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# LINKING RESOURCE ACQUISITION AND DEVELOPMENT PROCESSES TO RESOURCE-BASED ADVANTAGE: BRICOLAGE AND THE RESOURCE-BASED VIEW

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## ABSTRACT

We investigate the relationship between bricolage – an approach to a firm’s resource development – and the firm’s strategic resource position as depicted by the resource-based view (RBV). The RBV is concerned with the resource characteristics of firms that lead to sustainable competitive advantage. Alternatively, bricolage is a process of resource use and development characterised by using resources at hand, recombining resources and making do. Based on a sample of 1,329 entrepreneurial start-ups we find that higher levels of bricolage behaviour tend to lead to more advantageous strategic resource positions.

## INTRODUCTION

The resource-based view (RBV) of the firm represents one of the dominant traditions in the field of strategic management (Wernerfelt, 1984; Barney, 1991; Peteraf, 1993). RBV focuses on the characteristics of resources that deliver a firm sustainable competitive advantage (Eisenhardt & Martin, 2000), captured in Barney’s VRIO (Barney, 1991) framework. More recently, considerable attention has also shifted to the role of dynamic capabilities that deliver a firm advantage in fast moving environments (Helfat, 1997; Teece, Pisano, & Shuen, 1997; Winter, 2003). RBV has also been applied within the domain of entrepreneurship – both as a framework in empirical work to explain firm outcomes (e.g. Chandler & Hanks, 1994) and as a basis for theoretical developments concerning the advantage of entrepreneurial firms (Alvarez & Barney, 2002).

Yet theories to explain the processes and behaviours that firms use to generate and develop resource advantages (VRI) and the capability to exploit them (O) remain very underdeveloped (Sirmon, Hitt, & Ireland, 2007).

Bricolage is one such one such theory of a firms resource development processes that yields some promise in this context. Bricolage (Levi-Strauss, 1967) has been used as the theoretical underpinning to describe how some entrepreneurs tend to create and co-evolve with their environment by evaluating resources for the creation of something using resources at hand, by “making do” and the recombination of resources for new purposes (Baker, Miner, & Eesley, 2003; Gonzales, 2003; Baker & Nelson, 2005; Cunha, 2005). Earlier work has suggested that attempts to creatively use resources leads to idiosyncratic resource combinations. The question remains – do these idiosyncratic resource combinations (sometimes) also yield VRI resource advantages? Moreover, does bricolage behaviour also affect the capability to exploit them?

In this paper makes a first step towards answering these questions. We take some core ideas from bricolage and use them to develop theory about pathways through which bricolage might create resources that give firms strategic advantage. We test these ideas on a large sample of 1,329 entrepreneurial start-ups, 702 nascent firms and 627 young firms (less than three year old). As such, the study contributes to the important emerging conversation within RBV research concerning how firms go about creating positions of resource advantage.

## THE RBV AND ENTREPRENEURSHIP

### Foundations of the RBV

The resource-based view (RBV) of the firm represents one of the dominant tradition in the field of strategic management (Peteraf, 1993; Barney, 2001). Resource-based thinking can arguably be traced back to Penrose (1959). In her work examining the growth of firms, she highlighted the importance of firm resources and heterogeneity. More contemporary work (Wernerfelt, 1984; Barney, 1991) has focussed on the role of firm resources as sources of competitive advantage, and the sustainability of those advantages. Although several authors make a distinction between related concepts such as competencies (Prahalad & Hamel, 1990) and capabilities (Stalk, 1992) and resources

(Wernerfelt, 1984), for the purposes of explaining firm heterogeneity we follow Barney (1995) and treat resources, competencies and capabilities interchangeably. Importantly, the research focuses on the characteristics of a firm's resources that lead to sustained competitive advantages. This research tradition is encapsulated in the now well known VRIO framework (Barney, 1991), later updated to VRIO (Barney, 1995; Barney, 2001):

- Value: Is the resource bundle valuable to the firm for exploiting opportunities in the market?
- Rare: Are the resources rare among competing firms?
- Inimitable: Are the resources hard (or expensive) for other firms to duplicate or substitute with other resources?
- Organisation: Is the firm able to exploit the potential of these resources and appropriate economic rents from the market opportunities?

Two extensions to the traditional RBV framework outlined above have been particularly influential in forming a contemporary view of RBV. The first is knowledge-based view of the firm (Kogut & Zander, 1992). This view argues that it is tacit and social knowledge embedded within a firm, and its path dependency, which are instrumental in forming the firm's competitive advantage and its inimitability by competitors. In this way, organisation knowledge holds a special place as a resource within RBV.

