Environmental Dynamism as a Moderator of the Relationship Between Bricolage and Firm Performance

Authors

Julienne Marie Senyard, Queensland U. of Technology, j.senyard@qut.edu.au
Per Davidsson, Queensland U. of Technology, per.davidsson@qut.edu.au
Paul Richard Steffens, Queensland U. of Technology, p.steffens@qut.edu.au

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Abstract

Many firms initially face significant resource constraints during attempts to develop and grow (Shepherd et al., 2000). One promising theory that explicitly links to ways entrepreneurial firms respond to resource constraints is bricolage (Lévi-Strauss, 1966). Bricolage is defined as "making do by applying combinations of the resources at hand to new problems and opportunities" (Baker & Nelson, 2005, p. 333). Bricolage aligns with notions of resourcefulness: using what's on hand, through making do, and recombining resources for new or novel purposes. Through a bias for action and a refusal to enact limitations on the resources that are available to create solutions, bricoleurs can tackle unexpected complex challenges, take advantage of opportunities, and go where most other firms won't, in their attempts at firm development.

Bricolage studies have previously not empirically examined the impact of bricolage on firm performance. Our work contributes to the emerging behavioral theory of bricolage by offering the first empirical test evaluating the impact of bricolage on early stage firm performance (i.e. venture emergence in nascent firms and sales in young firms). Using new product development (NPD) theories of speed of development, co-creation and innovativeness, we theorise that bricolage has a positive effect on early stage firm performance. We then introduce environmental dynamism as a moderator which influences this relationship.

This study uses a sample of 390 Nascent firms and 325 Young Firms (henceforth: early stage firms) from the Comprehensive Australian Study of Entrepreneurial Emergence research project (CAUSEE), a large longitudinal research project to (1) determine the impact of bricolage on firm performance, and (2) test the moderating effect that environmental dynamism may have on the relationship between bricolage and firm performance. Our results indicate bricolage can be considered a tool of persistence in nascent firms and has a significant positive effect on young firm performance. The study also provides evidence, contrary to theorising that environmental dynamism negatively impacts the bricolage-performance relationship in young firms. These findings are illustrated in a model that further explores the limits of bricolage behaviours and enhances our understanding of how firms make resource decisions while facing constraint during their initial stages of development.

Introduction

Bricolage is an emerging theory that provides one explanation of how early stage entrepreneurial firms emerge and grow despite the constraints they face (Baker & Nelson, 2005). A few studies have begun to evaluate and theorise proposed relationships evaluating bricolage and firm performance (Baker & Nelson, 2005; Stinchfield et al., 2013) yet there is a lack of consensus in the results. More often than not prior research describes how bricolage generates positive firm outcomes (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). These mixed results indicate there may be important, yet largely unexplored factors that may influence this relationship. This research offers environmental dynamism as one

such factor that impacts the relationship between bricolage and firm performance. Uncertain 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 role of the environment in shaping bricolage decisions cannot be underestimated as it plays a critical role in resource decisions and behaviours (Fisher, 2012). As a result, in recent years, growing attention has been paid to the importance of context in bricolage (e.g. Cleaver, 2012; Desa & Basu, 2013; Ning, 2013). Limited empirical research exists testing the relationship between bricolage and firm performance, or other contingency effects including environmental dynamism. A review of the literature suggests this is the first empirical study to test the impact of bricolage behaviours on early stage firm performance in a large representative sample, and the first research to identify environmental dynamism as a potential contingency effect shaping the relationship between bricolage and firm performance. Hence, the current study addresses a significant gap in the literature.

Prior bricolage literature recognises the critical role of context but has traditionally focused on two environmental domains. The majority of research evaluates environmental munificence (Dess & Beard, 1984), in terms of abundance/constraint arguments (Baker & Nelson, 2005; Cunha et al., 2014; Desa & Basu, 2013; Fisher, 2012; Honig et al., 2014; Lévi-Strauss, 1966). Overwhelming results from this research suggest that bricolage behaviour provides a means to overcome resource constraints (Fisher, 2012), enabling firms to innovate and prosper, partly as a consequence of being able to create "something from nothing" (Baker & Nelson, 2005; Cunha et al., 2013). .

The other domain considers environments as the context for unexpected events or one-off crises (e.g., Bechky & Okhuysen, 2011; Ciborra, 2002; Johansson & Oliason, 2007; Tierney, 2003; Weick, 1993). This research, commonly illustrates the positive impact of bricolage through making do with the resources on hand, generating innovative work-arounds (Orr, 1996) assisting firms to get through the tough times (e.g. September 11 attacks Tierney, 2003). Others however, indicate bricolage may have unforseen negative impacts in response to uncertain environments (e.g Mann Gulch fire disaster, Weick, 1993). Limited evidence exists about the specific way in which environmental dynamism relates to bricolage and early stage firm performance. As a result, unanswered questions remain regarding the relationship between bricolage and firm performance in dynamic environments. .

By attempting to answer these questions and by highlighting the ways environmental conditions impact firm performance in firms that apply bricolage, this research provides two novel contributions. First, it explores neglected dimensions of firm performance that are infrequently theorised or tested in bricolage literature, namely new firm emergence and young firm sales, which typically measures in entrepreneurship literature through the first empirical tests in a large representative sample of early stage firms. The second contribution clarifies and extends prior bricolage research by providing a more complete picture of the influence of environmental dynamism and how it shapes the relationship between bricolage and firm performance. For practice these findings may help to set some potential prescriptive limits on when to use bricolage in the light of differing types of environments and what type of environments support higher levels of firm performance when applying bricolage behaviours.

