Strategic orientation and innovation funding: who's exploring and who's exploiting?

Nancy Forster-Holt
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Abstract: Using firm level outcomes, we apply the underutilized lens of Small Business Orientation (SBO) to the understudied area of innovation grant funding. Firms identifying as Entrepreneurially Oriented (EO) take more grants and money but SBO is significant to exploitation. The finding of these ‘Entrepreneurial SBOs’ (ESBO) is a secondary contribution of the paper, providing insights about the actions of firms that take innovation grant monies. We suggest that ESBOs are a good bet for seed grant programs to make, worthy of the attention, energy and the focus of public innovation investments that have been typically targeted toward EO firms.

INTRODUCTION

Grant programs sponsored at the state and federal levels are an important source of funding for entrepreneurs in the United States, especially at the early stages of an innovation when private monies would likely not get involved (Link and Scott 2012). The outcomes of innovation grant programs has not attracted much research attention (Link and Scott 2012). The two directions that a firm can take with a grant are to explore or to exploit the award monies. Explorative innovation is a strategy that conserves firm resources and exploitative innovation is a resource utilization strategy and these strategies have been linked with a firm’s strategic orientation (Kollman and Stockman 2014).

Entrepreneurial orientation (EO) generally describes a growth-oriented venture and small business orientation (SBO) describes a small-scale venture that is connected with its owner (Miller 1983, Kollman and Stockmann 2014). Compared with the attention paid to EO, there is very little focus on SBO (Aloulou and Fayolle 2005), and the suspected interactions of SBO and EO (e.g. Stewart, Carland, Carland, Watson and Sweo 2003; Stewart and Roth 2001; Runyan et al 2008). Although EO has inspired depth and breadth of inquiries as it matured, the literature is inconclusive in connecting EO with actions (the ‘EO-behavior gap’), and with entrepreneurial

Equally unclear is the connection between entrepreneurial orientation (EO) and firm performance outcomes (Wiklund 1999, Runyan, Droge and Swinney 2008; Stambaugh, Martinez, Lumpkin and Kataria 2017). Despite SBO as an afterthought in the literature it is an important construct for strategy research (Madison, Runyan and Swinney 2014), and strategic decisions based on personal agendas (i.e. SBO) have positive outcomes for the firm (Madison et al 2014). In this paper we use the underutilized lens of SBO to investigate entrepreneurial behavior and the outcomes of innovation grant funding programs.

Few studies have answered the call for investigation of more than one orientation in a firm, of EO to SBO, and vice versa, related to small business innovation and renewal (Runyan et al 2008, Deb and Wiklund 2017). Our work also contributes to recent calls for insights on one form of organizational ambidexterity -- the sequencing of exploration and exploitation. It is believed broadly that growth and innovation are tied to entrepreneurial activity (Link and Scott 2012) although older firms are more adept at exploitation (Mathias, McKenny and Crook 2017). Here we use firm level outcomes from the seed grant initiative of the Maine Technology Institute (MTI), although programs can be found in every state in the U.S. and are likewise directed by policy makers to support economic development through firms that explore and exploit innovations. The money is generally directed toward startup ventures and small, entrepreneurial firms (Link and Scott 2012). MTI’s primary mission is to accelerate the time of innovations to the market, and to attract or else leverage additional private and public investment in its awardees (maintechnology.org). In 2017 its annual funding was increased substantially, from about $10 million to $45 million. With this data, the paper addresses calls for micro level
measurements of EO and SBO (e.g. Wiklund 1999; Miller 2011; Gupta 2015; Deb and Wiklund 2017) as well as for firm level measurements of exploration and exploitation (Gupta et al 2006).

Publicly funded innovation programs and other initiatives tend to reflect an obsession among policy makers with high growth (EO) firms (Rehn, Brannback, Carsrud and Lindahl 2013). According to its promotional materials and website, maintechnology.org, MTI provides assistance to help convert “innovative ideas into new products, processes or companies.” All the firms that apply and win grants are innovative and entrepreneurial – so they are EO for at least one point in time. According to MTI’s site mainechnology.org, awardees are “doers, pioneers and innovators.” The MTI data provides a novel and objective vantage point, and although the generalizability of our study will be limited to the same types of firms that the MTI attracts to its seed grant program, our findings and methods will be useful to similar programs. Understanding how firm orientation (EO, SBO) connects with actions taken with innovation grant monies (exploration, exploitation) fills a gap not only in the literature but also in practice, and provides information that is essential for program evaluation and the recruitment of applicants. Our dependent variable of exploit is not rare but our use of objective data from the MTI makes it novel -- and repeatable. Previous studies of explore/exploit used surveys of firm managers -- and all of the papers called for the use of objective, publicly available data sources in future research (Mom, VanDenBosch and Volberda 2006; Abebe and Angriawan 2014, Kollman and Stockmann 2014).