The second is the notion of dynamic capabilities (Teece et al., 1997). Although conceived in slightly different ways by different authors (Helfat, 1997; Eisenhardt & Martin, 2000; Winter, 2003), in essence dynamic capabilities are the ability of a firm to transform itself and in some way and develop new capabilities to match the moving requirements of the environment. As originally defined by Teece and colleagues, dynamic capabilities are "the firm's ability to integrate, build and reconfigure internal and external competences to address rapidly changing environments" (p. 517).

### **The RBV and Entrepreneurship**

Although the earliest heritage of the RBV can be associated with the field of entrepreneurship and the work of Penrose (1959), recently the RBV has attracted renewed interest within the domain of entrepreneurship. Some of this work is focussed on applying the concepts of RBV within an entrepreneurial or new firm setting. Important contributions include Chandler and Hanks (1994), Shraeder and Simon (1997) and Westhead, Wright and Ucbasaran (2001), Edelman, Brush and Manolova (2005) (Wiklund & Shepherd, 2003). This said, these represent very partial empirical exploration of RBV in an entrepreneurial context. As they are essentially More recently, Arthurs and Buzenitz (2006) have applied the concepts of dynamic capabilities within the empirical domain of entrepreneurship.

Recently a stream of theoretical research has emerged exploring the role of "entrepreneurial capabilities" as a critical resource for the RBV. Alvarez and Busenitz (2001) argue that entrepreneurial capabilities identified in the domain of entrepreneurship provide the basis for an RBV of entrepreneurial firms. Specifically, they focus on the ability to seek and recognise opportunities (i.e. opportunity recognition) and the ability to organise resources to generate heterogeneous outputs (i.e. opportunity exploitation) as central resources of an entrepreneurial firm. Further, they argue that these abilities have the potential to satisfy the VRIO characteristics of a sustainable competitive advantage.

Alvarez and Barney (2004) put forward an entrepreneurial knowledge-based arguments toward developing a theory of the entrepreneurial firm. They suggest that an entrepreneurial firm is suitable for exploiting opportunities when (i) another actor does not control the critical resources to exploit an opportunity, and (ii) knowledge of the opportunity is either tacit, or an isolating mechanism exists to protect explicit knowledge.

Other work has been interested in understanding the role of dynamic capabilities in entrepreneurial firms. Zhara, Sapienza and Davidsson (2006) provide a comprehensive review and agenda for research in this area.

To allow empirical testing of "entrepreneurial capabilities" within an RBV framework, scales for measuring these capabilities are required. Some progress has also been made in this direction. For example, Borch, Huse & Senneseth (1999) develop a scale for network capabilities. Wiklund and Shepard (2003) operationalise knowledge-based firm resources such as marketing expertise / customer service and technical expertise. Similarly, Madsen, Alsos, Borch, Ljunggren & Brastad (2006) develop scales to measure opportunity search and technology competence resources.

The above work has made progress towards testing some aspects the RBV in entrepreneurial settings. Yet, there remains scope for considerable more research in this domain. First, the impact of a much broader range of resource categories warrants investigation. Second, a much more comprehensive exploration of the contingent effects of industry and competitive contexts is possible. Finally, a more systematic investigation of the VRIO characteristics of resource positions, rather than just resource advantage, is needed.

## **BRICOLAGE**

“Houston... We have a problem....”

Apollo 13 can be considered perhaps the most cited example of organizational bricolage (Cunha, Cunha, & Kamoche, 1999). When an explosion threatened the survival of the three astronauts onboard in space, the unplanned solution was found not according to any kind of contingency plans but to bricolage: materials available on the spaceship (e.g. plastic bags, duct tape, etc.). These were pieced together creatively, leading to an unorthodox but effective solution to the problems caused by the explosion (Rerup, 2001).

As previously noted, the term bricolage was developed by Levi-Strauss (1967) to suggest the creation of something new through involved actors in the process of recombination and transformation of existing resources (Venkataraman, 1997; Garud, Kumaraswamy, & Nayyar, 1998; Baker & Nelson, 2005) Levi- Strauss (1967) used terms “tools”, skill “repertoires” and elements of myths as resources available to use.

Bricolage constructs were further refined in work by Baker and Nelson (2005) whereby they further defined it as a focus on using resources at hand rather than purchasing new resources, using existing resources for new purposes, recombining existing resources and making do to provide breakthrough solutions in firm creation.

Following is further clarification of these constructs.

### **Resources at Hand**

In environments and conditions where resources are not readily available or difficult to access, processes often shift focus back on existing resources and their ability to be effective when applying it to specific venture ideas. Evaluating resources at hand was recognised in economic literature for its impact on economic functions at a national level and its application in developing countries (Harberger, 1959). Linked to this notion is Leibenstein’s General X efficiency model whereby economic actors are motivated by cost minimisation (through using resources at hand efficiently) rather than traditional neoclassical economic theories of profit maximisation (effectiveness). More recent literature has shifted to firm level analysis and initial resource endowments (Shane & Stuart, 2002) evaluating the role of business planning and resource efficiency, with post start up success (Castrogianni, 1996).

