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The Case of Inter-Organizational Projects

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Alternative Modes of Entrepreneurial Opportunity Exploitation: The Case of Inter-Organizational Projects

ABSTRACT

While entrepreneurship research has taken firm formation to be the predominant mode of opportunity exploitation, entrepreneurship can take place through many other types of organizational arrangements. In the present article, we consider one such alternative arrangement, namely the formation of inter-organizational projects (IOPs). We propose a multi-level contingency model that suggests that uncertainty both at the level of the firm and at the level of the environment makes the exploitation of opportunities through IOPs more likely. The model is tested by telephone survey data collected amongst a panel of 1725 SMEs and longitudinal industry data. Our findings provide strong support for the industry-level part of the model, but interestingly, only partial support for the firm level part of the model. This indicates that the effects of uncertainty need to be dissected into different levels of analysis to understand the conditions under which alternative modes of opportunity exploitation can be a prominent entrepreneurial alternative to new firm formation.

1. Introduction

While we have come to tentatively accept the position that entrepreneurship involves the identification, evaluation, and exploitation of opportunities (Aldrich & Cliff, 2003; Shane & Venkatamaran, 2000), research to date has taken firm formation to be the predominant mode by which such opportunities are exploited (Shane, 2012). In reality, however, firms can use a broad range of organizational arrangements to exploit opportunities (Davidsson, 2005), of which firm formation, either by individuals or organizations, is but one (Shane, 2012). This article explores one important alternative mode of opportunity exploitation, namely the formation of inter-organizational projects (IOPs). IOPs are temporary organizational entities that combine independent organizations to jointly complete a pre-defined project task within a pre-defined time frame (Jones & Lichtenstein, 2008; Sydow & Staber, 2002). After project completion, the IOP disbands (Sydow, Lindkvist & DeFillippi, 2004). The use of and research on such IOPs has increased dramatically in recent years (Bakker, 2010), and has suggested a number of characteristics that can make IOPs prominent modes of opportunity exploitation. These include the fact that the temporary nature of IOPs does not commit resources for extended periods into the future (Eisenhardt & Tabrizi, 1995; Schwab & Miner, 2008) and that IOPs can often be launched quickly to provide access to resources, information, and technology to pursue opportunities (Alvarez & Barney, 2001; Ireland, Hitt & Webb, 2006). To illustrate, Das (2006) mentions the inter-organizational project between the German pharmaceutical firm Bayer and U.S.A. based Scios to produce and market the congestive heart-failure treatment Natreacor. This project was a means to quickly exploit the opportunity that came from innovations in biotechnology products for the short-term treatment of congestive heart failure, where the short-term time horizon of just 3 years “reflected Bayer’s eagerness for quick results” (Das, 2006: 8). Observations like these resonate with recent work that found that a substantial group of firms forms IOPs at an increasing rate (Bakker, Knoben, De Vries, & Oerlemans, 2011) and makes an understanding of IOP formation important to entrepreneurship research.

Prior research on IOPs and other partnerships by entrepreneurial firms suggests that the formation of joint projects and collaborations can be been linked to entrepreneurial behaviour (Simsek, Lubatkin & Floyd, 2003), new product development (Deeds & Hill, 1996), foreign sales (Leiblein & Reuer, 2004), shareholder returns (Mouri, Sarkar & Frye, 2012), and innovative performance (George, Zahra & Wood, 2002). This clearly indicates the relevance of IOPs. However, in the context of SMEs, this focus on the outcomes of strategic partnering

(where IOPs, alliances or networks are the independent variable), has taken precedence over studies of their antecedents (where IOPs, alliances or networks are the dependent variable) (see the review by Hoang & Antoncic, 2003). A thorough understanding of antecedents is also important, however, as partnerships are not distributed randomly across firms (Gulati, 1998). In fact, when SMEs form IOPs as a response to entrepreneurial opportunities, then identifying the antecedents of IOP formation becomes an important step toward a more comprehensive understanding of the opportunity exploitation process by SMEs.

What factors make opportunity exploitation through IOPs more likely? This article reports on a study of a sample of 1725 SMEs across several industries that seeks to introduce a multi-level contingency model that outlines the key firm and industry-level processes and factors that influence the formation of IOPs. Our results will indicate that both the firm-level factor innovative scope, as well as the industry factors dynamism, concentration and munificence affect the formation of IOPs by SMEs. Firm level uncertainty was interestingly found to not be related to IOP formation, whereas effect size analyses reveal considerable effects of dimensions of industry uncertainty.

The main implications of these findings lie in the domain of opportunity exploitation and collective strategies by SMEs. First, our framework starts to address Shane's (2012) recent call for researchers to consider alternative organizational arrangements that may be employed to exploit opportunities, and to advance our limited understanding of the drivers that determine the choice between firm, market, or "something else" to exploit an entrepreneurial opportunity. Our framework implies that a general consideration of uncertainty falls short of explaining more specific choices in the range of organizational arrangements that are available to exploit opportunities, and that a distinction between firm-level and industry-level uncertainty is needed to provide a more fine-grained insight into the choices surrounding alternative forms of opportunity exploitation.

A second implication of our findings relates to the pertinent question that Alvarez, Ireland & Reuer (2006) recently raised: what are the collective strategies of SMEs and entrepreneurial firms like, and whether and how are they different from "traditional" alliances? Our finding that firm-level uncertainty is not related to IOP formation, but industry-level uncertainty measures are, implies that the antecedents of IOP formation by SMEs are different from the antecedents of strategic alliance formation by large firms. In the discussion section, we will discuss the further theoretical implications of these findings.

2. Theoretical Background

Inter-Organizational Projects: Definition and Characteristics

Inter-organizational projects combine otherwise independent organizations for the joint completion of a pre-defined project task within a pre-defined time frame (Jones & Lichtenstein, 2008; Sydow & Staber, 2002). Prior work has demonstrated both similarities and differences between IOPs and other forms of organization (Bechky, 2006; Cattanti, Ferriani, Frederiksen & Täube, 2011). An important similarity to other types of "network" modes of organization is that in IOPs patterns of exchange between partnering firms tend to be horizontal rather than hierarchical, reciprocal rather than one-way, and resources tend to be exchanged interdependently (Bakker et al., 2011; Grabher, 2004; Ferriani, Cattani & Baden-Fuller, 2009). One of the most central differences is that IOPs are temporary, bounded by an ex-ante defined point of institutionalized termination that is agreed between the partnering firms (Bakker, Boros, Kenis & Oerlemans, 2012; Grabher, 2002). At the end of this time frame, the IOP as an organizational entity disbands (Jones & Lichtenstein, 2008).

