

International Alliance Formation: Firm Experience and Firm age, do they matter?

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Abstract

For SMEs, forming international alliances is a way to internationalize their activities to maintain or to increase their competitiveness. But what factors contribute to the probability of SMEs to form an international alliance? Based on the analysis of a longitudinal event history of French biotechnology enterprises, the results of this study demonstrate that the firm's prior experience with international alliance is a strong factor of international alliance formation. Our results show that the phenomenon of "Born Global" may be explained by the management team's international experience.

Key words: International alliance Experience SME Biotechnology

Introduction

An international alliance is a collaborative relationship between a local entity and an overseas counterpart encompassing agreements to co-operate in joint activities such as research or development in technology innovation (Saffu and Mamman, 2000). Results of prior research show that the internationalization of the firm through alliances can be explained by contextual factors such as the firm location (Al-Laham and Souitaris, 2007; Coombs and Deeds, 2000). Location-specific technologies can attract foreign partners and contribute to international alliance formation (Coombs et al., 2006). International alliances can also convey the firms' capabilities and intentionality and can be viewed as a strategic choice (Glaister, 1996). Researchers in the entrepreneurship and management fields who have devoted their attention to the phenomenon of the internationalisation of small and medium size enterprises (SMEs) are many (Al-Laham and Souitaris, 2007; Bloodgood et al., 1996; Covellio, 2006; Gassmann et Keup, 2007; Jones, 2001; Jones and Coviello, 2005; Karagozoglu and Lindell, 1998; Pangarkar, 2008; Ruzzier, et al., 2007; Zhou et al., 2007). Empirical evidence demonstrates that internationalisation increases the firm's profitability and continuity over time, while contributing to its growth (Durand et al., 2008; Lu and Beamish, 2001; Oviatt and McDougall, 1997; Pangarkar, 2008). Then, for SMEs wishing to internationalize their activities, what are the factors contributing to the probability to form an international alliance? Several researchers have stressed the important role of learning for alliance formation (Lee and Park, 2008; Reuber and Fisher, 1997). According to Gulati (1995), previous alliance experience favour alliance formation. In addition, according to Ruzzier et al. (2007), the international experience of the firm may conduct to the firm's internationalisation. Hence, experience seems an important factor explaining the formation of international alliances. In order to investigate further the role of experience in international alliance formation, a research had been conducted. More specifically, three dimensions of experience were

examined : i) the manager's international experience, (management team), ii) the firm's experience with local alliance and, iii) the firm's experience with international alliance to determine which dimension (s) of experience favours the success of international alliance formation.

The aim of this paper is to present the results of a study examining a sample of French biotechnology SMEs based on an analysis of secondary data. The paper is structured as follow: in the first section of this paper, the theoretical foundations supporting our hypothesis are exposed. The research method is explained in the second section. Results of the study are presented in the third section. Finally, the paper concludes with a discussion of the results and suggestion for future research.

Theoretical background and Hypotheses

It is a well-known fact that experience plays an important role in the firms' internationalisation process (Lopez-Duarte and Garcia-Canal, 2004). In this study, two levels of experience are of concern: the firm' experience and the managers' experience. It is argued that in the context of international alliance formation, the firm's international alliance experience, the firm's local alliance experience and the managers' international experience may play an important role in the formation of international alliance.

Managers' international experience

The international experience of managers is characterized as a critical resource for firms wanting to compete internationally (Adler, 1997; Gregersen et al., 1998). Results of several studies based on *upper-echelons theory* have shown that, in large companies, the international experience of the managers and of the top management team (TMT) is closely linked to the firm's internationalisation capabilities (Carpenter et al. 2003; Carpenter and Fredrickson, 2001; Hermann and Datta, 2005; Lee and Park, 2008; Sambharya, 1996). By analysing a sample of small high-technology firms, Jones (2001) found that characteristics of the founder,