Resources at Hand evaluates firm processes, structural mechanisms, forms and routines as resources to construct new ventures (Ciborra, 1996). Other research evaluated physical resources e.g. available materials “such as wood and lorry gears” other “modest resources” and “embedded” individuals for the development of Danish wind turbines (Garud & Karnoe, 2003: 277), Human capital (Brüderl, Preisendorfer, & Ziegler, 1992), technical assets (Stuart, Hoang, & Hybels, 1999) and social capital and networks for building new ventures (Baker et al., 2003),

### **Recombination of Resources for Other Purposes**

Linked with resource evaluation of form, fungability, classification and design often bricoleurs recombine resources. This may be applying resources for purposes that the resources may not be originally designed for or combining resources to create something new. Garud and Karnoe (2003) suggest “Many of the resources were reused, recombined and deployed by constellations of different players”. Inherent to this process is the role of the entrepreneur/venture team in using, manipulating and recombining existing resources to create the firm. It may be considered as the development of a “hands on” approach: experimenting, tinkering, reframing, and manipulating existing resources to create something new. Bricolage is a practical, experiential approach and may be thought of as a form of practical intelligence, in the sense that it manifests itself in how people organise and reorganise resources to adapt to market opportunities or environmental shifts (Wagner, 2000).

Another example: The “ingenious reconciliation of existing organizational mechanisms and form, picked by management according to the subjective plans and interpretations (‘bricolage’) (Ciborra, 1996: 104).

### **Making Do**

As previously noted RBV involves structuring resource portfolio’s into capabilities and leveraging those capabilities to create value. Unlike the majority of literature which implicitly suggests acquiring resources in venture creation process (Bhidé & Stevenson, 1999), Sirmon et al. (2007) suggest value creation can occur by recombining existing resources and capabilities or making changes to the resources available to the firm (Morrow, Sirmon, Hitt, & Holcomb, 2007).

Through the bricolage processes, several authors recognised that “making do” solutions may, in fact, prove to be of lower or inferior quality or technically inferior Garud and Karnoe (2003) or ‘just good enough’ Berchetti and Hulsink (2006). Lanzara (1999: 347) notes “bricolage is usually associated with second best solutions, maladaptation, imperfection, inefficiency, incompleteness, slowness, but as a matter of fact in many design situations it is the only thing we can reasonably do when we are engaged in action.”

Using two of the three constructs: making do and combining resources, bricoleurs do their best to create a solution which may have bugs and gaps, appear clunky and imperfect and contains within it elements that are unusable unwanted. The focus here is about enabling the firm to “get the job done” rather than “getting the job done well”. This has important implications for market perception, and future success and growth of the firm. For example, Chandler and Hanks (1994) found firms that choose a high quality differentiation strategy had higher aggregate market share, sales, and cash flow growth when available resources supported this quality strategy.

To review, bricolage as evaluates existing resources and applying these resources to create something new. Three constructs further developed by Baker and Nelson (2005) include: using resources at hand, recombining existing resources and making do.

Research in bricolage elements has occurred at all levels of analysis including industry (Garud & Karnoe, 2003), national {James 1983}, firm (Baker & Nelson, 2005) and individual levels (Hmieleski & Corbett, 2006). Further more, theorists have evaluated bricolage in a variety of contexts including Australian primary school teachers (Dent & Hatton, 1996), prior musical recordings as materials for creating hip-hop music (Maira, 1999), genes and gene components (Duboule & Wilkins, 1998), twentieth-century American legal scholars (Hull, 1991) and the development of the wind turbine industry (Garud & Karnoe, 2003).

However, in more recent studies bricolage has been evaluated in terms of venture creation (Baker et al., 2003) and business growth. Further research has been conducted into bricolage in complex business environments including the use of bricolage in ICT (Ciborra, 2002; Ferneley & Bell, 2006; Ali & Bailur, 2007), the use of practical intelligence of entrepreneurs and technology and strategic entrepreneurship (Berchicci & Hulsink, 2006).