The temporary nature of IOPs has both advantages and disadvantages. For example, an important disadvantage is that their temporary nature tends to inhibit the sedimentation of knowledge acquired from projects, which can inhibit evolutionary learning cycles in periods

of relative stability (e.g. Grabher, 2004; Sydow et al., 2004). There are also important advantages to IOPs, however, which include that the temporary nature of IOPs does not commit resources for long periods into the future (Eisenhardt & Tabrizi, 1995; Schwab & Miner, 2008). Moreover, IOPs are a highly flexible mode of organization: they can be quickly launched and terminated to pursue opportunities (Schwab & Miner, 2008). In television production, for example, firms tend to form IOPs in order to complete short-term projects that disband upon completion of each production, which allows for important flexibility in attending to changing audience demands (Meyerson, Weick & Kramer, 1996). The flexibility of IOPs is further illustrated in the words of the director of the small media company MPlus (alias) that we interviewed in the course of this research project, who reported: “In our business, [...] collaboration is temporary, for a specific project for a specific moment. After that, you don’t collaborate any more, or maybe you do, but on a different project. The key is that you are not dependent on the other firms [...] You are much more flexible in deciding what route to take. [...] You’re not married”.

These characteristics of IOPs provide benefits in some conditions, and draw-backs in others. In the present article we take the perspective that under conditions of high levels of firm-specific and industry uncertainty, the above mentioned characteristics of IOPs offer important advantages over other organizational arrangements that can be utilized to exploit opportunities (like new firm formation). Under those conditions, IOPs can be a prominent alternative mode of opportunity exploitation.

Firm-Specific Uncertainty, Industry Uncertainty, and the Formation of IOPs

Uncertainty has been defined as the difficulty to accurately predict environmental states, effects, and responses (Milliken, 1987). We differentiate between firm-specific uncertainty and industry-level uncertainty (Beckman, Haunschild, & Philips, 2004). Firm-specific uncertainty can originate from many different sources, like new market entrance, mergers, or a change of top management. In contrast to industry uncertainty, these sources generate uncertainty that is largely unique to the firm, and often internal to it (Beckman et al., 2004). Industry uncertainty, on the other hand, is a more external type of uncertainty that is shared across a set of firms, and, therefore, independent of what happens on the level of one individual firm (Beckman et al., 2004). Firm-specific and industry uncertainty are independent theoretical constructs, because even in times of high industry uncertainty, which can be caused by for instance an industry-wide crisis or environmental volatility, some individual organizations can be insulated from these industry events and experience relatively low levels of firm-specific uncertainty. Similarly, in stable markets with low levels of industry uncertainty, individual firms may still face high levels of firm-specific uncertainty, for example, when firm-specific factors threaten their survival (Beckman et al., 2004).

Uncertainty has an intricate link to entrepreneurial opportunities, both enabling and constraining opportunities and entrepreneurial actions (McMullen & Shepherd, 2006). Entrepreneurial opportunities have been defined as “goods, services, raw materials, and organizing methods [that] can be introduced and sold at greater than their cost of production” (Shane & Venkatamaran, 2000: 220). More recently, researchers have argued that individuals and firms face a wide variety of different types of opportunities, which can be discovered, created, or some mixture of both (Alvarez & Barney 2007; Sarasvathy, Dew, Velamuri & Venkatamaran, 2003). Associated broader conceptualizations of entrepreneurial opportunities account for the development, improvement and adaptation of organizational outcomes, structures and processes, suggesting that entrepreneurs or intrapreneurs envision and act upon new means ends frameworks (Companys & McMullen, 2007; Sarason, Dean & Dillard, 2006). We consider such a broader definition appropriate for our investigation of entrepreneurial opportunities across a broad range of firms from different industries.

The above conceptualization of uncertainty and entrepreneurial opportunities forms the basis for our following framework that will suggest that both firm-specific and industry-level uncertainty increase the likelihood of SMEs forming IOPs. The mechanism for this, we argue, is that under conditions of high uncertainty, the aforementioned characteristics of IOPs offer a number of advantages over other types of organizational arrangements to exploit entrepreneurial opportunities. We elaborate on this next.

3. Hypotheses

3.1 Firm-Level Factors Influencing IOP Formation

Firm-Specific Uncertainty. As mentioned, in contrast to industry uncertainty, firm-specific uncertainty is largely unique to the firm, and often internal to it (Beckman et al., 2004). There are reasons to suggest that firm-specific uncertainty makes the formation of an IOP to exploit an entrepreneurial opportunity relatively more attractive in comparison to other modes of opportunity exploitation, like the formation of a new firm. First, IOPs on average tend to have relatively low start-up cost associated with them, and the resources that are required can be pooled with other participating firms (Sydow et al., 2004). This allows responding to opportunities at relatively low cost. The potential to pursue a perceived entrepreneurial opportunity with a more limited resource commitment may be especially relevant for SMEs because of their limited resources, especially when faced with substantial firm-specific uncertainty (Barnett, 1997). Second, IOPs are temporary: they can be formed and terminated relatively quickly. Hence, IOPs can offer a degree of organizational flexibility (Schwab & Miner, 2008). Contingency theory suggests that firms facing uncertainty prefer flexible modes of organization to address opportunities and challenges (Zott & Amit, 2008), because flexibility allows firms to adjust quicker to unforeseen developments (Donaldson, 2001). For instance, when confronted with high levels of firm-specific uncertainty, SMEs would likely be unable or unwilling to commit resources for extended periods of time as in the case of new firm formation (Jones & Lichtenstein, 2008), and rather keep their options open (McCarter, Mahoney & Northcraft, 2011). As an illustration, TI and Hitachi in 1988 formed an IOP in which they shared technology to capitalize on the opportunities associated with a new generation of memory chips (Das, 2006). Given the uncertainty that surrounded the technology that TI and Hitachi were developing, the partners were “at risk of losing a great deal of investment if the alliance were not to yield favourable results” (Das, 2006: 7). As a consequence, they formed an IOP, temporary and with a short time horizon, rather than a more long-term organizational arrangement that could have been conceived (Das, 2006).