such as foreign language ability, overseas work experience, and overseas education, predispose a firm to make contact with individuals and organisations in foreign countries. By studying Canadian SMEs, Reuber and Fisher (1997) show that the international experience of a management teams fosters the internationalization of a firm. Individuals acquire and build their international experience through education or through professional work in foreign environments (Carpenter et al., 2001). The international experience of the management team constitute a competitive advantage (Magnusson and Boggs, 2006; Carpenter et al. 2000). According to the resource-based view (RBV), the international experience of managers and entrepreneurs is a resource non-imitable and non- substitutable, therefore adding value to their firm (Ruzzier et al., 2007; Bloodgood et al., 1996; Carpenter et al., 2001). The international experience of the manager contributes to a more effective management of the development, coordination and control activities of international operations. Moreover, international experience allows managers to create an international network of personal relationships (Athanassiou. and Roth, 2006; Carpenter et al., 2001; Hermann and Datta, 2005), which may enhance future inter-organization relationships. Gunz and Jalland (1996) suggest that managers with a well-developed international experience perceive their environment more accurately and are more internationally oriented. Taken together, the arguments above suggest that the likelihood to contract an alliance with a foreign partner increased with the international experience of the individual manager and of the management team. Therefore the following hypothesis is proposed:

H1a: The greater the international experience of the management team, the greater the probability of the firm's internationalization through the formation of international alliance.

Next, the interdependence of firm age and managers' international experience is explored by specifying the conditions that may lead to the higher likelihood of forming an international

alliance. Our central argument is that both firm age and managers' international experience may affect international alliance formation. Most authors in the literature on strategic and organizational change seem to agree that older firms are more inert than younger firms (Hannan and Freeman, 1989). As firms age, the amount of routines, programs and structures increase becoming more internally consistent (Boeker, 1997). More mature firms with well established organizational routines can develop "core rigidity" becoming more adverse to change and novel situations. Contrary to older and more mature firms, Huergo and Jaumandreu (2004) show that more flexible younger firms tend to present a higher probability to innovate. We argue that the managers' international experience may be more influential in younger firms and less influential in more mature firms. Therefore, we suggest that firm age can potentially modify the positive effect of the managers' international experience on the internationalization process of the firm.

In other words, firm age and managers' international experience may have a negative collective effect on the likelihood of international alliance formation. Consequently we propose:

H1b : Firm age moderates the relationship between managers' international experience and the formation of international alliance.

Firm's experience with local alliance

International alliances bring new challenges not found within local alliances (Sirmon and Lane, 2004). International alliances are riskier than local alliances, given the cultural differences between partners (Barkema and Vermeulen, 1997; Sirmon and Lane, 2004). International alliances are very complex to manage successfully, in part due to the difficulty in matching the different goals and expectations of autonomous organizations, located in two or more countries (Nielsen, 2007). Because of inherent international alliance management difficulties, we expect firms more experienced with local alliances to enter more frequently

into international alliances than inexperienced firm. Indeed, the accumulated partnering experience of a firm is an important predictor of value creation in new alliances (Anand and Khanna, 2000). Such experience contributes to a firm's relational capability (Dyer and Singh, 1998) and contributes to the development of alliance management routines that assist in partner selection, the choice of appropriate governance mechanisms, and the effective management of alliances (Kale and Singh, 1999; Gulati, Lavie and Singh 2009).

Taken together, the arguments above suggest our second hypothesis:

H2: The greater the firm's experience with local alliance, the greater the probability of the firm's internationalization through the formation of international alliance.

Firm's experience with international alliance

Cultural differences which characterise international alliances accentuate risks and the costs incurred to reduce them. International alliance management is thus a difficult organizational activity given the high levels of complexity of collaborative projects and uncertainties of international projects outcome. Hence, some authors suggest that learning how to manage alliances may favour their success (Doz, 1996; Khanna et al, 1998). The literature on behavioural decision theory identifies several bias or anchors in managerial decision-making closely related to management experience. Managers often make initial judgements based on past situations without evaluating if these judgements are appropriate to the novel situation (Kahneman and Tversky, 1979). Consequently, managers often adopt suboptimal strategies in managing alliances when they remain anchored to old models pertaining to their past experience (Khanna et al., 1998). Therefore, firms build alliance management capabilities through the managers cumulative experience with strategic alliances over time (Rothaermel and Deeds, 2006). Kale and Singh (1999) argue that firms develop their capabilities from incremental learning and adaptation, adjusting their organizational day-to-day activities to novel situations when needed. Learning of international alliance management thus occurs

