115*  | -0.017                       | -0.021   | -0.022   | -0.024   |
| Consumer_Services                      | 0.030                                    | 0.026    | 0.024    | 0.026    | -0.114†                      | -0.104†  | -0.104†  | -0.105†  |
| Health, Education Social Services      | 0.028                                    | 0.029    | 0.027    | 0.028    | -0.072                       | -0.068   | -0.069   | -0.070   |
| Manufacturing                          | -0.100*                                  | -0.102*  | -0.095*  | -0.095*  | -0.044                       | -0.044   | -0.043   | -0.053   |
| Construction                           | -0.023                                   | -0.026   | -0.022   | -0.021   | 0.097†                       | 0.096†   | 0.095†   | 0.094†   |
| Agriculture                            | -0.050                                   | -0.058   | -0.050   | -0.045   | -0.097†                      | -0.094†  | -0.096†  | -0.099†  |
| Mining                                 | -0.036                                   | -0.030   | -0.024   | -0.020   | 0.091                        | 0.094    | 0.093    | 0.095    |
| Transportation                         | -0.017                                   | -0.017   | -0.013   | -0.015   | 0.013                        | 0.013    | 0.012    | 0.011    |
| Utilities                              | 0.033                                    | 0.024    | 0.025    | 0.024    | 0.001                        | 0.010    | 0.010    | 0.010    |
| Communication                          | -0.013                                   | -0.017   | -0.021   | -0.019   | -0.014                       | -0.004   | -0.002   | 0.002    |
| Real_Estate                            | -0.053                                   | -0.060   | -0.054   | -0.054   | 0.051                        | 0.053    | 0.055    | 0.054    |
| Finance_Insurance                      | -0.021                                   | -0.018   | -0.013   | -0.010   | -0.026                       | -0.022   | -0.023   | -0.029   |
| <i>Direct Effect</i>                   |  |          |          |          |                              |          |          |          |
| Bricolage                              |  | 0.097*   | 0.086*   | 0.083*   |                              | -0.105*  | -0.102*  | -0.173** |
| Innovativeness                         |  |          | 0.090*   | 0.094*   |                              |          | -0.015   | -0.008   |
| <i>Moderating Effect</i>               |  |          |          |          |                              |          |          |          |
| Bricolage x Innovativeness             |  |          |          | -0.040   |                              |          |          | -0.111*  |
| F                                      | 3.374***                                 | 3.476*** | 3.529*** | 3.426*** | 3.302***                     | 3.350*** | 3.208*** | 3.207*** |
| Change F                               |  | 0.100    | 0.053    | 0.103    |                              | 0.048    | 0.142    | 0.001    |
| R2                                     | 0.134                                    | 0.143    | 0.150    | 0.152    | 0.207                        | 0.217    | 0.217    | 0.225    |
| Δ R2                                   |  | 0.009    | 0.007    | 0.002    |                              | 0.010    | 0.000    | 0.008    |

Control entries represent standardized regression coefficients. \* P<0.05, \*\*P<0.01, \*\*\*P<0.001, †P0.10 (two-tailed), with directional hypothesis entries (one tailed).

