Interfirm Cooperation: Are The Existing Theories Relevant For Small Enterprises?

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Abstract

In the global, knowledge and technology-intensive industries, small enterprises have to collaborate with other firms in order to achieve a competitive advantage. To do so, small firms have to create unique cooperation strategies, instead of the kind of alliance capabilities that would be relevant for bigger (even medium) companies. Even though many theoretical studies on cooperation strategies in both Management and Entrepreneurship exist, only a limited number of empirical studies have been conducted. The main purpose of this empirical paper is to explore the phenomenon of interfirm cooperation in small and medium-sized enterprises (SMEs). Differences between alliance portfolio in small and medium firms are explored based on a sample of 104 Polish ICT firms and their alliance portfolios. Empirical tests confirmed the differences between small and bigger firms' cooperation strategies. Most theories related to interfirm cooperation and alliance portfolios are relevant for large and medium firms. Small enterprises forced to collaborate by changing market environments have had to create own ways of collaborating, as well as their own business models. The differences should be taken into account when analyzing firms of various sizes and characteristics.

Keywords: Interfirm Cooperation Alliance Portfolio, SME, Polish ICT Industry, Small Enterprises

Introduction

After more than a decade of research on interfirm cooperation from the perspective of networks and alliance portfolios¹, little attention has been paid to cooperation strategies performed by small firms. Even though there are various differences between smaller and larger companies, many researchers apply the same concepts/methods to all firms regardless of their characteristics (Mort & Weerawardena, 2006). Moreover, the literature often characterizes several stereotypical patterns of cooperation among firms with respect to traditional perceived alliances (strategic alliances with fixed goals, scope, resources, and formal agreements) and alliance capability (a concept that is relevant to big companies, based on the assumption that a firm has to achieve certain resources and capabilities in order to create alliances). In fact, in the case of small enterprises without strong alliance capabilities, cooperation with business partners is often necessary to build competitive advantage, sometimes from very beginning of setup. This is of particular significant in market sectors characterized by a high level of uncertainty, technology, and knowledge- intensive, global industries. Thus, small firms have to create their own unique patterns for creating, and managing of interfirm ties.

The purpose of this article is to focus on the differences between small (up to 49 employees) and bigger (50-249 employees) firms in terms of cooperation, namely alliance portfolio creation. The main assumption under which all previous studies on this topic have been conducted is that a firm's experience (namely age) in the market, as well as firm's development are positively related to the firm's alliance portfolio size (i.e., the quantity of alliances). In this study, we argue that this assumption may not be relevant for small companies,

¹ This research approach is based on egocentric networks, where the collaboration is analyzed from the perspective of a focal firm (ego) in a network of interfirm ties (relationships) (see, e.g., Rothaermel, 2001; Lavie, 2007).

and we empirically test our hypotheses. This is of particular importance for Polish firms, because over 90 percent of the Polish economy consists of very small, privately-owned enterprises. Moreover, companies employing 50-249 persons (medium-sized enterprises) are considered to be relatively large in Poland. Thus, we tested our hypotheses on small and medium-sized enterprises (SMEs), and their alliance portfolios.

In the following section, we examine extant theory and outline our hypotheses for empirical investigation. Next, we present our data and research methodology. Finally, we detail our research results and present the main conclusions from the study.

Theory and Hypotheses

Interfirm cooperation is an increasingly meaningful phenomenon in contemporary management. Contractor and Lorange (2002) observed the “explosion” in alliances, and the process has only increased since then. In recent literature, the term alliance is used to refer to a voluntary arrangement between two or more firms, which may take many different forms; from ad hoc cooperation to weak or loose informal ties to strong, formal collaborative R&D or joint ventures (Contractor & Lorange, 1988; Gulati, 1998). Moreover, firms engage in multiple alliances at the same time, creating alliance portfolios and joining alliance networks.

These phenomena have been studied from many different perspectives using various approaches. Two of the most influential recent approaches are the network approach and the alliance portfolio approach. The first of these is characterized by the application of social algorithms to investigate networks of interfirm ties (e.g., Uzzi, 1996; Powell et al., 1999; Gulati, 2007; Farina, 2009), while the second allows for a study of cooperation phenomena from the perspective of a focal firm and its partners - and, moreover, the partner’s resources (e.g., Rothaermel, 2001; Rothaermel & Deeds, 2006; Silverman & Baum, 2002; Shipilov, 2006; Lavie, 2007; Gulati, 2007). This approach allows for analysis of the impact of cooperation on firms’ performance. As a growing number of studies on the impact of alliances and network resources on firms’ effectiveness have concluded, there is no doubt that the number and quality of a firm’s alliances significantly influence its performance and its competitive advantage (e.g., Dyer & Singh, 1998; Gulati, Nohria, & Zaheer, 2000; Stuart, 2000; Gnyawali & Madhavan, 2001; Rowley et al., 2000; Zaheer & Bell, 2005; Lavie, 2007; Yamakava et al., 2011; Lee et al., 2001; Golonka & Rządca, 2013).