The remainder of this paper proceeds as follows. First, we introduce the relevant literature on bricolage and performance. The next section outlines arguments that hypothesize the positive influence of environmental dynamism on the bricolage–performance relationship. The research method is then described, including the sample, measures, and analysis. We then present the results of my hypothesis. The final section provides a discussion of these results, including how they contribute to both theory and practice.

Bricolage

Lévi-Strauss (1966) first theorised about bricolage as a response to create new forms and meanings from objects and tools within known local environments (Duymedjian & Clemens Rüling, 2010). Bricoleurs, using in-depth situated knowledge often created novel unexpected outcomes to the challenges they were attempting to solve (Lévi-Strauss, 1966).

Over the past decade, the literature on bricolage has burgeoned, examining its application in entrepreneurial settings (Baker et al., 2003; Baker & Nelson, 2005) intrapreneurial settings (Halme et al., 2012) and social ventures (Desa, 2012; Di Domenico et al., 2010; Keating et al., 2013; Zahra et al., 2009). Our understanding of bricolage has been extended by research investigating its influence on innovation (Baker et al., 2003; Brown & Duguid, 1991; Ciborra, 1996; Ciborra, 2002; Fuglsang & Sørensen, 2011; Lanzara, 1999; Spencer et al., 2005), sense making (Baker et al., 2003; Duymedjian, & Rüling, 2010; Weick, 1993), and institutional change (Innes & Booher, 2010; Cleaver, 2002; Desa, 2012; Mair & Marti, 2009).

Common actions described in the bricolage literature include a bias for action, making do with the tools or objects “on hand”, and relaxing the rules of what

resources could or should be used for, to create innovative solutions (Baker, 2007). Bricoleurs show a disdain for the rules, often challenging the biases of existing patterns of meaning, ignoring precedents, and values assigned to resources at hand (Baker & Nelson, 2005; Daft & Weick, 1984; German & Barrett, 2005). Rule breaking enables novel variations from traditional notions of institutional design, creation and use of resources (Bhide, 2000; Halkier & Gjertsen, 2004). Bricoleurs often gather and keep resources "just in case" (Lévi-Strauss, 1966) for current and future tasks, developing diverse resource troves[1], to enable skilful mobilisation and recombination of resources at hand (Baker & Nelson, 2005).

After committing to the creation of a firm, bricolage may be considered as the "the only thing we can reasonably do whilst engaged in action" (Lanzara, 1999, pg 347) in attempts to further leverage the limited initial sales the firm has generated. In this case, necessity (Ferneley & Bell, 2006) and a determination to get the job done (Berchetti & Hulsink, 2006) often lead firms to critically analyse what existing resources are available and ways these resources may be combined to develop novel outcomes.

Bricolage and Firm Performance

To date, there is a lack of consensus within the literature regarding the relationship between bricolage and firm performance, though prior inductive case research indicates, more often than not, a positive relationship where bricolage leads to better performance. Bricolage behaviours, through a reliance on existing resources and relationships (Baker et al., 2003) may contribute to the development of firms which are better able to manage the processes of early stage firm development despite the

[1] A trove is defined here as a collection of valuable objects for team use in resource activities (Baker & Nelson, 2005; Stinchfield et al., 2013).

resource constraints they face. Bricolage can sometimes generate "brilliant unforseen results" (Lévi-Strauss, 1966, pg 17) which allow early stage firms to persevere despite constraints and leverage initial sales.

Typical firm performance measures in entrepreneurship include assessments of firm emergence including the process of firms completing activities to enable them to becoming operational, those that continue to keep trying to get up and running but remain in the firm creation process, and those that decide to terminate the venture (Davidsson & Gordon, 2012; De Tienne et al., 2008), where becoming operational is preferred over persisting or termination, and persisting is favoured over termination. Other common firm performance measures used in entrepreneurship literature is firm sales (Carter et al., 1996; Schoonhoven et al., 1990) or growth (Delmar et al., 2013; McKelvie & Wiklund, 2010). Few bricolage studies, however, explicitly evaluate these performance measures. For example, Baker and Nelson (2005) implicitly suggest bricolage leads to higher firm performance, through higher growth opportunities when bricolage is used selectively across domains. Garud and Karnøe (2003) also imply the positive effect of bricolage through their Danish example of a bricolage team developing what became the dominant design in the wind turbine industry.

We outline here the three important (and interrelated) mechanisms that better explain the positive relationship between bricolage and firm performance, commonly described in prior bricolage theorising: (a) speed of development; (b) co-creation and (c) innovativeness.

Speed of Development

In prior new product development (NPD) literature, 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 authors contend that faster development and deployment 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: 277), often engaging in improvisational bricolage (Baker et al., 2003), typically making do with what's on hand. This enables them to experience fewer delays, increasing the speed of development, and as a result generate positive firm performance (Banerjee & Campbell, 2009). Such actions rely on the broad generalist "jack of all trades" skills (Lazeer, 2005) that bricoleurs possess (Baker & Nelson, 2005; Lévi-Strauss, 1966) and flexibility in the way resources are assessed and used in bricolage actions (Lévi-Strauss, 1966).