We proceed by proposing a research model using a review of relevant literatures. This is followed by hypothesis development and testing of relationships between a firm’s strategic orientation and either exploration or exploitation of the grant. Presentation of the results follows, leading to discussion of implications and limitations, and the suggestion of some future
directions. Though the paper stops short of offering policy prescription, we hope to provide insights and takeaways for businesses and policy makers alike.

**LITERATURE REVIEW, MODEL, HYPOTHESES**

*Small Business Orientation (SBO) and Entrepreneurial Orientation (EO) -- separately and together*

SBO is a firm level strategic orientation that facilitates the owner’s personal goals and attachment to the business (Runyan et al 2008, Madison et al 2014). There hasn’t been much focus on SBO in the literature (Madison et al 2014). According to the literature a small business owner, defined as the individual that starts and runs a business in order to achieve personal goals (Jenkins and Johnson 1997), is not primarily motivated by the growth of the firm (Runyan et al 2008). SBO differs from EO based on the short and long-term goals of the owner (Davidsson 1989) and is considered theoretically distinct from EO (Carland, Hoy, Bouton and Carland 1984). SBO was first thought to be either the opposite of EO, or even the absence of EO (Covin and Slevin 1989). A scale for SBO was developed (Runyan et al 2008; Fulford and Rizzo 2009) to measure the relative strength in broad categories of the owner’s emotional attachment, and the owner’s purpose and goals, but studies using this scale are rare (Madison et al 2014). Organizations that are rated high on the SBO scale will typically embody organizational structures based on routine tasks and uniformity, allowing for economies of scale and the implementation of cost leadership strategies (Covin and Slevin 1989).

The three primary elements of EO are *risk taking, innovativeness and proactivity* (Miller 1983), and these were operationalized with another measurement scale (Covin and Slevin 1989). *Risk taking* refers to resource allocation decisions (Venkatraman 1989), and a tendency to forego actions that have worked in the past (Dess and Lumpkin 2005). *Innovativeness* is the generation
of new ideas, enabling the company’s entry in to new arenas as well as enhancing existing market positions (see Kollmann and Stockmann 2014 for an excellent review). *Proactivity* describes a forward-looking perspective that is accompanied by innovative or new-venturing activity (Lumpkin and Dess 1996). Examples include a search for first-mover advantages as well as responding to existing customers, with customer loyalty and increased firm value as corporate goals (Morgan and Strong 2003). If any of the three elements in the EO scale by Covin and Slevin (1989) are weak or missing, then the firm is “less than entrepreneurial” (Miller 2011).

There is wide acceptance of the concept and the relevance of EO (Rauch, Lumpkin, Wiklund and Frese 2009). It is a mature area of research with a solid foundation, ready for a finer-grained investigation based on fresh perspectives (Gupta 2015). Miller (2011) noted that progress on his original 1983 EO concept included the extension of the unit of study of the EO (the firm) to the entrepreneurial level (the owner, or management). Because of this, the original EO/SBO dividing line is beginning to blur. Rather than providing a single insight, SBO and EO emerge from the continuous shaping and refining of owner’s connections with the business (Runyan et al 2008). For example a recent paper by Deb and Wiklund (2017) provided proof of a pattern of EO-SBO-EO, just as Runyan et al (2008) had suggested. This and other recent research brings EO to the person level (where SBO resides) by separating the components of EO from the aggregate index (e.g. Miller 2011; Lumpkin and Dess 2011), and measuring EO at more than one point in time (Wales 2016). The result is that EO can be operationalized in a variety of ways (Covin and Wales 2012). EO may occur at the intersection of the EO components (Gupta 2015) with the entrepreneur as the unit of study instead of the firm (eg Allolou and Fayolle 2005, Abebe and Angriawan 2014, Deb and Wiklund 2017). The three components of EO can be considered separately, episodically, and split into lower-order dimensions, for example
entrepreneurial behaviors (innovativeness and proactiveness) or managerial attitude (risk taking) (Anderson, Kreiser, Kuratko, Hornsby, and Eshima 2015). This explains the innovative small business that takes risks and is proactive towards competitors and environment (Wassim and Fayolle 2005).