Consistent with the above, we expect that firm-specific uncertainty makes opportunity exploitation through the formation of IOPs relatively more likely. Hypothesis 1 follows:

Hypothesis 1. *Higher levels of firm-specific uncertainty increase the probability of IOP formation by SMEs.*

Innovative Scope. Innovative project tasks expose SMEs to both risks and opportunities associated with exploring novel ideas that promise new and superior products or processes (George et al., 2002). While innovation represents an inherently uncertain process, it also opens up entrepreneurial opportunities to develop new products, processes, and markets. Because of the unpredictable nature of these activities, firms can choose to exploit innovative opportunities by more flexible forms of organization (Donaldson, 2001). Studies specific to IOPs offer different arguments on how the flexibility of IOPs can offer advantages for exploiting opportunities related to innovation (Brown & Eisenhardt, 1995; Eisenhardt & Tabrizi, 1995). First, in the case of emerging innovative opportunities, IOPs have the advantage that they can be quickly launched to address them, with the objective to gain a first-mover advantage. Moreover, and considering the often high failure rates of innovative

ventures, IOPs can also serve as an instrument to address and share associated risks. In fact, the low start-up costs associated with IOPs can make that firms “may launch a variety of ventures [...] and may terminate unsuccessful ventures at low cost and little disturbance to the organizational sponsor” (Sydow et al., 2004: 1475). Second, the formation of any new IOP implies partner-selection flexibility as it presents an opportunity to select participants who best fit the demands of the emerging innovative tasks (Schwab & Miner, 2011). Particularly for SMEs, which are unlikely to hold all needed resources internally, having the right set of partners with the right mix of complementary resources for each phase of the project is important (Alvarez et al., 2006).

For these reasons, we expect that SMEs that have a broader scope of innovative activities will be relatively more likely to form IOPs to exploit the opportunities that stem from innovative and creative ideas.

Hypothesis 2. *A broader innovative scope of activities increases the probability of IOP formation by SMEs.*

High Growth Strategies. An SME’s growth strategy is another firm-level variable that we expect to be associated with IOP formation. Aggressive growth strategies expose SMEs to the uncertainties and challenges of dealing with new markets, customers, and competitors (Davidsson, 2005). Flexible partnerships between firms, like IOPs, can address the challenges and opportunities associated with aggressive growth strategies.

The implementation of growth strategies typically requires resources to expand production, distribution and other capabilities (Beekman & Robinson, 2004). IOPs can be a low-cost and quick to set-up instrument to draw on resources of partner-firms. In general, they allow firms to access and draw on resources of other firms to help them satisfy their increasing customer base (Sydow et al., 2004). At the same time, IOPs allow a firm to remain flexible to adapt to challenges and opportunities as they emerge during the expansion (Schwab & Miner, 2008). For example, a firm can use an IOP as a pilot project to “test the waters” to identify actual market potential and to identify which other firms to develop deeper and more stable collaboration relationships with over time (McCarter et al., 2011).

For these reasons, we expect that high-growth strategies will on average make opportunity exploitation through the formation of IOPs relatively more likely. Hypothesis 3 follows:

Hypothesis 3. *High growth strategies increase the probability of IOP formation by SMEs.*

3.2 Industry-Level Factors Affecting IOP Formation

Industry Dynamism. Dynamism refers to the level of instability in an organization’s external environment (Dess & Beard, 1984). To meet the opportunities and demands posed by dynamic environments, flexible organizations tend to be at an advantage (Donaldson, 2001). In the specific case of SMEs and IOPs, the flexibilities of IOPs can support SMEs who face dynamic environmental changes in two ways. First, as dynamic environments increase the need for coordination of the actions of interdependent actors, IOPs create an action environment in which the behaviour of a selected part of the environment, the other IOP members, becomes more predictable (Pennings, 1981). Second, dynamism makes the future less predictable, in which case we would expect SMEs to be particularly hesitant to commit resources for longer periods into the future. Similar to previous arguments, this would make the formation of a short-term project more likely than the formation of a long term strategic alliance, or other more permanent organizational form to exploit related opportunities. As an example, in the computer industry of the 1980s, partnerships between American-based firms and Soviet-based firms would often take the form of short-term IOPs due to the volatile

economic and political conditions of the Soviet Union at the time (see, for instance, the example by Das, 2006).

In line with the above, we expect that dynamism makes the formation of IOPs to exploit entrepreneurial opportunities relatively more likely. This leads to Hypothesis 4:

Hypothesis 4. *Higher levels of industry dynamism increase the probability of IOP formation by SMEs.*

Industry Concentration. Besides dynamism, concentration has been proposed as the other primary indicator of environmental uncertainty (Dess & Beard, 1984). Concentration has been proposed to have a curvilinear relation with rivalry and related uncertainties. In fact, Boyd (1990) suggested uncertainty to be lower both in very highly concentrated industries (with few and highly visible competitors) and in industries with low concentration (with perfect competition and firms with small market shares that cannot individually influence market outcomes). In other words, competitive uncertainties, on average, have been suggested to be highest at moderate levels of concentration (Boyd, 1990). SMEs, however, by definition are not market dominating large firms. Consequently, from the perspective of a smaller firm, industry concentration may have uniquely different implications, especially related to the formation of collaborations with competitors.

The reason behind this is that in an industry that is highly concentrated around a few key players (typically not SMEs), the total market share for the smaller players is relatively smaller. As a consequence, smaller firms in the industry may be out matched and threatened by potential direct competition with market leaders. To address this joint threat, we would expect SMEs to be more likely to pursue opportunities to team up and undertake joint projects that promise to improve their competitiveness and address their relative size disadvantages. Again, the flexibility related to the low costs and temporary nature of IOPs can under these uncertain conditions make them a particularly attractive form of opportunity exploitation.