**Figure 2A Moderation Innovativeness: Bricolage and 12 Month Sales (Young Firm)**



\*Sales scale minimised to illustrate moderating effect

**TABLE 3 MEDIATION RESULTS: NASCENT FIRMS**

|  | Model 1<br>Bric-New | Model 2<br>New-Perform | Model 3<br>Bric-Perform | Model 4<br>Bric/New-Perform |
|--|---------------------|------------------------|-------------------------|-----------------------------|
| <i>Level of Resources Controls</i>     |                     |                        |                         |                             |
| YearsActive                            | 0.074†              | 0.019                  | 0.027                   | 0.021                       |
| Team /Solo (Dummy)                     | 0.107†              | -0.128*                | -0.112†                 | -0.121*                     |
| Spouse Team                            | -0.115*             | 0.137*                 | 0.122*                  | 0.132*                      |
| Log_Loans                              | -0.023              | 0.293***               | 0.292***                | 0.294***                    |
| Services/Products Dummy                | -0.180***           | -0.029                 | -0.049                  | -0.033                      |
| <i>Resource Heterogeneity Controls</i> |                     |                        |                         |                             |
| Serial Entrepreneur                    | 0.135†              | 0.090†                 | 0.095†                  | 0.083                       |
| Single/Parallel Entrep.                | -0.077              | 0.053                  | 0.048                   | 0.055                       |
| Education Level                        | -0.018              | 0.048                  | 0.047                   | 0.049                       |
| Industry Exp                           | 0.038               | 0.072                  | 0.073                   | 0.069                       |
| General Manage.Exp                     | -0.151*             | 0.013                  | -0.008                  | 0.006                       |
| <i>Industry Controls</i>               |                     |                        |                         |                             |
| Retail                                 | -0.099†             | -0.047                 | -0.057                  | -0.048                      |
| Hospitality                            | -0.086†             | -0.127*                | -0.124*                 | -0.116                      |
| Consumer_Services                      | 0.030               | 0.027                  | 0.026                   | 0.024                       |
| Health, Education Social Services      | 0.016               | 0.027                  | 0.029                   | 0.027                       |
| Manufacturing                          | -0.078              | -0.092                 | -0.102*                 | -0.095*                     |
| Construction                           | -0.042              | -0.020                 | -0.026                  | -0.022                      |
| Agriculture                            | -0.094†             | -0.042                 | -0.058                  | -0.050                      |
| Mining                                 | -0.070              | -0.029                 | -0.030                  | -0.024                      |
| Transportation                         | -0.045              | -0.014                 | -0.017                  | -0.013                      |
| Utilities                              | -0.005              | 0.032                  | 0.024                   | 0.025                       |
| Communication                          | 0.044               | -0.018                 | -0.017                  | -0.021                      |
| Real_Estate                            | -0.069              | -0.046                 | -0.060                  | -0.054                      |
| Finance_Insurance                      | -0.049              | -0.016                 | -0.018                  | -0.013                      |
| <i>Direct Effects</i>                  |                     |                        |                         |                             |
| Bricolage                              | 0.115**             |                        | 0.097*                  | 0.086*                      |
| Innovation/Newness                     |                     | 0.099*                 |                         | 0.090*                      |
| F                                      | 2.376***            | 3.551***               | 3.476***                | 3.529***                    |
| F value Change                         |                     |                        |                         | 0.053                       |
| R2                                     | 0.059               | 0.105                  | 0.102                   | 0.108                       |
| ΔR2                                    |                     | 0.006                  |                         |                             |

Control entries represent standardized regression coefficients. \* P<0.05, \*\*P<0.01, \*\*\*P<0.001, †P0.10 (two-tailed), with directional hypothesis entries (one tailed).