It’s been suggested that a firm’s orientation is a steady state, as either SBO and EO, with the firm undertaking a strategic stance as either EO and SBO at key junctures (Runyan et al 2008). This literature is complemented by organizational ambidexterity, which is a firm’s ability to balance exploration and exploitation (Mathias et al 2017). The starting point for our research model (Figure 1) is an initial firm strategic state of EO, because all MTI seed grant awardees could be labeled as EO at time of award application -- the checklists used by reviewers require that the applicant demonstrate innovativeness and proactivity in the narrative of the project. Plus risk taking is demonstrated by a guarantee of funds matching by the firm. These funds can come from the company, the owner or an investor and are detailed on a budget document. SBO by definition does not distinctly acknowledge the owner’s risks, instead risk is a firm level concept attributed to EO firms (Covin and Slevin 1989). And yet, EOs don't corner the market on risk. Carland, Hoy, Boulton and Carland (1984) note that, “risk taking propensity is inherent in ownership rather than entrepreneurship.” As shown in our research model, the firm’s EO at time of award is followed by its actual state as either EO or SBO, and we hypothesize that this is significant toward the exploration or exploitation of the award. The degree of exploration is explained in the methods section. A review of the literatures on explore and exploit facilitates the development of the hypotheses.
**Figure 1. Research model. Exploration and Exploitation within EO and SBO companies**

**Steady state: EO**

- H2: degree of exploration

**EXPLORE**

**MTI awardee: EO**

**EXPLOIT**

**Steady state: SBO (H1)**

**EXPLOIT**

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*Exploration and exploitation*

The variable called the degree of exploration is calculated from MTI variables, following the logic of two recent studies on explore/exploit (Mom et al 2006; Abebe and Angriawan 2014) and using variables from a third paper about SBIR grants (Link and Scott 2012). Exploitation relates to improvements in existing environments and trajectories (Benner and Tushman 2002). There are not widely accepted measures of exploration and exploitation (Kollmann and Stockmann 2014). Intuitively, explore and exploit strategies tap into different administrative routines and managerial behaviors – exploration necessitates developing new skills and internal processes, and exploitation adapts current resources to meet needs of existing customers (Lubatkin, Simsel, Ling and Veiga 2006). Organizations have been found to specialize in exploration or exploitation, but exploration and exploitation will generally be mutually exclusive (Gupta Smith and Shalley 2006), with exploitation used to help a firm realize returns to its exploration strategy (Kollmann and Stockmann 2014). Older firms are stronger than younger ones at balancing exploration and exploitation (Mathias et al 2017) but exploitation makes use of the firm’s current products and resources (Kohtamaki, Kautonen and Kraus 2010). Small, existing companies are well adapted for exploitation because the owners and managers of
smaller firms are closer to the firm’s competencies and are well suited to judge how and when to exploit such competencies (Lubatkin et al 2006).

With exploitation activities, firms target efficiency improvements, cost reduction, advances in processes and technologies; generally these are existing resources (Lumpkin and Dess 2001). Exploitation includes learning that is gained via local search, and by the selection and reuse of existing routines; exploration includes learning gained through variation, experimentation, and play (Baum, Li, and Usher 2000; Lubatkin, Simsek, Ling and Veiga 2006). We hypothesize the following as H1:

\[ H1: \text{SBO as the implied state of the awardee firm is positively related to exploitation.} \]

Firms have been found to execute explore and exploit strategies in organizational adaptation, technological innovation, organizational learning, and even organizational survival (Gupta, Smith and Shalley 2006). All firms, regardless of orientation, can explore for new knowledge or they can exploit existing knowledge (e.g. March 1991; Lubatkin, Simsek, Ling and Veiga 2006). The literature has been inconclusive, finding that high levels of EO can result in both exploration and exploitation (Kollman and Stockmann 2014, Abebe and Angriawan 2014) but also that entrepreneurial firms are more likely to explore (Abebe and Angriawan 2014). Innovativeness of the firm has a positive impact on exploration (Kollman and Stockmann 2014), but an overemphasis on exploration can have negative consequences (Volberda and Lewin 2003). Exploration and exploitation are each associated with differences in learning and innovation (Baum, Li, and Usher 2000; Benner and Tushman 2002; He and Wong 2004; Gupta, Smith and Shalley 2006). Through exploration firms discover new competencies and products, seize opportunities, create new markets or expand and penetrate the customer base in order to
enter into new markets with full-scale operations (Brown and Eisenhardt 1997; Choi and Shepherd 2004).