Nevertheless, in the literature, the cooperation phenomenon is often referred to in combination with the term alliance capabilities or relational capabilities (Dyer & Singh, 1998; Bharad & Khanna, 2000; Kale et al., 2000). This approach highlights the importance of building capabilities to create and maintain alliances. Among the most important factors in building such capabilities are previous experiences (Bharad & Khanna, 2000) and, from the resource-based view (RBV) of the firm, adequate resources (Barney, 1991), such as knowledge (Kogut & Zander, 1992). Kale et al. (2000) argue that “capabilities are developed through a process that involves the interpretation of past individual and organizational experience as a basis for present and future action” (p. 749). Researchers even suggest that developing such capabilities in order to create and manage alliances requires separate, dedicated organizational units within a company.

From most of the research studies described above, we may conclude that number of alliances that firms

create is directly related to the firm's age and development (i.e., growth). Moreover, the studies confirm "alliance capability" concept - the size of alliances' portfolio is positively associated with growth, and development of the company. However, the majority of this research has been conducted based on large or at least medium-sized companies, in which the size of the firm's alliance portfolio (i.e., the number of the firm's relationships with its partners) can be expected to be positively correlated with the firm's experiences on the market. The firms' experience is usually represented in the literature by firm's age (e.g. Lavie, 2007; Yamakava et al., 2011; Lee et al., 2001) and also sometimes with firm's development reflected in complexity of its internal organization, represented by firm's structure (Damanpour, 1991). Thus, we propose the following hypotheses:

Hypothesis 1: There is a positive association between a firm's age and the size of firm's alliance portfolio for small and medium firms (SME).

Hypothesis 2: There is a positive association between the growth of a firm's organizational structure and the size of firm's alliance portfolio for small and medium firms (SME).

Hypothesis 3: There is a positive association between the firm's size and the size of firm's alliance portfolio for small and medium firms (SME).

Similar to internationalization theories that are based on bigger companies and not as relevant to small firms (Vernon, 1966; Dunning, 2003), cooperation theories also should be verified in order to cover a wider spectrum of firms. Small firms differ significantly from large firms (Fillis, 2001; Bell et al., 2003), especially in technology and knowledge-intensive sectors (Almor and Hashai, 2004). Small enterprises have different characteristics, especially in terms of their age, the structure, and the scale of their business. Small firms face a number of barriers because of their limited resources and capabilities (e.g. Penrose, 1995), although SMEs are increasingly facing international problems similar to those faced by larger firms (Ruzzier et al., 2006).

However, the network approach has particular significance in the case of such enterprises, which are practically dependent on relationships with other companies (Osarenkhoe, 2010). Thanks to interfirm relationships, firms gain access to the network resources (i.e., resources of their partners) (Hoang & Antoncic, 2003; Gulati, 2007), and may share the risk with their partners, as well as gain access to different markets (Pittaway et al, 2004). Alliances and networks are also used by small firms from emerging markets to solve export problems (Ghauri et al., 2008) and are firms' "first choice" for internationalization (Gulati, 1998, Johanson & Mattsson, 1992). Additionally, for firms operating in technology- and knowledge-intensive global industries, it is no longer possible to operate without taking into account relationships with other firms (in order to offer more numerous and complex solutions to their customers) (Golonka, 2012), as well as the risks and opportunities created by international and global competition (Ruzzier et al., 2006). In analyses of interfirm cooperation, small firms were previously considered passive victims, but recent successes of small companies - especially born globals (McDougall et al., 1994)- have shown that their role is increasingly crucial in contributing to firm's future growth (Gjellerup, 2000, Ruzzier et al., 2006). Interestingly, all previous studies on alliance portfolios were conducted on the basis of big companies, with the assumption that certain alliance capa-

bilities, experience, and internal organization were necessary to create and manage alliances. Taking into account the distinct nature of small firms that have to find their own ways to develop a business, it is crucial to note that they also have to create unique ways of collaborating. Thus, the phenomena that are obvious in the case of bigger firms are not necessarily relevant to small enterprises. Therefore, we hypothesize that in the case of small firms, the basic assumptions used in analyzing bigger companies are not necessary relevant. Firm's size moderates the relationship between the firm's age/ firm's structure and alliance portfolio size:

Hypothesis 4: There is a positive correlation between a firm's age and the size of firm's alliance portfolio for medium-sized enterprises (but there's no such correlation for small firms).

