Industry, Enterprise, and Behavioral Predictors For Inter-firm Cooperation In Small And Medium-sized Enterprises

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Robert Hartl
DePaul University & University of St. Gallen
Chicago, Illinois

INDUSTRY, ENTERPRISE, AND BEHAVIORAL PREDICTORS FOR INTER-FIRM COOPERATION IN SMALL AND MEDIUM-SIZED ENTERPRISES

Robert Hartl
DePaul University & University of St. Gallen

Department of Management, DePaul University, 1 East Jackson Boulevard, Chicago, IL-60604
Email: rhartl@depaul.edu / robert.hartl@unisg.ch, Phone: 1 312 362 8353, Fax: 1 312 362 6973

ABSTRACT

Often the cooperation behavior of enterprises is described as a rational, conscious, and planned process. If so, a model should be able to identify distinguishing features that have a significant impact on the propensity for inter-firm cooperation. The proposed model analyzes the influence of the firm's, the entrepreneur's, and the industry-specific characteristics on the cooperation behavior via a single model that can be used to explain different kinds of cooperation. In this context, the model utilizes five year panel data to identify significant differences with regard to the place of cooperation and the origin of cooperation partners.

1. INTRODUCTION

For more than 20 years inter-firm cooperation has been discussed as a corporate strategy, but it has become more important in recent years. Particularly, cooperating with other firms provides many advantages, especially access to scarce resources like new technologies, products, skills, and know-how that will not be otherwise available, the possibility of risk sharing, and the pooling of complementary capabilities (Narayanan, 2000; Silverman & Baum, 2002). In addition, the field of research itself is of significant interest to both owners of small and medium-sized enterprises (SMEs) and researchers. Several aspects have been discussed in recent research (e.g., Lawrence et al., 2002; Reeves et al., 2002; Schilling, 2002; Silverman & Baum, 2002).

In this context, cooperation means that at least two legally and economically independent firms work together in one or more fields of interest to benefit from the advantages previously mentioned. The objective is mostly to become more effective and more competitive.

SMEs especially can benefit from inter-firm cooperation. Because of a lack of resources, they are often too small to compete successfully with their larger competitors. When working together with other enterprises, SMEs can benefit from economies of scale and economies of scope and thus can overcome their disadvantage of smallness. In addition, the firms stay independent and small and have a large advantage with respect to flexibility and competitiveness (Masurel & Janszen, 1998).

Currently, global strategies are mostly discussed only for large firms. In most cases such strategies cannot be adopted by SMEs because of different preconditions. Entrepreneurs may be forced to the conclusion that a SME is not only a smaller type of large firm. However, different strategies can be promising for a SME and a large firm acting in the same industry. Further, most of the empirical research dealing with internationalization and cooperation behavior uses only cross-sectional analyses. In addition, country- and industry-specific differences are rarely examined, mostly because of lack of data. However, this article focuses on identifying variables that have a significant influence on cooperation behavior of SMEs by using longitudinal and panel analysis with Interstratos[1] data.

2. LITERATURE REVIEW

The goal of this article is to identify circumstances that lead enterprises to cooperate with other firms. Much research has already been done in this field; three important approaches have been identified. First, there are authors who assume that structural characteristics of an enterprise have a significant influence on cooperation behavior. Second, authors argue that the personal characteristics of the entrepreneur have an effect on whether an enterprise will participate in inter-firm cooperation. Third, not only the characteristics inside the firm but also industry-specific characteristics are proposed to influence the propensity for cooperation.

Structural characteristics of the enterprise

With respect to the characteristics of an enterprise, authors concentrate on different influencing factors. Often it is argued that the size of an enterprise is predictive of the propensity for inter-firm cooperation. Caves (1996) sees reasons as high fixed costs and the time-consuming negotiations when a firm acts in a foreign environment. It is easier for large firms to generate needed resources, especially cash. Keeble et al. (1998) point out that internationally oriented enterprises differ significantly in size from nationally-oriented ones. Whereas most authors look at the absolute size of an enterprise, for Gomes-Cassares (1997) only the relative size in comparison with competitors influences cooperation behavior. Thus, SMEs that are acting in niches or as technological leaders will more often decline to cooperate with other firms, whereas large firms with low market share or lack of technological know-how may achieve economies of scale and economies of scope through inter-firm cooperation. SMEs can be dominant in their sector, but large firms can be small in comparison with their competitors.

Personal characteristics of the entrepreneur

More than 25 years ago Schermerhorn (1975, 853) predicted that research about "decision maker attitudes and predispositions toward cooperation" would become relevant. Froehlich and Pichler (1998) define different entrepreneurial types according to their attitudes. For investigating influences on cooperation behavior the authors focus on two types, the "pioneer", who likes taking risks and is also open to change and the "organizer", who has administrative-executive skills. The authors show that the pioneer is more inclined to inter-firm cooperation, especially to cooperation abroad that often involves higher risk. Evidence for significant differences between entrepreneurial types that influence managerial decisions is given. For Pleitner (1997) the "allrounder", a combination of the pioneer und the organizer, is the ideal entrepreneurial type for inter-firm cooperation.