through experience and actions which fit to situations. However, to make appropriate decisions, managers need to change their cognitive schemas stemming from past decisions. These suggestions are confirmed by studies showing the effects of experience on alliance success (Chang et al., 2008). Lane and Beamish (1990) stress the effects of parent-firms international experience on international joint-venture performance. Chang et al. (2008) demonstrate that the joint effect of intellectual capital and experience has a positive impact on the value creation of international strategic alliances. Therefore, as firms accumulate experience; their increasing abilities to anticipate and respond to contingencies are likely to enhance the chances of success in subsequent alliances (Anand and Khanna, 2000). The economic approach of the firm suggests that firms consider the co-development of project only if the expected benefits exceed the transaction costs (Teece, 1986). Consequently, the more the international alliance outcome may be perceived as a success, the more the firm is likely to contract international alliances. Given that firms' international alliance experience increases international alliance success, the discussion above leads to our third hypothesis:

H3: The greater the firm's international alliance experience, the greater the probability of the firm internationalizing through an international alliance.

Research Methods

Sample and data

The sample in the study consists of 47 French biotechnology firms. Data are extracted from the *BioScan* Directory database (from 2004 to 2007). Researchers have used *BioScan* extensively in earlier research mostly for the study of US firms (e.g. Rothaermel, 2002). In order to test the hypotheses, we employ an event history technique, which takes into account both the occurrence and timing of events (Allison, 1984). We use Cox's maximum-likelihood proportional hazard model (Cox, 1972), which has been widely used for event history analysis, including the analysis of alliance formation (Eisenhardt and Schoonhoven, 1996).

The dependent variable in a hazard model is a hazard rate that denotes a likelihood of a firm to form an international alliance at each time period. Its value for firm i in year t , denoted by $h_i(t)$, is given as:

$$h_i(t, xt) = h_0(t) \exp \left[\sum_{j=1}^{13} \beta_j x_{ij} \right]$$

where $h_0(t)$ is the baseline hazard function and $x_1 \dots x_{13}$ are the explanatory variables for firm i in year t .

We sought to develop a model of the factors that potentially influence international alliance formation, but we also wanted to control for relevant contingencies. Hence, control variables are also introduced. Table 1 presents a description of the independent variables (principal variables and control variables).

Alliances between SMEs were used to test our hypotheses. Therefore, a foreign firm is defined as an SME headquartered outside the country of France

Table 1. Description of the independent variables

Variable	Comments	Measure
Main variables		
Team international Experience	This measure is from the work of Matta and Beamish (2008). Data had been collected from the Web pages in the « Management » section where the managers resume are presented (Dimov and Shepherd, 2005).	Percentage (%) of managers (1) with work experience outside France or (2) with a Phd degree obtained outside of France or with post-doctoral experiences outside France or (3) who had previous a management position in an international division of a firm.
Firm's international experience Mgt with SME		A cumulative count of the firm's international alliances at year t
Firm's local alliance experience Mgt with SMEs		A cumulative count of the firm's local alliances with French SMEs at year t .
Control variables		
Ownership	It has been shown that public ownership has a positive influence on the capacity of firms to attract alliance partners (Rothaermel, 2002).	Dummy variable: Private= 1/Public firms =0.
Foreign Subsidiaries	Foreign subsidiaries may favour internationalisation by forming international alliance	Dummy variable: 1=yes 0= No
Products in development	Baum et al. (2000) show that the greater the start-up's new product development, the higher its attractiveness as an alliance partner	Number of new products at year t . The number of products in development are yearly products present in the pipeline in the pre-clinical stage and clinical phases I, II and III. Data on products in the pipeline is not available for years prior to 2004, For these years, the number of products in development has to be estimated (the average annual rate of growth (2004-2007) minus the yearly number of products in development in from the year the firm was created until 2004. For years previous to 2004 the formula is: Nb.of products in the development phase $t-1$ = The total Nb.of products in the development phase $t - x_D\%$ x Nb. de produits in development
Firm age	Previous research has shown how and why age and size affect start-up internationalisation (Knight and Cavusgil. 1996)	Number of years since founding at t .
Firm size	Although we have only analyzed SMESs, we used employees (the number of employees in firm) as a control variable given the potential organizational differences between firms with 50 employees and those composed of one or two individuals.	Log of the number of employees at year t