## References

- Aldrich, H. E. (1999). *Organizations Evolving*. Newbury Park, CA: Sage Publications.
- Allen, K., & Stearns, T. M. (2004). Technology In W. Gartner, K. Shaver, N. M. Carter & P. Reynolds (Eds.), *Handbook of Entrepreneurial Dynamics: The Process of Business Creation*. Thousand Oaks, CA: Sage.
- Ali, M., & Bailur, S. (2007, May 2007). *The Challenge of "Sustainability" in ICT4D- is Bricolage the Answer?* Paper presented at the Proceedings of the 9th International Conference on Social Implications of Computers in Developing Countries, San Paolo, Brazil.
- Anderson, O. J. (2008). A Bottom-Up Perspective on Innovations. *Administration & Society*, 40(1), 54-78.
- Baker, T., & Nelson, R. E. (2005). Creating something from Nothing: Resource Construction through Entrepreneurial Bricolage. *Administrative Science Quarterly* 50(3), 329-366.
- Baron, R.M. & Kenny, D.A. (1986). The moderator–mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations. *Journal of Personal Social Psychology*, 51 (6), 1173–1182.
- Bourgeois, L. J., & Eisenhardt, K. M. (1988). Strategic Decision Processes in High Velocity Environments: Four Cases in the Microcomputer Industry. *Management Science*, 34(7), 816-835.
- Brown, T., Davidsson, P., & Wiklund, J. (2001). An operationalization of Stevenson's conceptualization of entrepreneurship as opportunity-based firm behavior. *Strategic Management Journal*, 22(10), 953-968.
- Brush, C.G., Greene, P.G., & Hart, M.M. (2001). From initial idea to unique advantage: the entrepreneurial challenge of constructing a resource base. *Academy of Management Executive*, 15 (1), 64-80.
- Bruderl, J., Preisendorfer, P., & Ziegler, R. (1992). Survival Chances of Newly Founded Business Organizations. *American Sociological Review* 57 (2), 227-242.
- Brown, S.L., & Eisenhardt, K.M. (1997). The art of continuous change: Linking complexity theory and time-paced evolution in relentlessly shifting organizations. *Administrative Science Quarterly*, 42 (1), 1-34.
- Ciborra, C. U. (1996). The platform organization: Recombining strategies, structures and surprises. *Organization Science*, 7(2), 103-118.
- Ciborra, C. U. (2002). *The labyrinths of information*. Oxford: Oxford University Press.
- Dahlqvist, J. (2007). Measuring the market newness of new ventures. In J. Dahlqvist (Ed.), *Assesing new economic activity: Jonkoping International Business school, Jonkoping University*.
- Davidsson, P. (2008). Interpreting performance in entrepreneurship research. In P. Davidsson (Ed.), *The Entrepreneurship Research Challenge*. Cheltenham, UK: Elgar.
- Davidsson, P., Steffens, P. R., Gordon, S. R., & Reynolds, P. (2008). Anatomy of New Business Activity in Australia: Some Early Observations from the CAUSEE Project . School of Management, Faculty of Business, QUT.
- Davidsson, P., Steffens, P. R., Gordon, S. R., & Senyard, J. (2008). Anatomy of High Potent New Business Activity in Australia: Some Early Observations from the CAUSEE Project . School of Management, Faculty of Business, QUT.
- Day, G. S., & Wensley, R. (1988). Assessing advantage: a framework for assessing competitive superiority. *Journal of Marketing*, 52(2), 1-20.
- DeVellis, R. F. (2003). *Scale development: Theory and Applications* (Vol. 2nd Edition). Thousand Oaks, CA: Sage Publications.
- Edelman, L., Brush, C. G., & Manolova, T. (2005). Co-alignment in the resource–performance relationship: strategy as mediator. *Journal of Business Venturing*, 20(3), 359-383.
- Eisenhardt, K. M. (1989). Making fast decisions in high velocity environments. *Academy of Management Journal*, 32(3), 543-576.