## **LINKING BRICOLAGE AND RESOURCE POSITION**

We are interested in evaluating the different levels of bricolage and how it will affect the resource position of the firm. Drawing on the RBV VRIO framework (Barney, 1995; Barney, 2001) we consider several aspects of the firm’s resource position, namely:

- i. the overall level of resource advantage / disadvantage compared with competitors – an indicator of the firm’s overall relative resource position (VR).
- ii. the number of areas of strong resource advantage compared with competitors – another indicator of the firm’s overall resource position (VR).
- iii. the number of areas of strong resource disadvantage compared with competitors – an indicator of the firm’s capability to exploit any resource advantages they possess (O).
- iv. The inimitability (I) of the firm’s key area of advantage
- v. The ease of overcoming the firm’s key area of disadvantage– another indicator of the firm’s capability to exploit any resource advantages they possess (O)

As noted above, bricolage is concerned with the method or approach a firm takes to its resource development process. Sirmon et al. (2007) defines three processes as part of a firm’s resource management:

Structuring the resource portfolio. This includes acquiring (purchasing) resources, developing resources internally (accumulating) and divesting (shedding or selling) resources.

- i. Bundling resources to build capabilities. Three modes include stabilizing existing capabilities (making minor improvements), enriching by extending current capabilities and pioneering new capabilities.
- ii. Leveraging those capabilities to exploit market opportunities. This includes mobilizing capabilities, coordinating capabilities and deploying capability configurations.

Bricolage is concerned with both the structuring and bundling process. With respect to structuring, the tendency to 'use resources at hand' and 'make do' will favour accumulating (or developing resource internally) rather than acquiring (purchasing) resources. Further, 'recombining resources' and 'making do' describe particular modes by which a firm bundles their resources. By recombining resources in novel, unintended ways, firms will enrich their resources (extend current capabilities) and in some cases pioneer new capabilities. However, 'making do' will mean that the firm's bundling efforts are more focussed on overcoming limitations rather than seeking advantage.

We expect high levels of bricolage to have two, counteracting influences with respect to the overall level of advantage / disadvantage across the broad range of resources of the firm. First, the tendency to 'make do' will mean some resource areas of the firm won't be developed to the fullest extent possible. However, counter to this, we argue that firms engaging in higher levels of bricolage behaviours will tend to be able to overcome disadvantages more quickly. They will be better at overcoming obstacles and working around barriers to progress. Since young firms are more commonly faced with disadvantages associated with liabilities of newness and smallness (Aldrich & Auster, 1986), we expect this second influence to be more influential. Hence we hypothesise:

H1: Emerging and young firms that engage in higher levels of bricolage will tend to have a better overall level of resource advantage.

Moreover, firms engaging in higher levels of bricolage behaviours will tend to recombine existing resources to address a problem or opportunity. As argued above, we expect firms engaging in higher levels of bricolage behaviours will tend to be able to overcome disadvantages more quickly. However, because of the tendency to 'make do', we expect bricolage will have an asymmetric influence on a firm's resource development to address disadvantages versus building advantages. Bricolage is more concerned with problem solving and as such overcoming disadvantage by matching competing firms. Furthermore, the tendency to 'make do' will limit the firm's search for optimal resource combinations that may lead to resource advantages. However, this same tendency will not act to limit a firm's areas of disadvantage. Hence we expect,

H2: Emerging and young firms that engage in higher levels of bricolage will tend to have fewer areas of strong resource advantage.

H3: Emerging and young firms that engage in higher levels of bricolage will tend to have fewer areas of strong resource disadvantage.

Inherent in this process recombine existing resources to address a problem or opportunity is the role of the entrepreneur and applying elements of improvisation and creativity (Weick, 2002; Hmieleski & Corbett, 2006). At times this will lead to resource advantages. In these cases, owing to the idiosyncratic nature of this process, bricoleurs may develop resource advantages that are difficult to copy (Ciborra, 2002). Thus,

H4: The strongest area of resource advantage for emerging and young firms that engage in higher levels of bricolage will tend to be more difficult for other firms to imitate.

Along similar lines, recombining resources in creative ways will sometimes enable firms to more easily overcome difficult to copy advantages of other firms by substitution with an alternative resource bundle. Hence we expect,

H5: Emerging and young firms that engage in higher levels of bricolage will tend to be able to overcome key areas of disadvantages more easily and quickly.

## METHOD

Overall we employ a large-scale survey design and test our hypotheses using regression techniques.

## Sample and Data Collection

### *The main sample*

We conducted a large scale phone screening survey of 30,193 randomly selected adults with equal male/female representation and a maximum of one adult per household in 2007. This process yielded 1,988 entrepreneurial start-ups, either nascent firms (NF) or young firms (YF). In order to qualify for inclusion as a NF 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?

Both categories of respondents also had to confirm that they were (or intended to be) owners or part owners of the (emerging) firm. Further, for the NF category they had to confirm they had undertaken some concrete 'start-up behaviour' such as looking for equipment or a location, organizing a start-up team, working on a business plan, etc., within the last 12 months. Otherwise, or else they were deemed under qualified. Conversely, if they confirmed that the firm's revenues had exceeded expenses for six of the last 12 months they were deemed over qualified (and instead tested for eligibility in the YF category). Finally, the preliminary YF cases were retained if they confirmed that they started "trading in the market doing the type of business you are currently doing" in 2004 or later.