This stands in direct contrast to other typical behaviours in response to constraints, such as choosing to delay, downsize, give up (Baker & Nelson, 2005; Balakrishnan & Chen, 2005) or ignoring new opportunities (Gaglio & Katz, 2001). Firms engaging in more traditional resource-seeking behaviours, find themselves engaging in the time-consuming processes of attempting to attract new stakeholders (Bhidé & Stevenson, 1999) or investments (Brush et al., 2001) into their firms, creating delays in the process.

Co-Creation

Recent literature in NPD illustrates increasing interest in research evaluating engagement with customers (van Doorn et al., 2010) through the co-creation activities (Prahalad & Ramaswamy, 2004). This research indicates customer collaboration creates multiple benefits for the firm. First, customer involvement including active engagement and input into design creates solutions more aligned with customer needs (Hoyer et al., 2010), increasing customer satisfaction. A second argument suggests collaboration provides access to valuable relevant resources at reduced or no cost (Baker & Nelson, 2005). This process reduces the cost of development, as firms typically don't pay customers for their contributions.

Bricolage research is beginning to consider the value of co-creation activities with customers and its benefits for firm performance (Salunke et al., 2013). Individuals engaged in bricolage actively seek resources and feedback (Salunke et al., 2013) from existing customers, extend firm performance. NPD literature suggests such collaboration has the potential to contribute significantly to firm performance (Gruner & Homburg, 2000).

Innovativeness

A third reason 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. Bricoleurs often create unique solutions through the development of a diverse trove (Baker & Nelson, 2005) which is applied through a permissive and flexible approach to design. Breaking the rules of social and institutional meanings of what resources are and how they are valued allows bricoleurs to develop unique, idiosyncratic combinations of resources. These unique solutions, though often imperfect, enable the firm to

temporarily "get by" with "good enough" solutions where none previously existed (Gundry et al., 2011).

These three arguments on the potentially positive effects of applying bricolage to overcome resource constraints and lead to the following hypotheses:

> 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 and remain in the process.
>
> Hypothesis 1(b): Bricolage has an overall positive effect on the performance of nascent firms. That is, entrepreneurs engaged in bricolage are less likely to terminate than persist and remain in the process.
>
> Hypothesis 2: Bricolage has an overall positive effect on early stage firm sales.

In the following section we outline arguments for the moderating effect of environmental dynamism on the relationship between bricolage behaviour and early stage firm performance.

Moderating Effect of Environmental Dynamism

Environmental dynamism refers to the rate of change, absence of pattern and unpredictability of the environment (Dess & Beard, 1984). These dimensions suggest that environmental conditions range from stable to dynamic on an environmental continuum. Increasingly dynamic environments are defined as ambiguous industry structures with volatile shifts in technologies and customer preferences, fluctuations in product demand or supply of materials, and nonlinear and unpredictable change

(Day & Wensley, 1988; Eisenhardt, 1989). Current products and services become obsolete in dynamic environments, creating the impetus for novel offerings (Jansen et al., 2006, Sorensen & Stuart, 2000). Firms operating in dynamic environments must innovate in the midst of the changes and unpredictability is inherent in those environments.

Firms engaging in bricolage in such contexts may be well placed to address the challenges presented by these uncertain environments. we theorise here that as environmental dynamism enhances the relationship between bricolage and firm performance, such that firm engaging in higher levels of bricolage will experience better firm performance in increasingly dynamic environments. We make these arguments based on the ways increasingly dynamic environments may enhance speed of development, co-creation and innovativeness.

Baker and Nelson (2005) suggest bricoleurs typically possess broad self-taught generalist skills which are often applied flexibly in improvisational actions (Baker et al., 2003) leading to a reduction in delays and speed to development where bricoleurs can quickly enact bricolage solutions. Increasingly dynamic environments provide various opportunities for bricoleurs to remain engaged in action, applying their broad skill sets to create novel solutions in response to a variety of volatile challenges and opportunities, strengthening firm performance. Flexible responses using improvisational bricolage actions may also enhance performance in increasingly dynamic environments (Miles et al., 2000) as prior research indicates that flexibility is more important in dynamic than stable environments (Priem et al., 1995). The benefits of speed of development are more pronounced in increasingly dynamic markets as bricoleurs quickly respond to shifts in market demand (Eisenhardt & Tabrizi, 1995) through improvisational bricolage (Baker et al., 2003).

Salunke et al. (2013) ascribed the benefits of collaborating with existing customers through acts of bricolage. Hoyer et al. (2010) also recommended such actions lead to increased customer satisfaction and customer loyalty (Ries & Trout, 1986). In contexts of increasing environmental dynamism, collaboration with existing customers may reduce some of the complexity and resource demands typically experienced in dynamic markets as early stage firms are commonly already attempting to satisfy multiple internal challenges and tasks during firm development.

Simply by focusing on existing customers, bricoleurs don't spread themselves to thin, or get lost within the flux of opportunities and challenges, enhancing firm performance. Further, 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" solution to the environmental uncertainty. Although these solutions generated through making do are imperfect or unusual, they appear to get the job done, albeit temporarily where none previously existed (Gundry et al., 2011), strengthening firm performance.