Industry-specific characteristics

Industry-specific criteria are also proposed to have an impact on the owner-manager's decision about cooperation. Masurel and Janszen (1998) argue that a high degree of commercial cooperation results from a high market concentration. Particularly, when larger chain stores dominate the market, SMEs (especially food retailers) join cooperative organizations more often. Sell (1995) points out that the propensity to cooperation depends on the degree of competition in relevant markets. Cooperation strategies can be different for enterprises competing in oligopolistic markets than for those competing in polypolistic markets. Also economic development, i.e., whether markets are growing or shrinking, has an impact on inter-firm cooperation. The relevant markets for an enterprise are often determined by the sector of industry to which it belongs. Particularly, SMEs in technology-intensive branches are joining

international networks more often (Keeble et al., 1998; Sell, 1995; Suarez-Villa, 1998) at an early stage of business. Sell (1995) further argues that differences in competition regulations between locations have an impact on the cooperation behavior of firms.

3. A THREE-LEVEL COOPERATION MODEL

Whereas most of the literature focuses exclusively on one of the discussed aspects, this study assumes that the three approaches could be combined with multiple predictors. It is proposed that the structural, the personal, and the industry-specific characteristics all have a significant influence on the cooperation behavior of enterprises. See Figure 1.

Figure 1 about here

The following relationships between potential influencing factors on cooperation behavior are proposed. The assumptions are formulated in four hypotheses.

H1: Larger firms cooperate significantly more often than smaller firms.
H2: The manager's skills and international capabilities have a significant positive influence on the propensity for cooperation.
H3: The manager's preference for stability has a significant negative impact on the propensity for cooperation.
H4: Negative changes in markets have a significant positive influence on the cooperation behavior of enterprises.

4. DATA AND METHODOLOGY

Validity of empirical results across time can be confirmed with panel analysis. For these reasons, data from the Interstratos project have been chosen to test the hypotheses. In the Interstratos project the internationalization and the strategies of adjustment of firms have been analyzed during the years 1991 through 1995. In five annual surveys data have been collected in enterprises with one to 800 full-time employees in eight European countries[2] and five industry sectors[3]. The data set includes information concerning approximately 11,650 enterprises. This paper focuses on those 1,673 firms that answered the questionnaire at least four times.

Dependent variables

The dependent variables are dichotomous and have the value 1 when an enterprise is cooperating with other firms; otherwise the value is 2. The Interstratos data provide information concerning in which of 12 potential fields[4] the enterprises are cooperating. Further, the context of cooperation, i.e., the place of cooperation and the origin of the cooperation partner, is known. Because the questions are multiple response, all combinations can appear in the same enterprise.

Independent variables

A major advantage of the Interstratos project is that data have been collected in all three fields of interest, i.e., structural characteristics of the enterprises, personal characteristics of the entrepreneurs, and industry-specific characteristics. These variables are examined via the four hypotheses that are predicted to have an influence on cooperation behavior. To test the influence of further determinants, control variables are included in the data analysis.

Four variables are used to describe the characteristics of the enterprises. The size of a firm is

expressed by the number of employees. Further, three dummy variables are included. Two of them explain whether enterprises are subsidiaries or family businesses. The third one deals with the legal status, whether the firms are partnerships or incorporated enterprises.

The personal characteristics of the entrepreneurs refer to a manager's years of experience in the actual industrial sector. Also, the preferences and attitudes of the entrepreneur are of interest. With two-step factor analysis (Havnes, 1999), four factors have been identified: capability of the manager, planning preference, objection to external intervention, and preference for stability.

Finally, industry-specific characteristics are first described by the sector of industry to which an enterprise belongs. Second, changes in different markets are taken into account.

Methodology

Because of the structure of the data with dichotomous dependent variables and dichotomous, nominal, categorical, and numeric independent variables, *logit models* can be used to test the hypotheses (Agresti, 1990; Long, 1997). The result permits us to gain information about the probability that an enterprise will cooperate, depending on the tested independent variables.

5. RESULTS

The results for the binomial logistic regression for all five years are shown in Table 1. Measures for the fit of the model are given at the bottom of the table.

Table 1 about here

Surprisingly, in each year the coefficient for the number of employees is very low and does not have a significant influence on the propensity for inter-firm cooperation (H1). Moreover, in 1992 the coefficient is even negative. This result is discussed later in this article. It seems that subsidiaries are more often involved in inter-firm cooperation than are independent firms. At least in four years there is a significant positive influence on the cooperation behavior. Often, it is necessary that subsidiaries work together with their parent companies for specific projects. In contrast, for family businesses the coefficients are all negative but not significant. Finally, the legal status had a significant influence in three years when partnerships were supposed to cooperate less often than incorporated enterprises. In 1993 and 1994, the results were the opposite, but not significant. In terms of the results for the characteristics of the enterprises, the influence of the firm's size cannot be confirmed, whereas other variables like the economic independence and the legal status seem to be rather predictive for the cooperation behavior of SMEs.