Eligible cases 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 1,108 respondents, representing a response rate of 55.7 percent of the eligible cases identified in the screener.

### *The high potential over sample*

A random sample of start-ups will, of course, include a proportion of high potential (HP) start-ups; however, when a sufficiently demanding HP definition is employed that proportion is likely to be small Reynolds and Miller (1992). To identify 'high potential' businesses at an early stage for the purpose of comparing their characteristics with 'regular' start-ups is a very challenging task Aldrich (1999). By any meaningful definition they are rare, so obtaining a sizeable sample of them is even more difficult than is sampling 'regular' start-ups at an early stage (before they appear in any registers) (Reynolds, 1997; Wong, Ho, & Autio, 2005). Obtaining a large enough random sample of such entities may therefore be impossible or prohibitive in terms of costs. On the other hand, if they are identified through a single type of source (e.g., business incubators; business angel networks) the sample would almost certainly be biased compared to the theoretical category the study intends to investigate.

Recognizing some of the challenges with this cohort, we sought to identify a diverse sample of high potential nascent and young firms. A sample of potentially HP firms was initially generated from a variety of sources including major stakeholders including the Federal and State Governments, Australian Chamber of Commerce, University Commercialisation Offices, Patent and Trademark Attorneys, Government Awards and Industry Awards in Entrepreneurship and Innovation, Industry lead associations, Venture Capital Association, innovation directories including Australian Technology Showcase, Business and Entrepreneurs Magazines including BRW and Anthill. The use of many different sources serves to minimise any particular bias in the sample. In total, over 480 industry, association, government and award sources were generated in this process. Of these, 74 discrete sources generated high potentials that fulfilled the criteria. The 'suspected' HP cases were subjected to an expanded, multiple customised screening based on prior literature using a combination of criteria relating to:

1. *Human capital* (education, management experience, and start-up experience)
2. *Aspirations* (growth orientation)
3. *Technological sophistication and novelty* (innovation; IP protection); and being in a 'growth friendly' industry

A compensatory scoring system was developed such that no particular characteristic was necessary for high potential status whereas a predefined total score had to be reached across the dimensions. . Cases that reached this pre-defined total score were included in the study and subjected

to the full length interview. The criteria for distinguishing between NF and YF were the same as in the random sample.

In the oversample, 1116 firms were contacted as high potential cases. 331 cases agreed to participate in the screener, with 279 firms (134 nascents, and 140 young firms) successfully passing the high potential criteria. 222 Firms (108 Nascents and 113 Young firms) completed the full interview.

### **Resource Advantages Scales**

We sought to develop scales for measuring resource advantages (and disadvantages) and their VRIO characteristics for a broad-based cohort of entrepreneurial firms. Where possible scales were based on existing scales. We used multi-item scales to increase the validity of the constructs. The items for the scales are provided in Table 1. Exploratory and confirmatory factor analyses were conducted to establish unidimensionality of our scales.

The first block of the scales related to the firm's level of resource advantages and disadvantages. Respondents were asked the degree to which each resource category represented an advantage or disadvantage relative to other businesses in their industry on a 5 point response scale: Major Disadvantage, Slight Disadvantage, No Advantage or Disadvantage, Slight Advantage and Major Advantage. Following Wiklund and Shepherd (2003), we measured a firm's relative advantage in marketing expertise with a 3-item scale ( $\alpha = .80$ ). Alertness ( $\alpha = .84$ ) is a 3-item scale that gauged the extent to which the firm was better able to identify trends in the industry and market than competitors. Technical expertise ( $\alpha = .70$ ) was adapted from Wiklund and Shepherd (2003). The three items tapped into the extent to which the start-up had an advantage over competitors in terms of technological expertise, product/ service development and difficult to copy competences. Network capabilities ( $\alpha = .93$ ) was measured with 3 items (Madsen et al., 2006). The scale measured to what extent the entrepreneurial start-up was better able to utilize its network for its businesses than competitors. Flexibility ( $\alpha = .76$ ) was adapted from "the study Entrepreneurship in Different Organizational Contexts" (JIBS97) conducted at Jonkoping International Business School (see, Brown et al., 2001; Naldi, 2008) and measured the extent to which managers had the flexibility to make quick decisions and react to trends. The scale for cost advantage ( $\alpha = .73$ ) was measured with 4 items adapted from JIBS97. The scale gauged to what extent the start-up was having an advantage relative to competitors regarding labour, overhead, and operating costs. Product / service differentiation ( $\alpha = .78$ ) was measured with 3 items gauging to what extent its product had superior distinctive features relative to competitive offerings.