Results

In the sample, fifty seven percent of the firms (57%) have contracted at least one alliance. From them, a little more than thirty three percent (33.3 %) have at least contracted one international alliance. Descriptive statistics of the variables and correlations are presented in Table 2. Seventy two events are analyzed to test the hypotheses.

Table 2. Summary Statistics and Correlations among Continuous Variables in the Models

	Mean	s.d	1	2	3	4	5	6	7
1 Management Team's international experience	.287	.34							
2 Firm's international alliance experience	.11	.48	.310**						
3 Firm's local alliance experience with SME	.17	.44	.213	.529**					
4 Foreign subsidiary	.33	.47	.125	-.006	.109				
5 New product development	2.24	2.84	.339**	-.008	.157	-.126			
6 Ownership	.87	.34	-.011	.030	-.173	.123	.120		
7 Firm age	9.04	6.93	-.311**	-.073	.122	-.165	-.114	-.073	
8 Firm size	1.38	.45	-.002	.135	.436**	-.035	-.002	-.027	.402**

□ p < 0.05. □□ p < 0.01
Year = 2007.

In Table 3 are presented the results of the event history analyses. Column 1 shows the estimation results with the base model. Models 2, 3 and 4 separately test the main variables. Model 5 is the full model. Our results provide support for hypothesis *H1a*, indicating that the likelihood of a particular firm to form an international alliance depends on the international experience of the management team (model 5. $\beta = 2.180$; $p < .07$). According to Baron and Kenny (1986), moderation focuses on the *joint* effects of two factors on the dependent variable. Consequently, Model 6 introduces the interaction effect (Aiken and West, 1991). To deal with the possible multicollinearity between the interactions term and their components, first, we mean-centered the variables constituting the interaction term. Then, the interaction terms were created by multiplying the relevant mean-centered scales (Aiken and West, 1991). Consistent with our prediction, the interaction term is negatively associated with international alliance formation ($\beta = -.252$, $p < .06$), providing support to *H1b*.

To investigate the interaction effect of firm age and the managers' international experience, we conducted simple slope tests following the procedure proposed by Aiken and West (1991) for decomposing the interactive term. The test requires that we split the variable firm age into two groups: young firms (one standard deviation below the mean) and old firms (one standard deviation above the mean). We then estimate the effect of managers' international experience on the likelihood of international alliance formation. Figure 2 indicates that when a firm is young, managers' international experience has a positive impact on the probability to contract an international alliance ($\beta = .679$, $p < .039$) contrary to a mature firm ($\beta = .277$, n.s.).

Hypothesis H2 examines the effect of local alliance experience on the probability to contract an international alliance. The results show that the firm's local alliance experience does not influence international alliance formation. (Model 5. $\beta = .449$. n.s.). Hypothesis *H2* is not supported. However, our results support hypothesis *H3*. International alliance experience increases the probability to contract an international alliance (Model 5, $\beta = .659$. $p < .01$). Among control variable, only "firm age" and "ownership" are significant. Firm age and ownership have a negative effect on the likelihood of international alliance formation.