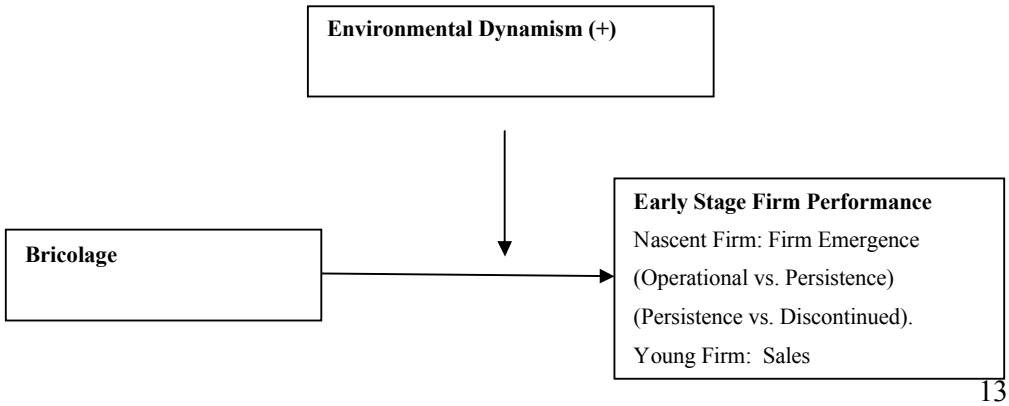
Research suggests bricoleurs also possess a permissive disdain for the ascribed rules of design and the common social meanings for resources within environments, often using scavenging junk, disused objects and tools commonly less valued by others operating within an industry (Baker & Nelson, 2005). As a consequence of building troves that hold unusual resources bricoleurs have the ability to create idiosyncratic unique solutions with the resources on hand. In dynamic environments, the rules relating to resources and their values are more flexible, as markets reconfigure in unexpected ways. This provides improved and different types of opportunities to scavenge different and valuable resources, to create additional innovative solutions, which in turn strengthens 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, which strengthens the relationship between bricolage and firm performance. 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 and remain in the process.
>
> 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 and remain in the process.
>
> Hypothesis 4: Environmental dynamism moderates the relationship between bricolage and firm venture emergence; specifically, the more dynamic the environment, the greater the positive relationship between bricolage and young firm sales.

Figure 1 illustrates the conceptual framework used in this research.

Figure 1 Conceptual Model



(+) signifies expected positive influence of dynamism

Methods

Sample and Data

The data for this research were drawn from the CAUSEE project, a 4-year longitudinal study which examined firm emergence, administered through telephone surveys (Davidsson et al., 2011) The approach and sampling techniques for the CAUSEE project can be found in recent research by Davidsson et al., (2011). The analysis in this research uses both the randomly selected nascent firm sample (493 NF cases) and the young firm sample (353 YF cases). See Tables 1 and 2 for sample descriptions.

As CAUSEE is a longitudinal survey, it enables us to study firm development over time. We use Wave 2 (W2) and Wave 3 (W3) data for the dependent variables in all hypothesis testing[2]. We time-separate the independent variable Wave 1 (W1), bricolage, from the dependent variables i.e. nascent firm venture emergence: (operational vs. remaining in the process, remaining in the process vs. termination, operational vs. termination) and young firm (sales revenue). Additional robustness tests were conducted with both samples. Appendix 1 provides a review of the hypothesis and illustrates these robustness tests.

Measures

[2] Due to space restrictions we only provide tables for statistically significant results. The other results are available upon request.

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.[3] 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 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.

[3] Cronbach = .821 (NF); Cronbach =.829 (YF).

Controls

We apply three categories of control variables in early stage firms. The first category aims to capture the overall level of resources available to the firm. The resources in this category are common to both the nascent and the young firm samples and include money invested into the firm via loans (log), employees (presence or absence), teams (or solo) and number of members in the team.

Past performance may have a strong influence on the following years and will also influence resource availability (Bradley et al., 2011). Therefore, we control for two indicators of past performance. For the nascent firms, 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 (e.g., we use Wave 1 sales as a control for Wave 2 sales, Wave 2 sales as a control for Wave 3 sales.)

The second group of control variables aims to capture some of the heterogeneity in resource development, including the human capital of the start-up team. Prior research in human capital suggests its influence on resource processes (Brush et al., 2001; Brush et al., 2008), the stage of the firm (Brüderl et al., 1992; Rotefoss & Kolvereid, 2005; Unger et al., 2011) and its survival (Bosma et al., 2004; Brüderl et al., 1992; Cooper et al., 1994; Stuart & Abetti, 1990), and on decreasing the likelihood of the entrepreneur's exit from the business (Gimeno et al., 1997). We also measure human capital (Reynolds et al., 2005) through education (number of owners with university degrees), prior entrepreneurial experience (number of previous start-up attempts) (Reynolds et al., 2005), and management experience (number of years) (Vesper, 1990).

The third and final group of control variables relates to other influences. These include innovativeness and whether the firm considers itself to be high-tech, as prior research indicates that a higher level of innovativeness increases the resource requirements (Rothaermel & Deeds, 2006). The "other influences" also include growth intention (measured as expected revenue in the next 12 months) (Stewart & Roth, 1991)**,** and service (versus product), as well as gender of entrepreneur (Beckwith et al., 2006).