Exploration involves an intention to shift a firm’s trajectory (Benner and Tushman 2002). The majority of startups are not pursuing known markets and therefore exploration activities are vital (Lubatkin, Simsek, Ling and Veiga 2006). According to practitioner literature, a startup is organized to search for a business model (Blank 2006). EO firms act through new sources of supply or new production methods that facilitate a competitive strategy of differentiation and product innovation (Storey 1994). Startups are not alike (e.g., Blank 2006; Miller 2011), and executing past firm practices in traditional product development tends to work if the market is similar to past experiences (Blank, 2006). A manager’s EO is positively related to exploration activities in the normal course of business (Abebe and Angriawan 2014). Likewise the EO firm is drawn to opportunity and the introduction of new products and entering new markets, and the SBO’s tendency is to reduce inefficiencies (Choi and Shepard 2004). We would thus be likely to find that EO firms explore more than SBOs before exploiting, and therefore hypothesize the following about exploration using innovation grants:

\[ H2: \text{The moderator variable of “degree of exploration” is positively related to exploration by the EO firm.} \]

We next describe methods, data including moderator variables and the tests of the hypotheses.

**METHODS**

*Data from MTI*

The Maine Technology Institute is a quasi-government agency that is empowered to award grants and loans to help Maine companies bring innovations to market. From its inception in 2000, it has awarded a total of 2040 grants and loans to 960 businesses. According to MTI’s
annual reports the number of awards each round varies, but roughly 50 percent of applicants are awarded seed grants. Starting in 2012, the highest seed grant award amount was doubled, to a maximum of $25,000. The grants do not have to be paid back, but the awardee is required to match the funds (mainetecnology.org). The data on the awardees was assembled by the author, using data on MTI’s website, its archives, and additional information that was provided by MTI personnel at the author’s request. The sample consists of all 206 seed awards for 162 unique companies in the years 2012 - 2016. The cutoff for data collection was the end of 2016, giving the most recent awardee reasonable time to exploit the award. Descriptive statistics for the data are in Table 1 and summary statistics for the variables are in Table 2.

**Table 1: descriptive statistics**

<table>
<thead>
<tr>
<th>DESCRIPTIVE STATISTICS</th>
<th>ALL</th>
<th>SBO</th>
<th>EO</th>
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<tbody>
<tr>
<td>(awards 2010-2016 n=206)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of awards</td>
<td>206</td>
<td>70</td>
<td>136</td>
</tr>
<tr>
<td>Number of awards, full amount</td>
<td>140</td>
<td>43</td>
<td>97</td>
</tr>
<tr>
<td>Number companies</td>
<td>163</td>
<td>62</td>
<td>101</td>
</tr>
<tr>
<td>Percent firms in business</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number awards</td>
<td>206</td>
<td>34%</td>
<td>66%</td>
</tr>
<tr>
<td>Average age all firms, years</td>
<td>11</td>
<td>17</td>
<td>8</td>
</tr>
<tr>
<td>Number of grants exploited</td>
<td>125</td>
<td>53</td>
<td>72</td>
</tr>
<tr>
<td>AVERAGE number/amount</td>
<td>2/$20,683</td>
<td>3/$22,216</td>
<td></td>
</tr>
<tr>
<td>Average total awards</td>
<td>$41,366</td>
<td>$66,648</td>
<td></td>
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</tbody>
</table>

MTI provided data about each award and firm, such as the year of the award, the number of awards and the amount(s) of award, plus the firm age at the time of grant was easily derived from the company’s founding year. However, firm level outcomes for the grants are only tracked by each portfolio manager, not for the program. To find this required secondary and archival
data, and we followed methods in the EO literature -- actually these papers have advocated for the use of secondary or archival data over survey data (e.g. Rauch et al 2009; Miller 2011; Lumpkin and Dess 2011; Wiklund and Shepherd 2011; Gupta 2015; Covin and Miller 2014; Wales 2016; Deb and Wiklund 2017). In order to measure whether or not the company exploited the idea, we gathered data using impression management (IM). IM data from company websites is a highly reliable source of data in management research (Micelotta and Raynard (2011). Through website signaling a small firm chooses which elements to display (Micelotta and Raynard 2011) – for example the firm’s strategic orientation. According to IM literature, firm websites give impressions especially for the dimensions of experience, efficiency, caring, economic health, and size (Winter, Saunders and Hart 2003).

We followed the methodology of previous researchers by developing indicators for content analysis and soliciting feedback for validity (eg Marcellotta and Raynard 2011, Short, Payne, Brigham, Lumpkin and Borberg 2009; Brigham, Lumpkin, Payne and Zachary 2013). Indicators of SBO (emotional attachment) and EO (emotional detachment) were shared with three sources for feedback and input: an academic researcher in the marketing area of the author’s school, a website content manager for EO and SBO firms and a small business owner -- all are unrelated to the research -- in order to pre-test our logic. We describe our use of IM below.