Hypothesis 5. *Higher levels of industry concentration increase the probability of IOP formation by SMEs.*

Industry Munificence. Munificence refers to the capacity of the environment (Dess & Beard, 1984). Low munificence (i.e. scarcity) means that there are relatively few resources in the environment, high munificence that there are many (Boyd, 1990). We suggest that in order to make sense of how munificence relates to IOP formation by SMEs, it is important: (1) to account for the unique position of SMEs in the general population of firms, and (2) to distinguish munificence (an aggregate industry-level construct) from the resources held by individual SMEs. A relatively munificent environment can act as an opportunity structure for SMEs to form partnerships with other firms, both because more such partners are available, and because there on average are more resources available to experiment with novel projects and new partners. Munificence can also lower levels of experienced rivalry between firms (Boyd, 1990). In other words, where environmental uncertainty may create the circumstances for entrepreneurial actions to address opportunities, munificence creates the resources whereby these opportunities can be leveraged (Koka et al., 2006). One reason why IOPs in these circumstances can be an especially attractive mode of opportunity exploitation is that periods of high munificence are often only temporary. In other words, in today's business environment, high levels of munificence cannot be trusted to stick around for extended periods of time. As a consequence, we would argue that due to the previous flexibility arguments, IOPs can under those conditions be a particularly promising alternative form of opportunity exploitation. On this basis, we formulate our final hypothesis as follows:

Hypothesis 6: *Higher levels of munificence in an industry increase the probability of IOP formation by SMEs.*

4. Methods

In order to empirically test the above set of hypotheses, we collected primary data on IOP formation from a large sample of SMEs in the Netherlands and complemented it with secondary data from the Dutch bureau of Statistics and the LISA-database. The LISA database contains information on economic activities for all establishments in the Netherlands (Knoben & Weterings, 2010). We deliberately used separate sources of data for the independent and dependent variables in order to address potential problems associated with common method bias (Podsakoff, MacKenzie, Lee & Podsakoff, 2003).

The primary data was collected through a telephone survey of general managers of SMEs to inquire about the IOPs their organizations were engaged in. If the general manager of the organization was not available, we interviewed the person with the best knowledge of the organization's partnerships. We chose this key informant design as an SME's strategy and partnering decisions tend to be determined by the decision leader (Lumpkin & Dess, 1996; Steensma, Marino, Weaver & Dickson, 2000). Our telephone survey was pre-tested and improved during a pilot study. We also followed up on the survey by qualitative interviews with a selected group of respondents, whom provided a deeper and richer understanding of the subject matter.

The EIM Business & Policy Research (EIM) institute maintains a random panel of 2000 Dutch SMEs which is stratified by industry sectors and size classes. 1725 organizations completed all survey items (RR = 86%). Non-responses involved mainly financial performance information. A non-response analysis indicated no statistically significant differences between firms that responded to all questions and firms that did not.

4.1 Dependent Variable

The dependent variable, IOP formation, was measured by general managers of SMEs reporting whether their firm currently engaged in IOPs, defined as a temporary inter-organizational project characterized by an interdependent execution of tasks with partner firms and ex-ante explicit agreements that the collaboration will end at a specific date or upon completion of the task. IOP formation is a categorical variable, which takes the value '1' if the SME was currently engaged in at least one IOP and the value '0' if it was not (mean = 0.14; s.d. = 0.35).

4.2 Independent Variables

Firm-Specific Uncertainty. Four response items captured whether an SME faced firm-specific uncertainty. Confirmatory factor analysis supported this four item measure (Cronbach's alpha .77). The four items were weighed with their factor loadings and the resulting variable was standardized (mean = 0.00; s.d. = 1.00).

Innovative Scope. The measure of an SME's innovative scope sums the scores of three binary response items that capture if a firm engaged in: (1) product and/or service innovation, (2) market innovation, and (3) process innovation. The resulting variable ranges from zero (no innovative scope) to three (broad innovative scope) (mean = 1.04; s.d. = 1.00).

High Growth Strategies. Respondents indicated whether their organization was implementing an aggressive growth strategy (high-risk; coded '1') or content with continuity (low-risk; coded '0') (mean = 0.42; s.d. = 0.49).

Dynamism. Following Boyd (1990), dynamism was measured by the standard error of the coefficient resulting from a regression of time (2003-2008) against annual industry gross-profits divided by the mean of industry gross-profits across those five prior years (mean = 2.95; s.d. = 1.70).

Concentration. The literature distinguishes two dimensions of concentration, namely the number of firms and their relative inequalities in market share (Boyd, 1990). The

Herfindahl-index captures both dimensions. It takes the sum of the squared market shares of each firm in an industry and therefore, ranges between zero and one. A smaller number of firms and increasing market share differences between firms will push the measure towards one. A score of 1 represents a perfect monopoly and a value approaching zero represents low levels of concentration. The Herfindahl-index was calculated based on employment shares based on census data (mean = 4.89; s.d. = 6.31).

Munificence. Following Boyd (1990), the abundance of resources available to industry members was captured by a regression of time (2003-2008) against the industry's annual gross-profits divided by the mean of the industry's gross-profits across those five prior years (mean = 16.53; s.d. = 9.21).

4.4 Control Variables

Firm Size. The size of the SME was measured by the number of employees. We log-transformed the resulting highly skewed distribution (mean = 1.89; s.d. = 1.36).

Financial Resources. This measure divides an SME's prior-year sales by the number of its employees – capturing its earning capacity per employee. We log-transformed this highly skewed variable (mean = 11.44; s.d. = 1.18).

Subsidiary Status. This categorical variable takes the value '1' if the company is a subsidiary of a larger company and the value '0' otherwise (mean = 0.16; s.d. = 0.37).

Legal Form. We included a categorical variable that takes the value '1' if the company had a separation of ownership and management and the value '0' otherwise (mean = 0.45; s.d. = 0.50).

4.5 Analyses

Our dependent variable has a discrete distribution with the value of '1' for firms that had formed an IOP and '0' otherwise. We consequently employed logistic regression analysis to estimate the effects of firm and industry factors on the probability of IOP formation. We calculate clustered robust standard errors that account for the lack of independence within industries. We use improvement of overall model fit based on log-likelihood ratio tests to identify the appropriate model for hypothesis tests (Long & Freese, 2006).