The second block was a new scale that asked the respondent to nominate the most important resource advantage and disadvantage of the firm. For the advantage, they were then asked four questions to determine how easy it would be for other firms to imitate and/or substitute this resource on a 5 point likert scale ( $\alpha = 0.70$ ). For the firm's key disadvantage, they were asked corresponding questions related to overcoming this disadvantage ( $\alpha = 0.68$ ).

Based on these scales, we operationalize the dependent variables for our tests of the five hypotheses as follows:

- H1: mean of the seven resource advantages / disadvantages areas
- H2: number of resource areas in which the firm is in the top quartile of firms.
- H3: number of resource areas in which the firm is in the bottom quartile of firms.
- H4: key advantage inimitability scale
- H5: key disadvantage inimitability scale

### **Bricolage Scale**

Bricolage constructs were developed following standard protocols for scale development (Brown, Davidsson & Wiklund, 2001; DeVellis, 2003). In order to assure face and content validity we made sure the items were designed to tap each element of the Baker and Nelson (2005, p. 333) definition of bricolage as "making do by applying combinations of the resources at hand to new problems and opportunities." In order to reflect the behavioural nature of the phenomenon a response scale was developed where 1 means "never" and 5 means "always". From a large list of items 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. we settled on a measure consisting of nine items.

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 from 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 a total of 9 items were included on the bricolage instrument. 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 behavioural 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 exploratory factor analysis (EFA) and ran a Cronbach alpha on the bricolage measures to ensure the appropriability of formative vs reflective modelling. If we were to proceed with reflective modelling, the results revealed Cronbach alphas that were above Nunnally’s recommended level for consistency ( $\alpha = .823$ ). An EFA on the 9 items was run using maximum likelihood extraction and direct oblimin rotation, and an eigenvalue of 1 as the cut-off point. It was found 1 item was highly complex, cross loading between the two component factors and needed to be dropped, enabling a one factor result. 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. Owing to this, traditional internal consistency reliability like cronbach alpha is “not an appropriate standard for evaluating the adequacy of the measures in formative models” (Jarvis, Mackenzie & Podsakoff 2003:202). Our final instrument consists of 8 items (see Table 1).

### **Control variables**

We have three groups of control variables. The first group aims to capture the overall level of resources – time and money - that have been invested in the venture. Specific variables include amount of money invested in the business (log), number of hours per week the owners are working, number of current employees, time since the first business activity commenced, and (for nascent firms) the proportion of gestation activities considered relevant to the business that have been completed.

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); business start-up experience (exact measure); management experience (number of years). We also included three indicators of the technology capabilities of the firm: whether the venture is perceived as high tech (dummy); whether the technology for the venture existed five years ago; whether R&D is considered a major part of the business.

The third group of variables account for various characteristics. These include: team (versus solo dummy); spouse team (dummy); number of owners; whether it is a home-based business (dummy); service (versus product dummy).

## **RESULTS**

To test each of the five the hypotheses, hierarchical linear regression was used. In the first step the control variables were introduced into the model, and in the second step our variable of interest, Bricolage, was introduced. Results are displayed in Table 2.

Overall, the models indicate modest explanatory power, with R-squared ranging from 0.11-0.13 for overall resource advantage, inimitability of key advantage and number of strong advantages; 0.07 for number of strong disadvantages; and as little as 0.033 for overcoming key disadvantages. In all cases the change in F statistic was significant when bricolage was introduced into the model ( $p < 0.001$ ).

In an overall sense, the results indicate that high levels of bricolage are generally a good thing for the resource position of entrepreneurial start-up firms. Findings with respect to the five hypotheses are:

- H1: Findings support the hypothesis that entrepreneurial start-up firms ( $\beta = 0.199$ ;  $p < 0.001$ ) that engage in higher levels of bricolage will tend to have a better overall level of resource advantage / disadvantage averaged across all important resource areas of the firm.
- H2: Findings reject the hypothesis that entrepreneurial start-up firms that engage in higher levels of bricolage will tend to have fewer areas of strong resource advantage. In fact, the results suggest that the reverse is likely to be true ( $\beta = 0.181$ ;  $p < 0.001$ ).
- H3: Findings support the hypothesis that entrepreneurial start-up firms ( $\beta = -0.170$ ;  $p < 0.001$ ) that engage in higher levels of bricolage will tend to have fewer areas of strong resource disadvantage.
- H4: Findings support the hypothesis that the most important area of resource advantage for entrepreneurial start-up firms that engage in higher levels of bricolage will tend to be more difficult for other firms to imitate ( $\beta = 0.542$ ;  $p < 0.001$ ).
- H5: Findings support the hypothesis that entrepreneurial start-up firms ( $\beta = -0.484$ ;  $p < 0.001$ ) that engage in higher levels of bricolage will tend to be able to overcome key areas of disadvantages more easily and quickly.