Data from Impression Management

Exploitation (Yes/No): comparing each awardee’s MTI project description with IM from its website that the company did/did not complete the project tells whether or not the award was exploited. Exploitation can involve new or existing products or processes for a firm (Brazeal and Herbert 1999). Evidence of exploitation was provided by the company, through its website in
product or service offerings, in a blog or newsletter, a press release, or links on the company’s site to external news stories, and assertions on the company’s ‘About us’ page that describe innovations or “new products, progress and improvement” (Michalisin 2001; Parhankangas and Ehrlich 2014).

**Degree of exploration:** logically one could assume that exploration is the absence of exploitation, but there was evidence of a similar explore-exploit pathway that Link and Scott (2012) found in their work with firms that won SBIR grants. Some firms ultimately exploited the project but according to the MTI data, they did so using subsequent grants to build a scaffold to support exploration. A significant number of firms did this, 90 out of the 163 unique companies. We used a technique by Mom et al (2006) and by Aberbe and Angriawam (2014) in order to develop a variable for the “degree of exploration” by the firms that used this exploration strategy and then ultimately exploited. This was simply a variable reduction, using the mean of three variables of MTI data that we selected by following Link and Scott (2012): a. more than one seed grant for the same project, b. the grant was for the full possible amount, and c. the number of all MTI grants awarded to the company. Consistent with previous methods the Cronbach’s alpha for the measure was .51, which is acceptable when five or fewer items are included in an index (Pallant 2010). Mean inter-correlation values fall between .2 and .4, as recommended by Briggs and Check (1996), to support the inclusion of the three variables in the ‘degree of exploration’. Following the methods of previous researchers this resultant variable reflects prevailing theory (Hair et al 2010, Zellwegger et al 2012, Madison et al 2014).

**Independent variables:**

**SBO of firm:** IM-based evidence of the owner’s emotional attachment and purpose and goals shows that the firm indeed portrays a baseline or steady state, as SBO (or as not-SBO),

Emotional attachment is a cornerstone of SBO, and indications on a company’s website included a company’s ‘About us’ area that indicates that the owner works for the business, and gives the impression through folksy language and images that the owner is ‘preserving the firm’ is consistent with visual and textual content in the Marcelotta and Raynard (2011) findings. Further indicators of the owner’s goals and purpose are again signaled in ‘About us’ section of websites, including messages of welcome, large sections are dedicated to the history and expertise of the family and a clear impression that innovation does not overshadow tradition in the product or service (Marcelotta and Raynard 2011).

EO of the firm: A firm that is selected for an innovation award by nature of the MTI application and process has displayed the EO indicators of innovativeness, risk taking and proactiveness. We assumed that the steady state of EO continued, unless we found evidence of a firm’s SBO using impression management, but we found EO via IM. On its website link for “About Company” an EO firm signaled a founder/team/owner that is emotionally detached using formal and clinical language that was quite the opposite of the SBO website. The EO company’s accomplishments are emphasized through a focus on innovations, R&D and product lines (Marcelotta and Raynard 2011). The detachment is further enforced -- and made distinct from SBOs -- by formal descriptions of management team members, advisors or investors, or else there was no mention of names at all. These strategies serve to “conceal” the entrepreneur (Marcelotta and Raynard 2011).
FINDINGS

Table 1 shows some simple calculations that provide a richer picture of the awardees, and Table 2 shows the means, standard deviations and correlations of the variables in the study. There were more EO firms than SBO firms among the awardees, and SBO firms take fewer grants at a lower average amount than EO firms. The average firm age is just under 11 years, but there are four awardees out of 206 that were over 53 years old (one was founded in 1880). If those firms are removed from the calculation, the average age is 8 years. The dependent variable is exploitation and following previous research was tested using regression (Mom et al 2006; Aberbe and Angriaawam 2014). Binary logistic regression is a preferred methodology by researchers of social sciences when the dependent variable is dichotomous and the variables are a mix of dichotomous and categorical (Vardhan and Biju 2012). The results are discussed next, with insights directed to practitioners and policy makers regarding innovation grants and a firm’s likelihood to explore or exploit.