Hypothesis 5: There is a positive correlation between a firm's structure and the size of firm's alliance portfolio for medium-sized enterprises (but there's no such correlation for small firms).

Data and Methodology

Sample

After conducting exploratory fieldwork to develop the theoretical background for this study, we collected data to test our hypotheses. Taking into account that creating alliances is generally considered a crucial strategy for firms in technology and knowledge-intensive global sectors (Kale et al., 2000) we focused on the industry that falls the most suitably in this category - the information and communication technologies industry (ICT Industry) (Gieryszewska & Romanowska, 2003).

This industry consists of firms that are highly IT and communication-oriented, in which a growing number of alliances, mergers, and acquisitions have been observed in recent years (Gulati, 2007). We identified Polish ICT firms based on EKD identification number (European Classification of Activity). We focused on small and medium-sized enterprises (SME), defining a small enterprise as a firm employing 10-49 persons and a medium-sized enterprise as a firm employing 50-249. The latter are considered relatively large in Poland. For randomly selected companies in this set, we first collected contact information for the top managers that may participate in creating firm's strategy. We used telephone interviews to collect data, and ultimately we received 104 complete usable responses. In this sample, 50 firms are medium-sized and 54 are small enterprises.

Variables

The size of a firm's alliance portfolio represents its number of ties (Nohira, 1992). For the purposes of the present research, this dependent variable was operationalized as the total number of alliances in a firm's alliance portfolio. Then, following Lavie (2007), we adjusted the Portfolio size variable by taking the logarithm of the number of alliances. Firm age was operationalized as the number of years since the incorporation of each company. Since the formal organizational structure is primarily reflected in the organizational chart (Harrington, 1991) - and, according to Damanpour (1991), the hierarchical level of a firm's organizational

structure refers to the number of levels in the firm's hierarchy below the chief executive level - we used variable Firm structure as the number of hierarchy levels in each company, calculating levels below the chief executive to the lowest level of the firm's hierarchy.

Analysis

To test our hypotheses, we used Spearman's correlation analysis for pairwise comparisons of nontransformed variables², as well as the regression models (in which the logarithm of the number of alliances was included). The models were tested using Ordinary Least Squares (OLS) regression analysis.

Research results

We report descriptive statistics in Table 1 and our findings in Table 2 and 3. In order to test hypotheses, we included 5 models in the analysis, gradually incorporating all the variables as well as the interactions among them.

As can be observed in Model 1, with small and medium-sized enterprises analyzed together, firms age is significantly positively associated with portfolio size ($\beta = 0.308$; $p < 0.01$). This result confirms Hypothesis 1. There is a positive association between a firm's age and the size of firm's alliance portfolio for small and medium firms analyzed all together (SME).

In the second model, firm structure is entered as an independent variable. It is worth mentioning that using the firm's structure in a model results in decreasing the observed influence of the firm's age and increasing the explained variance from less than 10% to almost 30%, which suggests that the complexity of a firm's organizational structure should be perceived as an important indicator of that firm's alliance portfolio size. The relationship between this variable and the firm's portfolio size ($\beta = 0.449$; $p < 0.01$) indicates that changes in alliance portfolios' size are related to organizational growth. This result confirms Hypothesis 2. There is also a positive association between the growth of a firm's organizational structure and the size of firm's alliance portfolio for small and medium firms (SME).

Firm's size is not statistically significantly associated with firm's alliance portfolio, as shown in the results of Model 3 below. Thus, Hypothesis 3 has not been supported. There is no significant association between the firm's size and the size of firm's alliance portfolio for small and medium firms (SME).

To test Hypothesis 4 and 5, the interaction variables were calculated³ and entered into the analysis (see models 4 and 5). Results show that the interaction between firm's structure and firm's size significantly affects firm's alliance portfolio ($\beta = 0.295$; $p < 0.01$ in both Model 4 and Model 5). Figure 1 illustrates this effect. Interactions between firm's age and firm's size as well as between firm's age and firm's structure, and firm's age, firm's structure and firm's size all together are not associated with size of firm's alliance portfolio; nevertheless, each of the last two models explains almost 40% of firm's alliance portfolio size.

² Considering the highly positively skewed distribution of the portfolio size variable and presence of outliers, it was better to use non-parametric test - less sensitive to outliers than Pearson's r.

³ Interactions were calculated as the product of variable: *firm size* (coded 1 for medium-sized enterprises and -1 for small enterprises) and firm's age and *firm's structure* centered by their means.