## CONCLUSION

The paper sets out to formulate and test an important theoretical link between the processes of resource development utilised by a start-up firm and the resource-based position that it achieves. Specifically, we question and test whether higher levels of bricolage behaviour is good for a firm's resource position. It represents a step towards a more complete resource-orientated perspective that reflects the realities facing start-up firms.

We contribute to theories of resource development in start-up firms. Bricolage has recently received considerable attention in entrepreneurship as an often desirable approach to resource development (e.g. Baker et al., 2003; Baker and Nelson, 2005). We show that in a large, broad-based sample of start-up firms, bricolage does in general tend to lead to an improved resource position.

We also contribute to the resourced based view (RBV) of the firm. This strong research tradition has focussed on identifying resource positions that lead to above average performance, but largely neglected resource development processes (Sirmon et al., 2007). We show that one such resource development process, bricolage, has a positive influence on a start-up firm's resource position.

Finally, this research clearly represents only a first step towards exploring the impact of resource development processes, such as bricolage, on firm outcomes. Possible avenues for advancement include: examining a more comprehensive range of outcomes including overall firm performance or competitive advantage; longitudinal studies of outcomes; examining whether the results translate to mature firm contexts, a more nuanced, contingent look at the conditions under which bricolage is more or less advantageous; and, a more detailed view of specific resource advantages within single industry contexts.

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**Table 1: Measures and items of independent and dependent variables<sup>a</sup>**

**Cost leadership** (Naldi, 2008)

- Purchase prices<sup>b</sup>
- Labour costs
- Operating costs
- Overhead costs

**Product differentiation** (new scale)

- Product or service uniqueness
- Superior product or service
- Distinctive product or service features

**Marketing expertise** (Wiklund and Shepherd, 2003).

- Expertise in marketing
- Innovative marketers
- Ability to provide excellent customer service<sup>b</sup>

**Market knowledge**

- Knowledge of the latest industry trends
- Knowledge of the latest technological trends
- Knowledge of what the leading customers are asking for

**Technical expertise** (Wiklund and Shepherd, 2003)

- Technical expertise
- Expertise regarding development of products or services
- Competence that is difficult to copy

**Network capabilities** (Madsen et al., 2006)

- Ability to use the firm's networks to influence the firm's environment
- Ability to use the firm's networks to access useful knowledge
- Ability to use personal networks for business purposes

**Flexibility** (Naldi, 2008)

- Freedom for managers to make and implement fast decisions
- Flexibility to react fast to new trends

**Inimitability of key resource advantage** (new scale)

- It would be rather easy for other businesses to copy this advantage<sup>R</sup>
- It would take other businesses a long time to copy this advantage
- It would be very costly for other businesses to copy this advantage
- Other businesses could easily match this advantage, although perhaps in a different way<sup>R</sup>

**Overcoming key resource disadvantage** (new scale)

- It will be rather easy for us to overcome this disadvantage<sup>R</sup>
- It will take us a long time to overcome this disadvantage
- It will be very costly for us to overcome this disadvantage
- It will be fairly easy to work around this disadvantage, although perhaps in a different way<sup>R</sup>

**Bricolage** (new scale)

- We are confident of our ability to find workable solutions to new challenges by using our existing resources
- We gladly take on a broader range of challenges than others with our resources would be able to.
- We use any existing resource that seems useful to responding to a new problem or opportunity
- We deal with new challenges by applying a combination of our existing resources and other resources inexpensively available to us
- When dealing with new problems or opportunities we take action by assuming that we will find a workable solution
- By combining our existing resources, we take on a surprising variety of new challenges
- When we face new challenges we put together workable solutions from our existing resources
- We combine resources to accomplish new challenges that the resources weren't originally intended to accomplish