Table 2: means and other statistics

<table>
<thead>
<tr>
<th>TABLE 2</th>
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<tbody>
<tr>
<td>Means and other statistics</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>N=206</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variable</td>
<td>Mean</td>
<td>Std dev</td>
<td>Max</td>
<td>Min</td>
</tr>
<tr>
<td>Number grants</td>
<td>2.8</td>
<td>1.8</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>Years in business</td>
<td>10.89</td>
<td>19.49</td>
<td>137</td>
<td>0</td>
</tr>
<tr>
<td>Years since award</td>
<td>2.85</td>
<td>1.38</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Full amount</td>
<td>0.68</td>
<td>0.47</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Award amount</td>
<td>$21695</td>
<td>$5696</td>
<td>$25000</td>
<td>$3500</td>
</tr>
<tr>
<td>Index of exploration</td>
<td>0.57</td>
<td>0.28</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

The results from the regressions are displayed in Table 3 and significance levels are noted. The adjusted explained variance (R-squared) ranges from .158 to .62 which indicates that not all the models were equally relevant. Consistent with previous researchers we tested three
statistical models (Abebe and Angriawan 2014; Mom et al 2006). Model 1 tests control variables only and Model 2 tested hypothesis 1, which was that firms that are SBO are more likely to exploit. The second hypothesis, that EO firms are more likely to exploit after exploration, was tested with Model 3. Model 3 is the strongest but both hypotheses are supported. We find that SBO is significant for exploitation, supporting support for hypotheses 1, and that EO and the degree of exploration is significant for exploiting, and this supports hypothesis 2. Firms that are SBO as an implied or steady state exploit the innovation for which it won the seed grant. The age of the firm was significant, with older firms exploiting, which is a finding that supports earlier work where EO predicted positive performance in companies 10 years or less, while SBO predicted performance for older firms (Runyan et al 2008). These findings will be discussed in the next section.

Table 3: results of binary logistic regression

<table>
<thead>
<tr>
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<th>DV=EXPLOIT (yes/no)</th>
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<tbody>
<tr>
<td></td>
<td>coefficients from binary regression</td>
</tr>
<tr>
<td>N=206</td>
<td>Model 1</td>
</tr>
<tr>
<td>Control variables:</td>
<td></td>
</tr>
<tr>
<td>Years in business</td>
<td>.054***</td>
</tr>
<tr>
<td>Years since grant award</td>
<td>0.18</td>
</tr>
<tr>
<td>Amount of grant</td>
<td>0.00</td>
</tr>
<tr>
<td>Independent variables:</td>
<td></td>
</tr>
<tr>
<td>EO steady state</td>
<td>-0.42</td>
</tr>
<tr>
<td>SBO steady state</td>
<td></td>
</tr>
<tr>
<td>Degree of exploration^</td>
<td></td>
</tr>
<tr>
<td>Model performance:</td>
<td></td>
</tr>
<tr>
<td>Nagelkerke-R2</td>
<td>0.132</td>
</tr>
<tr>
<td>% correct predictions</td>
<td>66.50%</td>
</tr>
<tr>
<td>Chi-squared</td>
<td>21.99**</td>
</tr>
</tbody>
</table>

* p-value < .10
** p-value <.05
***p-value<.001
DISCUSSION

This study investigates the role of strategic orientation in the exploitation of innovation seed grants. All MTI awardees ate EO to win the grant. Our first contribution is that our findings support a multidimensional model of strategic orientation. Though not all small business owners are entrepreneurs (Carland, Hoy, Boulton and Carland 1984), they can of course be entrepreneurial (Aloulou and Fayolle 2005). The all or nothing implications of strategic orientation has gone largely unchallenged (Gupta 2015) and agencies that seek to direct innovation funds will benefit from knowing that within the applicant pool, there are -- and must be -- EO and SBO firms. Through impression management we learned that an SBO portrays itself distinctly from an EO on its site, reflecting the tone and character of its owner. This confirms the ‘steady state SBO’ that was coined by Runyan et al (2008). The SBOs exploited the seed grant, possibly because the owner takes fewer risks with their own matching funds and only applies with a project that is well-vetted. Although the descriptive statistics show that EO firms take more grants and for a larger average total amount, orientation was not a significant predictor of exploitation. Consistent with McKenny et al (2017), the age of the firm was significant, with firms over 10 years more likely to exploit and those under 10 more likely to explore. EO is a resource-consuming strategic orientation requiring extensive investments by the firm (Covin & Slevin, 1991). We suggest that exploration helps explain the orientation-performance gap found by EO scholars. And through our findings we coin the hybrid state, the ‘Entrepreneurial SBO’ (ESBO), because there is a portion of a local economy’s activity that takes place in traditional sectors or in services, which do not qualify as “high tech” or “innovative” (Trajtenberg 2005).