Performance: Nascent Firms.

For the nascent sample, we use a measure of the venture emergence in wave 2 and wave 3. Prior research suggests, however, that measurement of venture emergence in nascent firms is problematic as firm outcomes are challenging to define (Davidsson, 2008), and there is a lack of consensus in the entrepreneurship literature. Some research has considered the stage of a venture through self-reported measures of the firm being *operational*, *persisting*, or *terminated*, and other research has used a dichotomous self-reported measure of either *persisting* or *terminated* (cf. Davidsson & Gordon, 2012 for a review). 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*; Davidsson & Gordon, 2012). We use dichotomous pairs of measures together, i.e. operational vs. persisting to test our hypothesis .

To be considered operational, firms had to answer *yes* to the following question: Have you realised any sales revenue, income, or fees for more than six of the past 12 months? A firm is considered terminated when firm is no longer active. Persistence is defined as having activities "in progress" with some activities completed, yet these

activities have not yet led to sufficient revenues for the firm to be classified as operational.

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). Sales are often considered important for this cohort as they enable the firm to gain visibility, which increases market legitimacy (Carter et al., 1996; Schoonhoven et al., 1990). Delmar (2008) suggest the most commonly used measures were employment and sales and are considered to be more objective relative to market share and subjective assessments of growth. Employment, and an important indicator in job creation dynamics is often lagged when comparing results with financial development. Environmental dynamics and volatility are more likely to be uncovered through the use of sales as a measure as it changes more rapidly to market demands than employment. We use wave 2 and wave 3 absolute sales (log) as performance measures.

Analysis Techniques

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. Binomial logistic regression estimates the probability of an event happening which, in this case evaluates the odds of bricoleurs being operational versus persisting and the odds of bricoleurs persisting versus terminating. It then

tests the moderating influence of environmental dynamism. Four binomial regression models were run to test the hypotheses in the nascent firm analysis. Model 1 includes only the control variables, Model 2 contains the predictor variable (bricolage), Model 3 adds the moderator to the predictor and control variables, and the final model, Model 4, also includes the interaction term. In assessing the overall appropriateness of the model as well as the individual variables and their significance, I followed the process outlined in Hosmer and Lemeshow (2000).

Using the model chi-square test, we assessed the goodness of fit. A model's chi-square is the difference between the -2LL (minus two times the log likelihood of the model) of the fitted model and the -2LL of the null hypothesis model. We also report the Nagelkerke-statistic, which specifies the variance explained by my models as well as the overall rate of correct classification by the models. In order to test whether the addition of the predictor, moderator, and interaction variables led to a significant improvement of the model, we examined the block chi-square test. This indicates the difference between the -2LL of the full model and that of the prior model. For example, the block chi-square test for the predictor (bricolage) is assessed as the difference between the -2LL of Model 2 and that of the control model (Model 1).

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 3 and 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

Wave 2

On balance, the nascent firm wave 2 results indicate that increasing levels of bricolage behaviours increases the odds the firm will persist (i.e. they are still in the process versus the firm 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 no directional support for Hypothesis 1(a) (Table 5). The results indicate the opposite: that bricoleurs are more likely to persist and remain in the process of firm creation versus becoming operational. 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 6 provides the results.

Wave 3

Wave 3 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

Wave 2

For the young firms, Hypothesis 2 predicted that increasing levels of bricolage would have a positive effect on early stage firm sales. We find no statistically significant relationship between bricolage and sales in wave 2.

Wave 3

In wave 3, the results indicate a statistically significant weak relationship between bricolage and early stage firm performance (sales) in wave 3 sales ($\beta = .018$, $p < 0.05$), providing support for hypothesis 2 (Refer Table 7). 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 my theorising, environmental dynamism has a strong

negative moderation effect on the relationship between bricolage and firm performance, but it is not statistically significant.

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 4.10. Figure 2, 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.

Discussion

This research empirically explored the contingent effects of environmental dynamism and its impact at the firm level on nascent and young firms. It examined the effect of bricolage on venture emergence in nascent firms. Overall, the results suggest bricolage increases the log odds of persistence versus becoming operational or termination[4]. This extends previous research on bricolage (Baker, 2007; Powell, 2011) by being the first study to empirically test bricolage as a tool of resilience in nascent firms. The results indicate bricolage assists nascent firms to remain tenacious despite the challenges they face. Subsequent tests explored the contingent effect of dynamism on the relationship between bricolage and firm emergence. We found a positive but not significant relationship in nascent firms. These non-significant results may not be surprising, given nascents typically are still in the process of completing gestational activities, and may not yet have fully entered the market.

[4] Using wave 2 data.

The results indicate that bricolage has a positive effect on wave 3 sales. This result is contradictory to the research of Stinchfield et al (2013)[5]. These overall results are supportive of the general theoretical thrust of prior theory about bricolage, which suggest that because most new organisations are resource-constrained in important ways, resourceful behaviors – including bricolage – are likely to be play a key role in shaping entrepreneurial outcomes.

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). 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.

Dynamic markets may also provide challenges which are too multifaceted and complex as the markets move in unexpected ways. For an early stage firm, these

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

resource requirements are problematic since the firm may have already consumed most of the limited resources in the trove to develop its initial market offering. As a result of these multiple and complex challenges, bricoleurs must devote more time to scavenging resources or gathering resources via network bricolage (Baker et al., 2003), and there may also be delays as they wait for resources to become available or as they attempt to integrate them into their resource 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.