Discussion and conclusion

The purpose of this study was to determine the extent to which experience was associated with international alliance formation. Our results show that international experience (firm's international alliance experience and management team's international experience) plays an important role in international alliance formation. These results support several works (Al-Laham and Souitaris. 2008; Reuber and Fisher. 1997; Ruzzier et al.. 2007). The international experience of the firm increases the managers' international experience providing them with the opportunity to acquire tacit knowledge from individuals of the foreign firm which favour the success of internationalization (Athanassiou and Nigh. 2000). In addition, our results show that the management team's initial international experience also favour the formation of

international alliance. Hence, managers often use their social network to facilitate the firm's internationalization (Zhou et al. 2007) and create opportunities for internationalization (Covellio. 2006; Zhou et al., 2007). This phenomenon is particularly true for young firms. The probability of a young firm to contract an international alliance is higher than for older firms. The phenomenon of "Born Global" has been highlighted in many articles concerning the internationalization processes of firms (Knight and Cavusgil. 1996). By analyzing small firms, Welch and Luostarinen (1988) show that small firms have unexpectedly fast foreign direct investments. Brush (1992) found that small US manufacturers often start international activities during the first year of operation. One of the contributions of this paper is to show that the internationalisation of young firm may be explained by the international experience of the management team.

While the study makes contributions to the international alliance literature, several potential limitations should be noted. More research is needed on international alliance formation analysing samples from others countries to examine the potential limitations of the research and how our results can be generalized from the specific French biotechnology context. Our intent is to extend this research in the future. Nevertheless, this study opens up many avenues for future investigations relative to the international experience of management teams. For instance, analyzing 54 US biotechnology enterprises, Coombs and Deeds (2000) do not find any link between international experience and international alliance formation. Bloodgood et al. (1996) suggest that professional experience may be more relevant in explaining internationalization than personal experiences. Our results suggest that these differences may be explained by the firm age effect.

Table 3 Proportional hazard modeling of international alliance formation

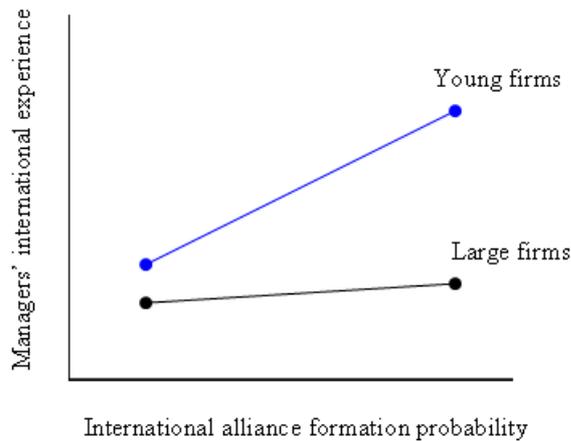
Variables	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
<i>Control variables</i>												
Foreign subsidiary	.621	(.495)	.768	(.511)	.541	(.597)	1.090	(.562)	1.127	(.778)	.828	(.519)
New product development	-.115	(.099)	-.181†	(.109)	-.154	(.117)	-.131	(.108)	-.190	(.117)	-.154	(.103)
Ownership	-1.246	(.827)	-1.272†	(.819)	-1.959*	(.916)	-1.655†	(.911)	-1.865*	(.948)	-1.167†	(.615)
Firm age	-.610***	(.126)	-.593***	(.123)	-.864***	(.171)	-.738***	(.152)	-.804***	(.164)	-.118	(.063)
Firm size	-.312	(.712)	-.356	(.688)	-.412	(.841)	-.188	(.786)	-.218	(.805)	-.243	(.593)
<i>Theoretical \ variables</i>												
Management Team's international experience			1.201†	(.662)					.859†	(.480)	1.252*	(.984)
Firm's local alliance experience with SME					.239	(.518)			.449	(.450)	.034	(.407)
Firm's international alliance experience							.577***	(.153)	.659**	(.214)	.350**	(.210)
											-.487**	(.210)
-2Log likelihood	163.596		160.058		163.184		152.821		150.163		181.925	
Khi-square Score Test	19.030**		26.829***		21.325***		25.006***		29.866***		35.800***	
dl	5		6		6		6		8		9	

† p < 0.10. * p < 0.05. ** p < 0.01. *** p < 0.001

Number of events = 72.

Standard error in parentheses

Figure 1. Interaction effect decomposition



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