Our secondary contribution is toward innovation grant programs, with takeaways for three primary audiences: public policy makers, quasi-public agencies in the innovation grants space, and businesses. According to Link and Scott (2012) there has been a conspicuous absence of
systematic empirical analyses related to public-sector R&D investments in technology-based entrepreneurial enterprises, due largely to the lack of entrepreneurial firm-specific or project-specific data. With our study we used data that are project specific, objective and repeatable. For companies in the MTI programs, it is possible to thoughtfully strategize a progression of grants beyond the seed award, named by the MTI as Phase 0, Development loan, Business Accelerator grant, and Equity Capital fund. Similar to studies of firms that are included in incubators, future research would include consideration of all the applicants, to understand what projects were rejected. Other firm level findings are that some awardees never start the business and some go out of business. The questions of what a state can and cannot do to stimulate innovation and entrepreneurship (Mazzucato 2013) may be answered through our investigation of who explores and who exploits.

With our finding that SBO is significant but EO is not significant to exploiting the grant we suggest that a granting agency would be inclined to be orientation-blind in its selection process. To date evidence about policy and outcomes has been incomplete, and perpetuates programs that are based on assumptions (some think myths) about how much influence these programs can have on the creation of high growth firms (Brown, Mawson, and Mason 2017). Innovation can include both process and product innovations, and has a positive expected value for the innovator and or society (Trajtenberg 2005).

An inadvertent finding of this paper suggests that the EO firm can benefit from being episodically SBO. “Appropriate evaluation of commercial potential is a crucial aspect of an entrepreneurial firm’s innovative capability – no matter how sophisticated an invention is, its commercial potential is a key to successful innovation” (Link and Scott 2012). The purely EO firm explores – and there are characteristics of the SBO that, if adopted may support exploitation. Efforts that are typically focused on the SBO may help the EO to exploit. Although
that outcome is not the focus of this study, it is a notable outcome of the grant award process and warrants attention in future research. Innovation is not easily recognized, and is not always beneficial; moreover its impact can be context dependent, reflecting factors such as the age of the firm, the type of innovation, and the cultural context (Rosenbusch, Brinckmann and Bausch 2011).

As suggested by our finding of the ESBO, firms are tied to their primary owner and the local ecosystem in many ways. MTI seed grant awards may provide just enough risk for bankers to respond to -- a way for the ESBO firm to seek legitimacy from resource providers and the market (Mills and McCarthy 2014). Traditional methods of financing such as loans by community banks often require personal assets pledged and this creates a lack of separation of the owner from the firm (Ang et al 1995; Coleman and Cohen 2001).

A final, contribution of this paper is that we used objective data, first at program level, and subsequently at firm level through impression management for award outcomes and strategic orientation. A future research direction is to use impression management to understand the broader role of signaling in attracting financing from non-traditional sources such as angel or venture finance (which rewards EO), or from conventional financing such as bank loans (which eschews EO but also rewards SBO). The positioning by the ESBO firm – of SBO as baseline and yet EO in a strategic or episodic way – may be a strategy that companies can use in order to enhance their risk profile in small ways without jeopardizing access to traditional methods for financing.

Descriptive data showed that ESBOs on average received fewer awards, and for smaller amounts than EOs. The ESBO firm is less likely to seek additional outside funding in the form of investors (Mills 2013) and therefore there may be significance in the stage that the project is at
before they apply for the seed grant – the ESBO perhaps applies for seed money only after a self-funded exploration, apply with a more fully developed concept, and use the seed grant to provide the final lift needed to exploit. The average size of business in the US is declining, as new establishments start and stay smaller, providing a steady job for the owner (Choi and Spletzer 2012). Small firms are strategically oriented and managed to recognize opportunities and then mobilize resources (Aloulou and Fayolle 2005). New ventures funded by their owners and initiated in established in organizations have the benefit of resources including human and financial capital (Zimmerman and Zeitz 2002). This opens an opportunity for agencies such as the MTI, in educating SBOs that are less likely to seek more funding, perhaps opening a dialog about how an SBO can add value to its firm and leverage more than one seed grant. The MTI’s offerings and guidance may not be the right fit for the SBO-focused venture, instead the Small Business Administration (SBA) may be the better organization to engage in the relationship.

Some firms that explore will delay exploitation because they cannot qualify for traditional financing, instead jockeying for follow on financing and investment in order to enable exploitation. With the variability and unpredictability of the timing, terms, and availability of non-traditional financing, it is important that companies, those who advise them, and policymakers, understand the fork in the road in startup finance. The MTI serves an important role of making small amounts of money available to startups -- banks don’t tend to lend smaller amounts, since larger loans are likely more profitable (Mills 2013). Future research could investigate results of follow on funding from MTI that act as a signal of investment quality to investors and of risk mitigation to lenders.
Limitations and future research directions