Co-creation with existing customers in dynamic markets was theorised to reduce the volatility of the market and provide customers who were more tolerant of the "good enough" (Gundry et al., 2011 pg 4) bricolage solutions enhancing early stage firm performance. However, further dimensions regarding the relationship with customers and the outcome generated (sales) may minimise these benefits. For example, by creating solutions to specific, idiosyncratic customer needs firms may find these can't be leveraged in the wider markets as the bricolage solution may be overly specialised, unexpectedly create firm and/or resource costs that were not initially envisaged or imagined (be it financial costs or excessive over consumption of resources), and difficult to maintain (e.g. the solution is not sustainable long term.) Further, firms may choose to co-create with less demanding customers who typically do not seek innovative outcomes, often because of an "inability or unwillingness to pay standard prices" (Senyard et al., 2014, pg 216). As a consequence of initially developing less innovative solutions, and remaining with less demanding existing customers, whose basic needs remain relatively unchanged, this may dampen further sales and growth opportunities (Baker & Nelson, 2005). Further, as a result of

focusing on these existing customers, firms may miss out on other valuable market opportunities that may have enabled higher levels of innovativeness, fuelling higher firm performance.

Another explanation on the limitations of co-creation in dynamic environments is the firm's inability to leverage the often barely typically imperfect transient bricolage solutions that existing customers were happy to accept and purchase. Making do with the mediocrity of these initial solutions is problematic for the firm as it diminishes the innovativeness of further iterations of bricolage solutions. Attempts to extend these initial (often temporary, stop gap) offerings may lead to wasted effort (Senyard et al., 2014). That is, when these solutions are scrutinised carefully, more often than not either the initial solutions exhibit gaps which can't be filled or fixed, or they can't be extended or built on. As a consequence of focusing only on these less demanding customers who accepted the initial offerings, rather than seeking customers in these dynamic environments who may demand more innovativeness and potentially provide more sales, bricoleurs in highly dynamic environments cannot generate higher sales or take advantage of the cost and learning-curve effects of leveraging past solutions which results in delays, overconsumption of already tight resources, hampering the relationship between bricolage and firm performance.

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 who are alert to opportunities chase one opportunity after another as they emerge and then quickly vanish in shifting markets. Constant tinkering and experimentation from trying to build solutions 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), which may then result in increased costs (Gallo & Gardiner, 2007) and further market confusion.

In summary, increasingly dynamic environments may reduce the positive effects of bricolage in firm performance in the following ways. First, attempts to apply bricolage to multiple challenges may create delays owing to the requirements of additional resource-gathering activities as well as delays in combination attempts as the scope of the task is beyond what the current resources in the trove can do. This may further create delays within acts of recombination as bricoleurs try to make sense of new resources and integrate them within the trove.

Second, co-creation with customers may be both a help and a hindrance. On one hand, it may reduce the noise within increasingly dynamic environments leading to enhanced performance, but focusing on less demanding existing customers may also create less innovative solutions and wasted effort in resource combinations, and an inability to take advantage of cost and learning-curve effects (Senyard et al., 2014). As a result, firms miss out on other valuable opportunities to further extend relationships with other customers who demand higher levels of innovativeness, fuelling higher firm performance (sales).

Finally, bricoleurs may attempt to satisfy too many opportunities found in shifting environments, increasing their costs and creating a lack of focus within the firm, wasting resources as they attempt to satisfy multiple opportunities. The results generated in this research extend the work of Baker and Nelson (2005) to suggest

that some limits should be placed on the use of bricolage not only across multiple domains but also across multiple challenges and opportunities in dynamic environments, particularly if the trove cannot meet the requirements of the tasks which need to be completed.

Conclusion

A lack of agreement currently exists in bricolage theorising 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 research 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 contribution tests environmental dynamism as a contingency effect shaping the bricolage and firm performance relationship. To the best of my knowledge, this has not been studied in prior bricolage literature. 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: 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.

Future research should continue to theorise and test other dimensions of environmental dynamism which this study did not take into consideration, such as dynamism in employment, in technology, and in the level of competition (Castrogiovanni, 2002; Dess & Beard, 1984). As these other dimensions may make different resource demands, they may generate different results which can produce a more complete picture of dynamism and its impact on bricolage and performance. Environmental hostility may also be assessed as another boundary condition (Sharfman & Dean, 1991), as market competition may create different challenges and opportunities and different resource constraints, all of which will subsequently impact bricolage activities.