<sup>b</sup> item dropped after factor analyses

<sup>R</sup> reverse-coded item

**Table 2: Regression Results**

Variables	Overall Resource Advantage (H1)			Number of Strong Advantages (H2)			Number of Strong Disadvantages (H3)			Inimitability of Key Advantage (H4)			Difficulty to Overcome Key Disadvantage (H5)		
	Coeffic.	Std. Err.	p-value	Coeffic.	Std. Err.	p-value	Coeffic.	Std. Err.	p-value	Coeffic.	Std. Err.	p-value	Coeffic.	Std. Err.	p-value
Bricolage	<b>0.199</b>	<b>0.023</b>	<b>0.000</b>	<b>0.542</b>	<b>0.067</b>	<b>0.000</b>	<b>-0.484</b>	<b>0.073</b>	<b>0.000</b>	<b>0.181</b>	<b>0.045</b>	<b>0.000</b>	<b>-0.170</b>	<b>0.043</b>	<b>0.000</b>
Control variables															
(Constant)	<b>2.977</b>	<b>0.106</b>	<b>0.000</b>	<b>-1.125</b>	<b>0.306</b>	<b>0.000</b>	<b>4.350</b>	<b>0.333</b>	<b>0.000</b>	<b>-1.189</b>	<b>0.202</b>	<b>0.000</b>	<b>0.302</b>	<b>0.195</b>	<b>0.121</b>
Time since First Business Activity	0.001	0.003	0.702	-0.014	0.009	0.146	0.007	0.010	0.483	<b>0.013</b>	<b>0.006</b>	<b>0.033</b>	<b>0.011</b>	<b>0.006</b>	<b>0.063</b>
Log Amount Invested	<b>0.022</b>	<b>0.011</b>	<b>0.040</b>	<b>0.067</b>	<b>0.031</b>	<b>0.030</b>	-0.058	0.034	0.084	<b>0.037</b>	<b>0.020</b>	<b>0.070</b>	0.021	0.020	0.291
Hours / week: Owners	0.000	0.000	0.242	<b>0.004</b>	<b>0.001</b>	<b>0.001</b>	-0.002	0.001	0.149	<b>0.001</b>	<b>0.001</b>	<b>0.041</b>	0.000	0.001	0.677
Number of Current Employees	-0.008	0.037	0.831	<b>0.250</b>	<b>0.105</b>	<b>0.018</b>	-0.181	0.115	0.116	0.040	0.070	0.571	<b>0.234</b>	<b>0.067</b>	<b>0.000</b>
Team (vs Solo Dummy)	-0.022	0.043	0.606	-0.207	0.124	0.095	0.136	0.135	0.313	-0.065	0.082	0.426	0.082	0.079	0.302
SpouseTeam	<b>-0.092</b>	<b>0.045</b>	<b>0.041</b>	-0.062	0.130	0.635	0.214	0.142	0.131	-0.025	0.086	0.771	-0.045	0.083	0.584
Ownership Team Size (Number of Owners)	-0.001	0.002	0.452	<b>-0.009</b>	<b>0.005</b>	<b>0.048</b>	0.005	0.005	0.318	0.005	0.003	0.101	0.000	0.003	0.933
Home Business (Dummy)	-0.050	0.033	0.133	-0.102	0.096	0.289	0.064	0.104	0.538	<b>-0.237</b>	<b>0.063</b>	<b>0.000</b>	-0.010	0.061	0.874
Services (vs Product Dummy)	-0.012	0.031	0.697	-0.037	0.090	0.685	-0.135	0.098	0.170	-0.021	0.060	0.724	0.002	0.057	0.966
Human Capital - Education (Degree)	-0.037	0.031	0.226	<b>-0.178</b>	<b>0.088</b>	<b>0.044</b>	0.049	0.096	0.613	<b>0.162</b>	<b>0.058</b>	<b>0.006</b>	0.014	0.056	0.797
Human Capital - Business Experience	<b>0.080</b>	<b>0.038</b>	<b>0.036</b>	0.015	0.110	0.893	-0.234	0.120	0.051	<b>0.177</b>	<b>0.073</b>	<b>0.015</b>	<b>-0.090</b>	<b>0.070</b>	<b>0.197</b>
Human Capital - Management Experience	<b>0.133</b>	<b>0.037</b>	<b>0.000</b>	<b>0.377</b>	<b>0.107</b>	<b>0.000</b>	<b>-0.378</b>	<b>0.117</b>	<b>0.001</b>	0.094	0.071	0.188	0.034	0.068	0.621
Venture High Tech (Dummy)	<b>0.122</b>	<b>0.034</b>	<b>0.000</b>	<b>0.511</b>	<b>0.098</b>	<b>0.000</b>	<b>-0.251</b>	<b>0.107</b>	<b>0.019</b>	<b>0.144</b>	<b>0.065</b>	<b>0.027</b>	-0.097	0.063	0.123
Technology Exists < 5 Years (Dummy)	0.015	0.034	0.661	-0.119	0.099	0.232	-0.113	0.108	0.297	<b>0.185</b>	<b>0.066</b>	<b>0.005</b>	0.142	0.063	0.025
Substantial R&D (Dummy)	0.013	0.032	0.681	-0.009	0.094	0.927	0.097	0.102	0.340	0.036	0.062	0.558	-0.028	0.060	0.644
<b>Model Statistics</b>															
R squared	0.127			0.125			0.077			0.117			0.033		
F	12.62			13.46			8.27			11.51			2.94		
p-value F	0.000			0.000			0.000			0.000			0.000		
Change R squared	0.046			0.040			0.029			0.011			0.011		
Change F	72.64			64.71			43.53			16.50			15.61		
p-value Change F	0.000			0.000			0.000			0.000			0.000		