- Eisenhardt, K. M., & Martin, J., A. (2000). Dynamic capabilities: what are they? *Strategic Management Journal*, 21(10-11 Special Issue), 1105-1121.
- Garud, R., & Karnoe, P. (2003). Bricolage versus breakthrough: distributed and embedded agency in technology entrepreneurship. *Research Policy* 32(2), 277-300.
- Green, S. G., Welsh, M. A., & Dehler, G. E. (2003). Advocacy, performance and threshold influences on the decision to terminate new product development. *Academy of Management Journal*, 46(4), 419-434.
- Gopalakrishnan, S., & Damanpour, F. (1994). Patterns of generation and adoption of innovation in organizations: Contingency models of innovation attributes *Journal of Engineering and Technology Management*, 11(2), 95-116.
- 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.
- Hatton, E. (1989). Lévi-Strauss's bricolage and theorizing teachers' work. *Anthropology and Education Quarterly*, 20, 74-96.
- Liao, J., & Welsch, H. (2003). Exploring the venture creation process: Evidence from tech and non-tech nascent entrepreneurs. In W. D. Bygrave et al. (Ed.), *Frontiers of Entrepreneurship Research 2003*. Wellesley, MA.: Babson College.
- Levi-Strauss, C. (1967). *The Savage Mind* Chicago: University of Chicago Press.
- MacKenzie, S. B., Podsakoff, P. M., & Jarvis, C. B. (2005). The Problem of Measurement Model Misspecification in Behavioral and Organizational Research and Some Recommended Solutions. *Journal of Applied Psychology*, 90(4), 710-730.
- Nunnally, J. C. (1978). *Psychometric Theory* (2nd ed.). New York: McGraw-Hill.
- Olson, E. M., Walker, O. C., Jr, & Ruekert, R. W. (1995). Organizing for effective new product development: the moderating role of product innovativeness. *Journal of Marketing*, 59(1), 48-62.
- Rerup, C. (2001). 'Houston, we have a problem': Anticipation and improvisation as sources of organizational resilience. *Comportamento Organizational e Gestao*, 7, 27-44.
- Reynolds, P. D. (1997). Who Starts New Firms? – Preliminary Explorations of Firms-in-Gestation. *Small Business Economics*, 9(5), 449-462.
- Reynolds, P. D., & Curtin, R. T. (2008). Business Creation in the United States: Panel Study of Entrepreneurial Dynamics II Initial Assessment. *Foundations and Trends in Entrepreneurship*, 4(3), 155-307.
- Reynolds, P., & Miller, B. (1992). New firm gestation: Conception, birth, and implications for research. *Journal of Business Venturing*, 7(5), 405-417.
- 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), 177-208.
- Shepherd, D. A., Douglas, E. J., & Shanley, M. (2000). New venture survival: Ignorance, external shocks, and risk reduction strategies. *Journal of Business Venturing*, 15(5-6), 393-410.
- Stark, D. (1989). Bending the bars of the iron cage : bureaucratization and informalization in capitalism and socialism. Notre Dame, Ind.: The Helen Kellogg Institute for International Studies University of Notre Dame.
- Swink, M., Sandvig, J., & Mabert, V. A. (1996). Customizing concurrent engineering processes: Five case studies. *Journal of Product Innovation Management*, 13(3), 229-244.
- Venkataraman, N. (1989). The concept of fit in strategy research: toward verbal and statistical correspondence. *Academy Management Review*, 13 (3), 423-433.
- Wiklund, J., Baker, T., & Shepherd, D. (2009). The age-effect of financial indicators as buffers against the liability of newness, *Journal of Business Venturing*, Forthcoming.
- Wong, P. W., Ho, Y. P., & Autio, E. (2005). Entrepreneurship, innovation and economic growth: Evidence from GEM data. *Small Business Economics*, 24, 335-350.

## Appendix 1 CAUSEE Bricolage Measures

Q1 OK, does the following represent how you never, rarely, sometimes, often, or always go about doing things for your start-up? Firstly, ... **READ STATEMENT**

|   | Never | Rarely | Sometimes | Often | Always | DK | Refused |
|---|-------|--------|-----------|-------|--------|----|---------|
| We are confident of our ability to find workable solutions to new challenges by using our existing resources                      | 1     | 2      | 3         | 4     | 5      | 9  | 8       |
| We gladly take on a broader range of challenges than others with our resources would be able to.                                  | 1     | 2      | 3         | 4     | 5      | 9  | 8       |
| We use any existing resource that seems useful to responding to a new problem or opportunity                                      | 1     | 2      | 3         | 4     | 5      | 9  | 8       |
| We deal with new challenges by applying a combination of our existing resources and other resources inexpensively available to us | 1     | 2      | 3         | 4     | 5      | 9  | 8       |
| When dealing with new problems or opportunities we take action by assuming that we will find a workable solution                  | 1     | 2      | 3         | 4     | 5      | 9  | 8       |
| By combining our existing resources, we take on a surprising variety of new challenges  | 1     | 2      | 3         | 4     | 5      | 9  | 8       |
| When we face new challenges we put together workable solutions from our existing resources  | 1     | 2      | 3         | 4     | 5      | 9  | 8       |
| We combine resources to accomplish new challenges that the resources weren't originally intended to accomplish                    | 1     | 2      | 3         | 4     | 5      | 9  | 8       |

Contact:

Julienne Senyard; [j.senyard@qut.edu.au](mailto:j.senyard@qut.edu.au); (T) +61 7 3138 7547 (F) +61 7 3138 5250

Faculty of Business Queensland University of Technology GPO Box 2434 Brisbane Queensland Australia 4000

## ACKNOWLEDGEMENTS

We gratefully acknowledge the significant financial support that made this study possible. The CAUSEE research is funded by Australian Research Council grants DP0666616 and LP0776845 as well as contributions from industry partners BDO Kendalls and National Australia Bank.