In logistic regression models, the strength and direction of effects associated with changes in an independent variable depend on the values of all other variables in the model (Hoetker, 2007). We estimated the average marginal effects across all actually observed values for the other variable in the model, hereby improving on the common practice of setting all other variables at their mean. The latter can be problematic because the mean ignores the actual dispersion of values and because in the case of categorical variable the mean tends to be a value for which the variable is not defined. We performed hypothesis tests based on conditional analyses that substitute specific reasonable values for variables of interest (Bowen & Wiersema, 2004; Long & Freese, 2006). In addition, we will provide graphs that show the effects across the full observed range of variable values.

5. Results

Table 1 reports pooled descriptive statistics and correlations. Higher levels of industry munificence are associated with lower levels of concentration ($r = -.75$). Relatively larger SMEs are more likely to have separation of ownership ($r = .49$) and tend to engage in a broader scope of innovations ($r = .34$). In our interpretation of results, we take these associations between the independent variables into account, but the VIFs of even these few higher correlations are still well within acceptable bounds (Verbeek, 2004).

Table 2 presents the estimates of the binary logistic regression model that tests our hypotheses. Model 1 contains only control variables. Model 2 adds the hypothesized firm

factors and model 3 adds the hypothesized industry factors. Model 4 is the full model and includes all variables of interest. The Δ Log-likelihood estimations show that model 4 offers superior model fit and will, therefore, be used to evaluate our hypotheses.

We evaluated the results of our hypotheses by 1) reporting the average marginal effect from Table 3, and whether this effect is statistically significant, 2) by reporting the size of the effect by estimating the probability of IOP formation for different levels of the independent variables, and 3) by presenting graphs of those effects that are statistically significant. On the basis of these analyses, we found the following overall pattern of results:

1. Firm-Specific Uncertainty \rightarrow Not supported. The results show that increases in firm-specific uncertainty by one standard deviation around the mean lead to only small increases in the probability of IOP formation ranging from 1.0% to 1.2%. Moreover, these changes are not statistically significant ($p = .160$ and $p = .133$, respectively).

2. Innovative Scope \rightarrow Supported. The results imply a 3.9% increase in IOP formation for a one level increase of innovative scope from 0 to 1, a change from 1 to 2 types of innovative activities increases IOP formation by 5.3% and a change from 2 to 3 types of innovative activities increases IOP formation by 6.9%. Moreover, all of these relative increases are statistically significant ($p < 0.001$).

3. High-Growth Strategies \rightarrow Not supported. The difference between the probability estimates is not in the hypothesized direction and not statistically significant ($\Delta \text{Pr}(\text{IOP}=1) = 0.021$; $p = 0.197$).

4. Industry Dynamism \rightarrow Supported. Table 2 demonstrates that industry dynamism has a significant positive effect on IOP formation ($b = .011$; $p < .05$). Figure 1b shows the pattern of effects for the observed levels of industry dynamism.

5. Industry Concentration \rightarrow Supported. The results show how a one standard deviation change of industry concentration around the mean increases the probability of IOP formation by about 2.8% ($0.143 - 0.115$) to 5.1% ($0.194 - 0.143$), and these increases are statistically significant ($p < 0.01$).

6. Industry Munificence \rightarrow Supported. We found that munificence has a statistically significant positive average marginal effect (Table 2: $b = .006$; $p < .001$). Again, we estimated the probabilities of IOP formation for relevant munificence values. The findings imply that a one standard deviation change around the mean of industry munificence increases the probability of IOP formation by 4.9% ($0.141 - 0.092$) to 6.8% ($0.209 - 0.141$).

6. Discussion

Entrepreneurship involves the identification, evaluation, and exploitation of opportunities (Shane & Venkatamaran, 2000). Regarding the latter, research to date has strongly emphasized firm formation over other possible organizational arrangements by which entrepreneurial opportunities may be leveraged (Shane, 2012). In the present study, we explored the formation of Inter-Organizational Projects (IOPs) as one alternative organizational arrangement that can be used to exploit entrepreneurial opportunities. As research suggests that as much as one third of the activities that SMEs undertake is project-based (Turner, Ledwith & Kelly, 2009), IOP formation may be a very prevalent strategy for entrepreneurial firms. Our efforts were focused on identifying the antecedents that drive IOP formation by SMEs.

Our overall pattern of results supports a multi-level contingency model that identifies innovative scope at the level of the firm, and dynamism, concentration, and munificence on the level of the industry as important drivers of IOP formation. Our findings have implications for research on entrepreneurial opportunity exploitation, inter-organizational cooperation by SMEs, and the role of industry variables in small business management. These issues are outlined in the following sections.

6.1 Uncertainty as a Driver of Alternative Modes of Opportunity Exploitation

Shane (2012: 13) recently lamented that “little work has been done to identify the factors that affect the different organizational arrangements under which opportunities are identified, evaluated, and exploited.” Thus far, the main choice of mode for opportunity exploitation has been between markets and hierarchies, and within the latter category, between existing firms and new firms (Shane, 2012). This dichotomy, while conceptually convenient, is however unlikely to be replicated in practice, with many alternative forms that exist separate from market and hierarchy that can be used to exploit opportunities and that thus capture entrepreneurship (Davidsson, 2005). As we have extensively discussed in this paper, IOPs represent one such alternative mode.

We suspect that one reason that there may be relatively little theoretical development on alternative modes of opportunity exploitation, is that we have a limited understanding of the drivers that determine the choice between firm, market, or “something else” to exploit an entrepreneurial opportunity. While there are reasons to suspect that this choice is likely to entail a consideration of cost versus value (Shane & Venkatamaran, 2000: 223) and that uncertainty has a strong bearing on the relatively weight of the two (McMullen & Shepherd, 2006), a general consideration of uncertainty falls short of explaining more specific choices in the range of organizational arrangements that are available to exploit opportunities. More specifically, in order to develop a more fine-grained insight into the choices surrounding alternative forms of opportunity exploitation, our findings suggest that a distinction between firm-level and industry-level uncertainty is needed.