As often happens, our limitations provide some future research directions. First, because the MTI awardees were EO as motivation for applying for the grant, hypotheses about companies that are purely SBO were eliminated, as those firms were not likely to apply for an MTI grant. As a result, we do not know what the ‘tipping point’ would be for SBO firms to become ESBO firms. It may be a combination push and pull: the pull from the marketplace, and from MTI’s educational sessions and marketing information, and the push from inside the organization. A pattern of EO-ESBO could be informed by the study of ambidexterity, which refers to the synchronous pursuit of both exploration and exploitation via areas in the company that specialize separately in each (e.g., Lubatkin, Simsek, Ling and Veiga 2006; Kohtamaki, Kautonen and Kraus 2010). In this paper we acknowledge but don’t address the intuitive nature of the concept of ambidexterity, which is historically a large firm construct (O’Reilly and Tushman 1996). Future research could extend the logic of ambidexterity to the smaller firm to help understand the patterns of EO-ESBO.

EO has a greater impact on the performance of nonfamily firms, whereas SBO drives the performance of family firms (Madison, Runyan and Swinney 2014; Steiger, Duller and Hiebl 2015). We did not distinguish family owned businesses in this paper, but future research would include the effects of the strategic orientation of the family firm (Brigham, Lumpkin, Payne and Zachary 2014). Likewise, research that connects SBO with literature on companies that choose to stay small (e.g. Anderson and Ullah 2014) would serve to enlighten programs such as the MTI and SBA. There are several kinds of startups in addition to purely new ventures, including expansions, and other new initiatives in existing companies (Miller 2011).

Our data gathering is novel, and can be replicated, but it could be improved. We did not
consider the gender of the firm owner as an independent variable. We can surmise the gender of
the applicant from the company’s website but a future direction would be to explore if genders
affect steady state as ESBO or EO, and who is more or less likely to participate in MTI grant
programs. Another limitation to the study is that the sample is rather small; large-scale repetition
is desirable. Although we are working with data gathered over time, we assume linearity, which
does not fully capture dynamic business practices. For example, we were not consistently able to
capture the amount of time taken from grant award to project exploitation. The MTI portfolio
managers work with each firm on a case by case basis and there are times when due to the
realities of the project, a judgment is made to extend or relax the 60-month report back period.

CONCLUSION

There is inherent bias toward entrepreneurship as a desired state comes from popular
press, policy maker and the academic literature (Wiklund 1999). The message to managers is to
behave more entrepreneurially in order to improve or maintain the performance of their firms
(eg; Dess, Lumpkin, and Covin 1997). However a mix of strategic orientations may serve a
company well. Understanding which firms explore and which firms exploit offers substantial
insights for business owners, those who advise them, and those that encourage innovation and
growth, such as policy makers, bankers and investors. We shed some light on the types of firms
that occupy the EO-performance gap, with a novel perspective of seed grant awardees, who are
at the corner of explore and exploit. EOs exploited innovations only after prolonged exploration
and several MTI grants and loans. This evokes the first line of the book ReWork, by Fried and
Heinemeier (2010): “The startup is a magical place... It’s a place where you can spend other
people’s money until you figure out a way to make your own. It’s a place where the laws of
business physics don’t apply.” Entrepreneurial SBOs (ESBO) were able to explore and then
exploit using very few grants. The SBO is indeed not defined as the absence of EO (Runyan et al 1989), but rather we tentatively suggest that EO is a building block for SBOs. Our finding of the ESBO revealed a group of business owners worthy of the attention, energy and investments that have been typically reserved for EOs. Our findings shed new light on the SBO in particular, and the exploitation of innovations that keep a small business relevant in a changing world.

REFERENCES


Steve Blank Four Steps to the Epiphany: 2006


Founded in 1892, the University of Rhode Island is one of eight land, urban, and sea grant universities in the United States. The 1,200-acre rural campus is less than ten miles from Narragansett Bay and highlights its traditions of natural resource, marine and urban related research. There are over 14,000 undergraduate and graduate students enrolled in seven degree-granting colleges representing 48 states and the District of Columbia. More than 500 international students represent 59 different countries. Eighteen percent of the freshman class graduated in the top ten percent of their high school classes. The teaching and research faculty numbers over 600 and the University offers 101 undergraduate programs and 86 advanced degree programs. URI students have received Rhodes, Fulbright, Truman, Goldwater, and Udall scholarships. There are over 80,000 active alumnae.

The University of Rhode Island started to offer undergraduate business administration courses in 1923. In 1962, the MBA program was introduced and the PhD program began in the mid 1980s. The College of Business Administration is accredited by The AACSB International - The Association to Advance Collegiate Schools of Business in 1969. The College of Business enrolls over 1400 undergraduate students and more than 300 graduate students.

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