Table 1 Nascent Firm Sample Description

Main NF Sample (Wave 2) N= 488	
Gender Male	277
Gender Female	211
Ethnicity Indigenous	17
Ethnicity European	402
Ethnicity Asian	17
Ethnicity Middle Eastern	4
Ethnicity Mixed/Something Else	44
Other Start Ups Experience	249
Concurrent Business	354
Industry Experience (Av)	15.53
Management Experience (Av)	19.02
Education High School Year 10	68
High School Year 12	66
Diploma (TAFE)	148
Education Bachelor	106
Education Post Graduate	85

Table 2 Young Firm Sample Description

YF Sample (Wave 3) N= 325	
Gender Male	190
Gender Female	135
Ethnicity Indigenous	10
Ethnicity European	274
Ethnicity Asian	6
Ethnicity Mixed/Something Else	33
Other Start Ups Experience	143
Concurrent Business	80
Industry Experience (Av)	16.59
Management Experience (Av)	16.15
Education High School Year 10	54
High School Year 12	64
Diploma (TAFE)	69
Education Bachelor	87
Education Post Graduate	37

Table 3 Correlation Nascent Firms n=488

	M	SD	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.
1.W2 Stage of Venture (NF)	1.8750	.82240	1																
2.Wave 1 Bricolage	31.7556	5.18067	-.054	1															
3. Dynamism	.0275	.03649	-.039	.027	1														
4. Gestation Activities	17.4549	6.99443	-.383**	.160*	.007	1													
5. Financial Investment (Log)	1.0161	1.86791	-.151**	-.009	-.084*	.294**	1												
6. Services (or Products)	.5216	.50005	-.121**	-.012	.169**	-.016	.073*	1											
7. Gender	1.43	.496	-.043	-.028	-.002	-.044	-.036	.030	1										
8. Education (Degree)	12.0492	14.7219	.043	-.032	.082*	.045	.028	-.016	-.060	1									
9. Business Experience	14.4160	13.3587	-.004	.148*	-.023	.184**	.015	-.122**	-.180**	.120**	1								
10. Management Experience	18.2889	12.9242	-.028	.139*	-.045	.096**	.060	-.091*	-.070*	.112**	.368**	1							
11. High Technology	.3074	.46188	.004	.163*	.163**	.106**	.005	-.020	-.161**	.056	.056	.020	1						
12. Innovativeness	3.9857	2.47322	.045	.158*	.035	.092*	-.111**	-.110**	-.055	-.019	.071*	-.053	.264**	1					
13. Future Expect. Total Rev	6315890	4643040	-.093*	.093*	-.030	.112**	-.013	-.068	-.056	-.049	.127**	.100**	.056	-.024	1				
14. Serial Category	.5840	.49340	.008	.101*	-.004	.144**	.032	-.086*	-.165**	.093**	.911**	.310**	.032	.059	.097*	1			
15. Team (or Solo) Dummy	.5020	.50051	.013	.021	-.027	.066	.127**	-.143**	-.126**	.142**	.228**	.224**	.057	.004	.097*	.207**	1		
16. Team Size (Number of	2.1865	5.09097	.012	.070*	.012	.115**	.095*	-.072*	-.102**	.106**	.156**	.113**	.050	.034	.050	.118**	.228**	1	
17. Hired Employees (dummy)	.1393	.34666	-.285**	.077*	.028	.422**	.185**	-.024	-.061	.042	.130**	.113**	.085*	.025	.147**	.112**	.142**	.194**	1

†P0.10 * P<0.05, **P<0.01, ***P<0.001 (two- tailed).***P<0.001

Table 4 Young Firm Correlation Matrix n=325

	M	SD	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.
1.Wave 3 Sales(Log)	4.84	1.24	1																	
2.Wave 1 Bricolage	31.33	5.36	.138**	1																
3. Dynamism	0.03	0.03	-.043	.075*	1															
4. Young Firm Age	1.93	2.33	-.004	-.070	-.008	1														
5. Financial Investment (Log)	0.70	0.46	.259**	.038	-.081*	.034	1													
6. Services (or Products)	11.82	14.68	-.024	-.041	.129**	-.003	-.152**	1												
7. Gender	10.15	12.50	-.061	-.024	-.016	-.063	-.097*	-.006	1											
8. Education (Degree)	16.98	13.26	.046	.031	.170**	-.006	-.076*	.009	-.011	1										
9. Business Experience	0.27	0.45	.102*	.110*	-.039	-.045	.102*	-.108**	-.133**	-.031	1									
10. Management Experience	1.42	0.49	.103*	.139*	-.101**	.038	.109**	-.127**	-.020	.080*	.331**	1								
11. High tech	84694	30837	.043	.139*	.174**	-.068	.017	.018	-.180**	.152**	-.051	-.048	1							
12. Innovativeness	52454	19746	.030	.248*	.063	-.046	.059	-.194**	-.094*	.066	.229**	.068	.252**	1						
13. Fut. Expect. Total Rev	2.33	2.03	.410**	-.029	.003	.087	.070	.015	-.116*	.064	.150**	.132*	.066	-.011	1					
14. Prior Sales (W2)	0.44	0.50	.353**	-.016	-.006	.128*	.132**	.025	-.102*	.074	.103*	.131**	.018	-.010	.936**	1				
15. Serial Category	0.49	0.50	.089	.111*	-.045	-.020	.068	-.109**	-.101**	-.037	.916**	.302**	-.052	.224**	.108*	.095*	1			
16. Team (or Solo) Dummy	1.61	0.78	.171**	.128*	-.094*	.042	.250**	-.162**	-.016	.096*	.209**	.314**	.032	.075*	.157**	.167**	.178**	1		
17. Team Size (Number of	0.38	0.49	.195**	.090*	-.067	.055	.212**	-.110**	-.069	.174**	.242**	.313**	.055	.072*	.262**	.215**	.202**	.802**	1	
18. Hired Employees	4.84	1.24	.339**	.094*	.049	.082	.272**	-.043	-.112**	.095*	.149**	.120**	.021	.118**	.136*	.176**	.123**	.272**	.313**	1