6.2 Partnering by SMEs as a Distinctive Theoretical Domain

A second important theoretical implication of the present study pertains to the question that Alvarez, Ireland and Reuer (2006) recently raised: what are the partnerships by SMEs and entrepreneurial firms like, and whether and how are they different from “traditional” alliances? In this regard, our results are indicative of a pattern that suggests that the antecedents that underlie IOP formation by SMEs differ in a number of important respects from what we know drives the process of strategic alliance formation by large firms. More specifically, previous studies of strategic alliance formation by large firms have suggested that perceived firm-level uncertainties tend to be relatively strong predictors of strategic alliance formation (Burgers, Hill & Kim, 1993; Gulati, 1998). Beckman et al., (2004), for example, found in their study of the 300 largest U.S. firms that firm-specific uncertainty was significantly related to the formation of new alliances with new partners. In contrast, we find that firm-specific uncertainty did not significantly affect IOP formation by SMEs, but that measures of uncertainty on the industry level (most notably industry dynamism and concentration) did affect the formation of IOP partnerships by SMEs. We believe that this finding ties into important prior work that has suggested descriptive differences between the partnerships by small and large firms (e.g. Leiblein & Reuer, 2004) and is suggestive of an initial understanding of what the partnerships by SMEs and entrepreneurial firms are like, and how they are different from “traditional” alliances (Alvarez et al., 2006).

7. References

- Aldrich H.E., Cliff H. 2003. The pervasive effects of family on entrepreneurship: Toward a family embeddedness perspective. *Journal of Business Venturing*, 18, 573–596.
- Alvarez S.A., Barney J.B. 2007. Discovery and creation: Alternative theories of entrepreneurial action. *Strategic Entrepreneurship Journal*, 1, 11-26.
- Alvarez S.A., Ireland R.D., Reuer J.J. 2006. Entrepreneurship and strategic alliances. *Journal of Business Venturing*, 21, 401-404.

- Bakker R.M. 2010. Taking stock of temporary organizational forms: A systematic review and research agenda. *International Journal of Management Reviews*, 12, 466-486.
- Bakker R.M., Boros S., Kenis P., Oerlemans L.A.G. 2012. It's only temporary: Time Frame and the Dynamics of Creative Project Teams. *British Journal of Management*, Forthcoming.
- Bakker R.M., Knobben J., De Vries N., Oerlemans L.A.G. 2011. The nature and prevalence of inter-organizational project ventures: Evidence from a large scale field study in the Netherlands 2006–2009. *International Journal of Project Management*, 29, 781-794.
- Barnett W.P. 1997. The Dynamics of Competitive Intensity. *Administrative Science Quarterly*, 42, 128-160.
- Beckman C.M., Haunschild P.R., Phillips D., J. 2004. Friends or Strangers? Firm-Specific Uncertainty, Market Uncertainty, and Network Partner Selection. *Organization Science*, 15, 259-275.
- Boyd B.K. 1990. Corporate Linkages and Organizational Environment: A Test of the Resource Dependence Model. *Strategic Management Journal*, 11, 419-430.
- Bruton G.D., Ahlstrom D., Li H.L. 2010. Institutional theory and entrepreneurship: Where are we now and where do we need to move in the future? *Entrepreneurship Theory and Practice*, 34, 421-440.
- Das T.K., Teng B.S. 2000. A Resource-Based Theory of Strategic Alliances. *Journal of Management*, 26, 31-61.
- Das T.K. 2006. Strategic alliance temporalities and partner opportunism. *British Journal of Management*, 17, 1-21.
- Davidsson P. 2005. *Researching Entrepreneurship*. New York: Springer.
- Deeds D.L., Hill C.W.L. 1996. Strategic alliances and the rate of new product development: an empirical study of entrepreneurial biotechnology firms. *Journal of Business Venturing*, 11, 41-55.
- Dess G., Beard D. 1984. Dimensions of organizational task environments. *Administrative Science Quarterly*, 29, 52-73.
- Dickson P.H., Weaver K.M. 2005. R&D alliance formation: the relationship between national R&D intensity and SME size. Paper presented at the ICSB 50th World Conference Washington, DC.
- Dickson P.H., Weaver K.M. 2011. Institutional Readiness and Small to Medium-Sized Enterprise Alliance Formation. *Journal of Small Business Management*, 49, 126-148.
- Donaldson L. 2001. *The contingency theory of organizations*. Thousand Oaks, CA: Sage.
- Eisenhardt K.M., Tabrizi B.N. 1995. Accelerating Adaptive Processes - Product Innovation In The Global Computer Industry. *Administrative Science Quarterly*, 40, 84-110.
- Ferriani S., Cattani G., Baden-Fuller G. 2009. The relational antecedents of project entrepreneurship: Network centrality, team composition and project performance. *Research Policy*, 38, 1545–1558.
- George G., Zahra S.A., Wood D.R. 2002. The effects of business–university alliances on innovative output and financial performance: a study of publicly traded biotechnology companies. *Journal of Business Venturing*, 17, 577-609.
- Grabher G. 2002. Cool projects, boring institutions: Temporary collaboration in social context. *Regional Studies*, 36, 205-214.
- Gulati R. 1998. Alliances and networks. *Strategic Management Journal*, 19, 293-317.
- Hoang H., Antoncic B. 2003. Network-based research in entrepreneurship: A critical review. *Journal of Business Venturing*, 18, 165-187.
- Hoetker G. 2007. The use of logit and probit models in strategic management research: Critical issues. *Strategic Management Journal*, 28, 331-343.