Table 1 Groups' characteristics - descriptive statistics (mean, median and standard deviation)

	Small enterprises (n = 54)			Medium-sized enterprises (n = 50)		
	M	Me	SD	M	Me	SD
Portfolio size	14.04	8	13.24	27.12	15	29.53
Firm age	11.28	9	6.11	12.6	11.5	7.28
Firm structure	2.93	3	0.67	3.48	3	0.68

Table 2 OLS regression analysis results.

Dependent variable: Portfolio size log	MODEL 1	MODEL 2	MODEL 3	MODEL 4	MODEL 5
Firm age	0.308** (0.013)	0.186* (0.012)	0.184* (0.012)	0.077 (0.013)	0.083 (0.016)
Firm structure	—	0.449** (0.111)	0.418* (0.120)	0.432* (0.120)	0.433 (0.013)
Firm size (dummy) (Medium-sized entr.- 1)	—	—	0.081 (0.169)	0.085 (0.169)	0.086* (0.171)
Firm structure*Firm size	—	—	—	0.295** (0.122)	0.295** (0.122)
Firm age*Firm size	—	—	—	0.064 (0.015)	0.066 (0.016)
Firm age*Firm structure	—	—	—	0.008 (0.020)	0.009 (0.020)
Firm age*Firm structure *Firm size	—	—	—	—	-0.010 (0.020)
R ²	0.095	0.281	0.287	0.379	0.379
Adjusted R ²	0.086	0.267	0.265	0.340	0.333

** $p < 0.01$; standard errors in parentheses.

N=104 (50 medium-sized firms, 54 small firms).

Note: The standardized regression coefficients, β , have been presented in the table; standard errors in brackets.

As can be clearly seen in Figure 1 and Table 3, firm's alliance portfolio moderates the relationship between firm's basic characteristics (especially firm's structure) and the firms' alliance portfolio size is strongly positively related to firm's structure only for medium-sized enterprises - the more hierarchical levels in an organizational structure, the bigger the portfolio size of medium-sized firm. For small companies no such relationship can be observed, so Hypothesis 5 is confirmed. Correlations presented in Table 3 also partially supports Hypothesis 4. However the relationship between firm's age and portfolio size is almost unnoticeable and statistically insignificant not only for small enterprises, but also for the whole population of ICT SME,

Table 3 Correlations matrix (Spearman's rho)

	Small firms (10-49 employees)			Medium-sized firms (50-249 employees)		
	PS	FA	FS	PS	FA	FS
Portfolio size	1.000	-0.095	0.082	1.000	0.379**	0.765**
Firm age	–	1.000	-0.006	–	1.000	0.516**
Firm structure	–	–	1.000	–	–	1.000

PS: Portfolio Size, FA: Firm Age, FS: Firm Structure

**Significant at 0.01 level *Significant at 0.05 level.

The relationship between firm structure and portfolio size in small and bigger firms

Fig. 1 Portfolio size and firms' structure for small and medium firms separately.

when controlling for interactions (see Table 2).

Conclusions

The main aim of the study was to highlight the importance of differences in interfirm cooperation patterns between small and bigger (in this case, medium-sized) firms. The majority of previous studies have been conducted under the assumption that cooperation theories, especially those related to the alliance portfolios research approach, are relevant for all companies regardless of their size. Consistent with this assumption, it is also assumed that the age and growth of a firm is associated with the number of alliances it creates by the firm. However, it is worth mentioning that most existing theories have been created with large organizations in mind. Small enterprises have to create their own ways of competing and collaborating. The findings of this

empirical study demonstrate that one of the most seemingly obvious assumptions related to the association of organizations' size and growth with their alliance capability might actually be a significant barrier to the analysis of small enterprises.

In the case of small firms, a firm's age and firm's structure are not associated with its alliance portfolio size (i.e., the number of business partnerships, or alliances, it creates. However, such an association does exist in the case of medium-sized companies (Figure 1). This study offers empirical evidence that collaborating patterns are not necessarily relevant for small enterprises. Small firms are typical for the Polish economy, wherein over 90 percent of companies are small or even micro-size enterprises. The results are consistent with several previous studies on internationalization patterns of small and bigger companies (e.g. Dunning, 2003; Almor & Hashai, 2004). Similarly to internationalization methods, small enterprises have had to create unique ways of collaborating with other companies. Generalizing from the findings of this research, the main theories on alliance creation (e.g., alliance capability) do not seem to be relevant to small firms. Nevertheless, this argument should be scrutinized by future research that may deepen the analysis using qualitative methods. Careful analysis of interfirm cooperation patterns of small enterprises should aid in understanding the differences and the uniqueness of small firms. It appears to be crucial to take into consideration special conditions that are not necessarily similar in the case of small versus larger firms. Moreover, the theories created for big companies sometimes may be not applicable while studying small enterprises. Small firms demand "customized" tools and methods.

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