†P0.10 * P<0.05, **P<0.01, ***P<0.001 (two- tailed).***P<0.001

Table 5 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)	11.4	.917	.087***	(.026)	11.73	.916	.087***	(.026)	11.698	.916	.088***	(.026)	11.75	.916
Financial Investment (Log)	.049	(.080)	.382	.952	.055	(.080)	.462	.947	.055	(.080)	.476	.946	.054	(.080)	.457	.947
Services/Products Dummy	-.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)	6.18	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)	2.16	1.017	-.015	(.012)	1.535	1.015	-.014	(.012)	1.390	1.014	-.014	(.012)	1.413	1.014
High Tech	.499	(.306)	2.65	.607	.469	(.309)	2.306	.625	.477	(.312)	2.334	.621	.473	(.313)	2.288	.623
Innovativeness	-.145*	(.062)	5.52	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)	1.74	1.787	-.567	(.442)	1.642	1.763	-.570	(.443)	1.658	1.768	-.574	(.443)	1.682	1.776
Team Size	-.329	(.218)	2.26	1.389	-.333	(.220)	2.276	1.395	-.334	(.221)	2.297	1.397	-.338	(.221)	2.340	1.402
Employee	1.238*	(.565)	4.80	.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			

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

Table 6 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 Investment (Log)	-.058	(.087)	.446	.943	-.054	(.088)	.382	.947	-.050	(.088)	.317	.952	-.042	(.088)	.223	.959
Services/Products Dummy	-.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.]	418.937	[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		

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

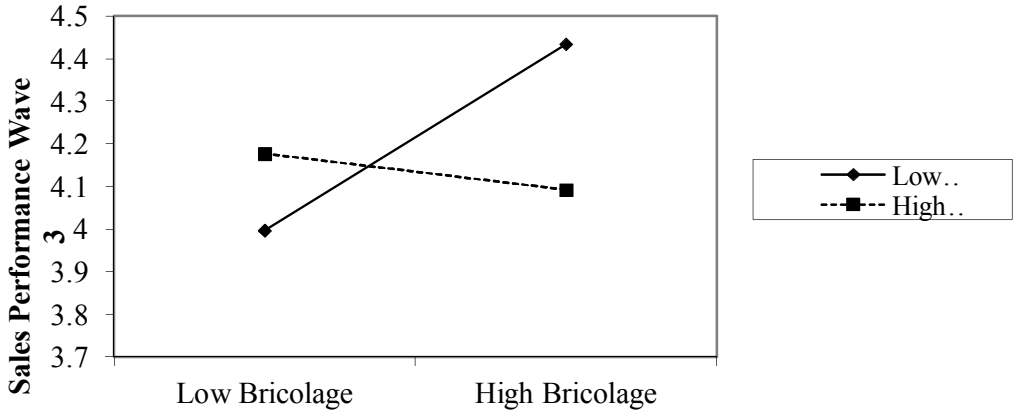
Table 7 Wave 3 Young Firm Dynamism (n=247)

	Model 1		*Model 2*		*Model 3*		*Model 4*	
Years Active	-.023	(.046)	-.019	(.047)	-.021	(.047)	-.012	(.047)
Financial Investment (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)
General 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 2 Moderating Effect of Dynamism on Bricolage and Young Firm Sales (Wave 3)



Appendix 1 Review of the Hypothesis

Hypothesis & Expected Direction	Independent	Moderator	Dependent	Direction & Significance Wave 2	Direction & Significance Wave 3	Supported?
H1(a). Operational vs Persist (+)	Wave 1 Bricolage		Firm Emergence Measure	(-ve) Sig (.05) relationship for persist, not operational	(-ve) but not significant	No Directional support in W2 but sig at .05*. No not sig in W3.
H1(b). Persist vs Terminate (+)	Wave 1 Bricolage		Firm Emergence Measure	(+ve) Sig (.05) relationship for persist, not terminate	(-ve) but not significant	Yes, support in W2.
H2 Young Firm Sales (+)	Wave 1 Bricolage		Sales (Log)	(+ve) but not significant		Yes, support in W3.
H3 (a). Operational vs Persist (+)	Wave 1 Bricolage	Environmental Dynamism		(+ve) Not significant	(+ve) Not significant	No
H3(b). Persist vs Terminate (+)	Wave 1 Bricolage	Environmental Dynamism		(+ve) Not significant	(+ve) Not significant	No
H4 Young Firm Sales (+)	Wave 1 Bricolage	Environmental Dynamism		(-ve) but not significant	(-ve) sig at .05	No support W2, No Directional support in W3.

Additional Robustness Tests

Test	Independent	Curvilinear IV/Moderator	Dependent	Direction & Significance
Cronbach tests for Bricolage Measure				Nascent sample= .821, Young firm sample=.829.
Hier.Linear Regression (HLR)	W1Bricolage	W1Bricolage Squared	W2 Sales (Log)	Pos (Non Sig)
HLR	W1Bricolage	W1Bricolage Squared	W3 Sales (Log)	Pos (Non Sig)
HLR	W1Bricolage	Dynamism Curvilin,	W3 Young Firm Sales	Not Significant Curvilinear Relationship

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