- Ireland R.D., Hitt M.A., Webb J.W. 2006. Entrepreneurial alliances and networks. In: Shenkar O., Reuer J.J. (eds.) *Handbook of Strategic Alliances*. Thousand Oaks, CA: Sage; 2006. pp. 333-352.
- Jones C., Lichtenstein B. 2008. Temporary Inter-Organizational Projects: How Temporal and Social Embeddedness enhance Coordination and manage Uncertainty. In: Cropper S., Ebers M., Huxham C., Smith Ring P. editor editors. *The Oxford Handbook of Inter-Organizational Relations*. Oxford, UK: Oxford University Press; pp. 231-255.
- Lumpkin G.T., Dess G.G. 1996. Clarifying the entrepreneurial orientation construct and linking it to performance. *Academy of Management Review*, 21, 135-172.
- McMullen J.S., Shepherd D.A. 2006. Entrepreneurial action and the role of uncertainty in the theory of the entrepreneur. *Academy of Management Review*, 31, 132–152.
- Meyerson D., Weick K.E., Kramer R.M. 1996. Swift trust and temporary groups. In: Kramer R.M., Tyler T.R. editor editors. *Trust in organizations: frontiers of theory and research*. Thousand Oaks: Sage; pp. 166-195.
- Miller D., Shamsie J. 1999. Strategic responses to three kinds of uncertainty: Product line simplicity at the Hollywood film studios. *Journal of Management*, 25, 97-116.
- Milliken F.J. 1987. Three Types of Perceived Uncertainty about the Environment: State, Effect, and Response Uncertainty. *Academy of Management Review*, 12, 133-143.
- Mouri N., Sarkar M.B., Frye M. 2012. Alliance portfolios and shareholder value in post-IPO firms: The moderating roles of portfolio structure and firm-level uncertainty. *Journal of Business Venturing*, 27, 355-371.
- Patzelt H., Shepherd D.A., Deeds D., Bradley S.W. 2008. Financial slack and venture managers' decisions to seek a new alliance. *Journal of Business Venturing*, 23, 465-481.
- Ruef M. 1997. Assessing organizational fitness on a dynamic landscape: an empirical test of the relative inertia theory. *Strategic Management Journal*, 18, 837-853.
- Sarason Y., Dean T., Dillard J.F. 2006. Entrepreneurship at the nexus of individual and opportunity: A structuration view. *Journal of Business Venturing*, 21, 286– 305.
- Sarasvathy S., Dew N., Velamuri S.R., Venkatamaran S. 2003. Three views of entrepreneurial opportunity. In: Acs Z., Audretsch D. (editors). *Handbook of Entrepreneurship Research*. Dordrecht: Kluwer; pp. 141–160.
- Schwab A., Miner A.S. 2008. Learning in Hybrid-Project Systems: The Effect of Project Performance on Repeated Collaboration. *Academy of Management Journal*, 51, 1117-1149.
- Shane S., Venkatamaran S. 2000. The promise of entrepreneurship as a field of research. *Academy of Management Review*, 25, 217–226.
- Shane S. 2012. Reflections on the 2010 AMR Decade Award: Delivering on the promise of entrepreneurship as a field of research. *Academy of Management Review*, 37, 10-20.
- Simsek Z., Lubatkin M.H., Floyd S.W. 2003. Inter-Firm Networks and Entrepreneurial Behavior: A Structural Embeddedness Perspective. *Journal of Management*, 29,427-442.
- Steensma H.K., Marino L., Weaver K.M., Dickson P.H. 2000. The influence of national culture on the formation of technology alliances by entrepreneurial firms. *Academy of Management Journal*, 43, 951-973.
- Sydow J., Lindkvist L., DeFillippi R. 2004. Project-based organizations, embeddedness and repositories of knowledge: Editorial. *Organization Studies*, 25, 1475-1489.
- Thompson J.D. 1967. *Organizations in Action: Social science bases of administrative theory* (2nd ed.) New Brunswick, New Jersey: Transaction Publishers.
- Turner J.R., Ledwith A., Kelly J. Project management in small to medium-sized enterprises. *International Journal of Managing Projects in Business*, 2, 282-296.

TABLES AND FIGURES

TABLE 1
Descriptive Statistics and Pairwise Correlations^a

Variable	Mean	s.d.	Min.	Max.	VIF	1	2	3	4	5	6	7	8	9	10
1. Inter-Organizational Project Formation	0.14	0.35	0	1	-	-									
2. Firm-specific Uncertainty	0.01	1.00	-1.00	2.68	1.02	0.06	-								
3. Innovative Scope	1.04	1.03	0	3	1.17	0.18	0.05	-							
4. High-growth Strategy	0.42	0.49	0	1	1.02	0.01	-0.02	-0.02	-						
5. Dynamism	2.95	1.70	0.98	6.43	1.14	0.04	0.03	-0.10	-0.01	-					
6. Concentration	4.89	6.31	0.51	22.4	2.53	0.00	0.03	0.06	-0.03	-0.31	-				
7. Munificence	16.53	9.21	-0.80	30.30	2.44	0.07	-0.01	-0.04	0.02	0.26	-0.75	-			
8. Firm Size ^b	1.89	1.36	0.00	4.79	1.62	0.14	0.11	0.34	-0.11	0.02	0.08	-0.09	-		
9. Financial Resources ^b	11.44	1.18	6.30	17.00	1.17	0.06	0.05	0.10	-0.08	-0.12	0.12	-0.16	0.19	-	
10. Subsidiary Status	0.16	0.37	0	1	1.12	0.04	0.05	0.17	0.00	-0.04	0.07	-0.06	0.31	0.12	-
11. Legal Form	0.45	0.50	0	1	1.59	0.12	0.08	0.24	-0.12	-0.06	0.17	-0.07	0.49	0.31	0.17

^a n = 1725 organizations. Correlations greater than |.05| are significant at $p < .05$ and correlations greater than |.07| are significant at $p < .01$.

^b Log-transformed

TABLE 2
Logistic Regression Model of
Inter-Organizational Project Formation^{abc}

Variable	Model 1		Model 2		Model 3		Model 4	
Firm level variables								
Firm-specific Uncertainty			0.013 [†]	(0.008)			0.011	(0.008)
Innovative Scope			0.046 ^{***}	(0.007)			0.048 ^{***}	(0.008)
High-growth Strategy ^d			0.021	(0.016)			0.021	(0.016)
Industry-level variables								
Dynamism					0.008	(0.005)	0.011 [*]	(0.005)
Concentration					0.007 ^{***}	(0.002)	0.007 ^{***}	(0.002)
Munificence					0.007 ^{***}	(0.001)	0.006 ^{***}	(0.001)
Control variables								
Firm Size	0.026 ^{***}	(0.007)	0.016 [*]	(0.008)	0.029 ^{***}	(0.007)	0.019 ^{**}	(0.007)
Financial Resources	0.008	(0.007)	0.008	(0.006)	0.015 [†]	(0.007)	0.015 [*]	(0.007)
Subsidiary Status ^d	-0.006	(0.021)	-0.016	(0.019)	-0.007	(0.023)	-0.016	(0.022)
Legal Form ^d	0.037 [†]	(0.019)	0.029	(0.018)	0.025	(0.019)	0.018	(0.019)
Constant	-3.262 ^{***}	(0.647)	-3.610 ^{***}	(0.664)	-5.444 ^{***}	(0.665)	-5.957 ^{***}	(0.748)
Log-likelihood	-674.69		-655.72		-661.92		-642.17	
ΔLog-likelihood	-		18.97		12.77		32.52	
χ ² ΔLog-likelihood	-		37.94 ^{***}		25.53 ^{***}		65.04 ^{***}	
AIC	1359.38		1327.44		1337.84		1306.34	
BIC	1386.65		1371.06		1376.02		1366.33	

n = 1725

^a Robust standard errors in parentheses

^b Models 3 and 4 introduce variables on the industry level, and are estimated with robust standard errors clustered on the industry level

^c Coefficients represent the average marginal effect of the variable across all observed values for the other variables in the model. For dummy variables, the effects of discrete changes from 0 to 1 are reported.

^d Dummy variable

Two-tailed tests:

† $p < .10$

* $p < .05$

** $p < .01$

*** $p < .001$

FIGURE 1a-1d. Effects of Statistically Significant Variables on IOP Formation by SMEs

Fig. 1a: Effect of Innovative Scope on IOP formation

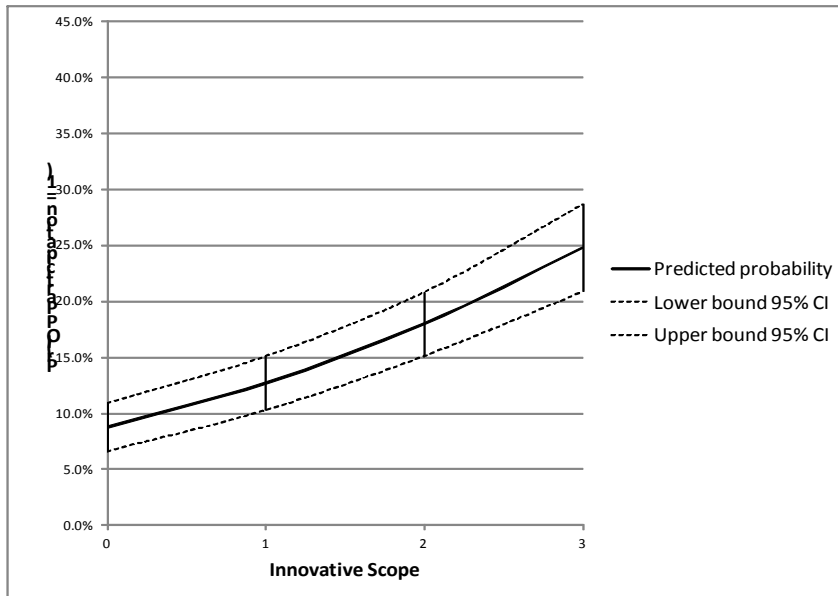


Fig. 1b: Effect of Dynamism on IOP formation

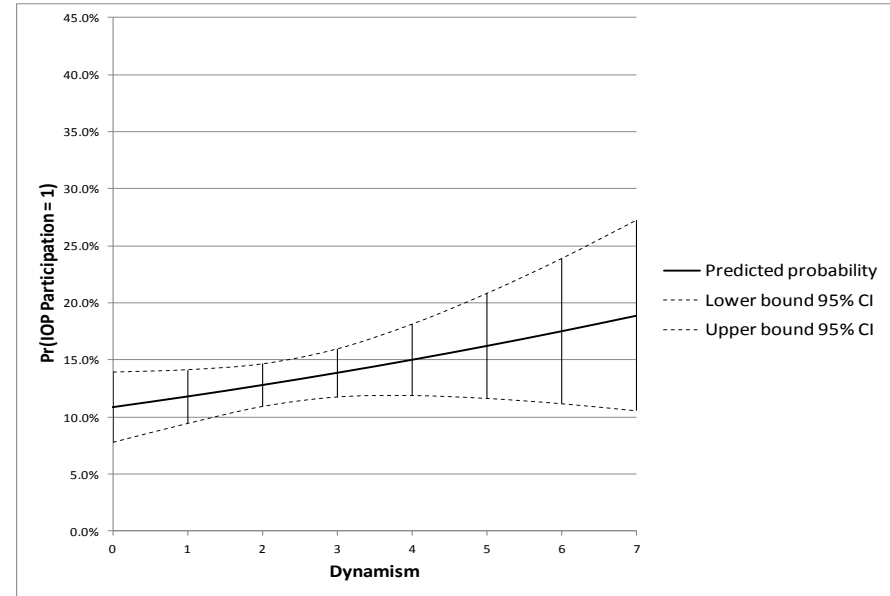


Fig. 1c: Effect of Concentration on IOP formation

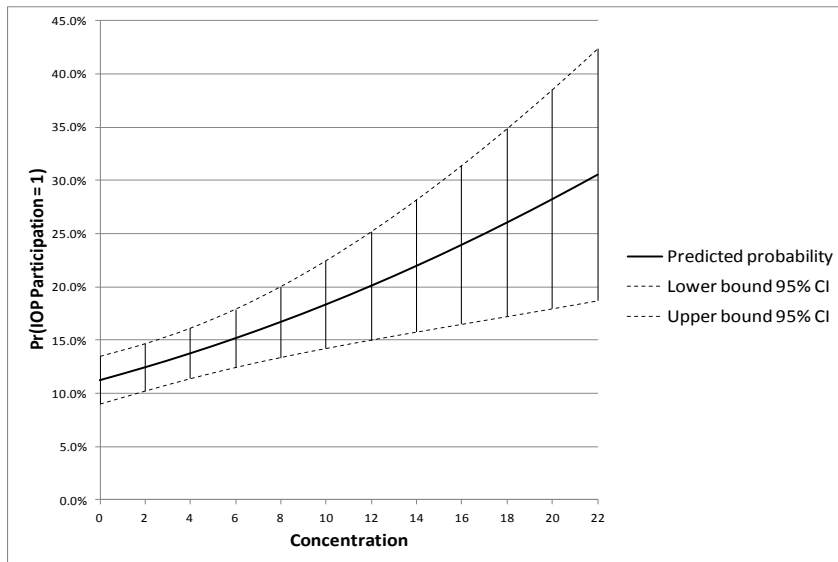


Fig. 1d: Effects of Munificence on IOP formation