The analysis of the personal characteristics provides an inconsistent result (H2 and H3). Moreover, significant outcomes for the manager's experience, his or her capabilities, and his or her planning preferences seem to be coincidental. In 1993 and 1994, the propensity for being involved in inter-firm cooperation decreased when managers had higher capabilities. This result is also discussed later.

In the field of industry-specific characteristics, the sector to which an enterprise belonged was significant only in 1994. More important were the changes in different markets (H4). Changes in supply markets were significant in all five years, but the direction of influence is surprising. The enterprises cooperated less often when the changes in supply markets were determined to be negative for the firms. Initially, it was proposed that negative changes would force enterprises to work together to stay competetive. The influence of changes in other markets

seems to be rather coincidental. Especially in 1991 and 1995, changes in sales markets had a significant influence on the cooperation behavior, but the direction of influence is contrary.

So far, all four hypotheses cannot be confirmed. But where are the underlying explanations for these results? As often occurs in empirical research, the data have been analyzed without taking into account some specific characteristics of the data set. Here, information about the place of cooperation and the cooperation partners is available. Using these facts for further examinations will put the previous results into perspective.

Table 2 about here

Table 2 summarizes the findings of these alternative analyses for the year 1994. Analysis for other years provides similar results. As we can see, the number of employees has a negative but not significant influence on domestic cooperation and on cooperation with domestic partners. However, larger enterprises are significantly more often involved in foreign cooperation and cooperation with foreign partners than smaller ones. This result shows the necessity for a differentiated view on inter-firm cooperation. On the one hand, firms seem to require size for international activities. Reasons are, for example, the enormous initial set-up costs in a foreign country; only large firms can raise the money that is needed. Although not significant, it can also be explained that smaller firms are more often interested in domestic cooperation. According to network founding theory, start-ups with only a few employees especially tend to cooperate with other enterprises. H1 cannot be confirmed for all kinds of inter-firm cooperation. Only for foreign cooperation and cooperation with foreign partners does the propensity increase significantly with the size of an enterprise.

The same interpretation can also be made for the manager's capabilities that have a significant influence on the cooperation behavior for all four contexts of cooperation. The variable has a negative impact on domestic cooperation and cooperation with domestic partners, whereas the impact is positive for foreign cooperation and cooperation with foreign partners. Especially, managers who spent more time abroad and speak more languages are mostly more open to international cooperation. In comparison with this, younger entrepreneurs with less experience abroad are rather concentrated on domestic cooperation and cooperation with domestic partners. For those entrepreneurs – especially in start-ups – it is often important to enter a market in which the risks of international activities can be avoided. It is also obvious that managers with a tendency toward stability are more reluctant to cooperate abroad or with foreign partners. This can be confirmed by the sigificant negative influence in both contexts of cooperation. Possible reasons are that such activities would force enterprises to reorganize their structure, to implement new methods of communication, or simply to take a higher risk. For domestic cooperation, the impact is opposite but relatively low and not significant. According to these results, H2 and H3 also cannot be confirmed for all kinds of inter-firm cooperation. Only for foreign cooperation and cooperation with foreign partners can evidence for the proposed positive relationship between the cooperation behavior and the manager's capabilities be given. Similarly, the proposed negative impact of the manager's preference toward stability can be given only for international cooperation and cooperation with international partners.

As we have seen in the previous analysis over five years, the sector to which a firm belongs has been significantly related to cooperation only in 1994. This significance is mainly based on domestic inter-firm cooperation. However, it can only be argued that firms in the textile and clothing industry cooperate significantly less than firms in the furniture-making industry. But

more important are the changes in different markets (H4). Whereas changes in labor, sales, and capital and credit markets have only a low and not significant influence on cooperation behavior, changes in supply markets have a strong impact. But, again, the direction of this influence on domestic cooperation and cooperation with domestic partners is surprising because negative changes lead the managers not to work together with other firms. This result could be put into perspective by seperately regarding the impact on different fields of cooperation. But this should be discussed in another setting. H4 can not be confirmed at all.

6. DISCUSSION

Before the results are discussed, some restrictions of the previous analysis have to be mentioned. Data about the number of partners in each field of cooperation and the firm's age are not available. Therefore, additional surveys have been made in Switzerland and Germany. Also, interaction effects between variables, e.g., sector of industry and country, should also be taken into account and more variables could be included. Additionally, the data should be analyzed by country, branches, and fields of cooperation in further research.

But, of course, the Interstratos data have numerous advantages. Research projects that allow longitudinal or even panel analysis can rarely be found because of the huge costs of collecting such data. With the Interstratos data, differences between enterprises in various countries and branches can be examined. Further, data about structural characteristics of the enterprises, personal characteristics of the entrepreneurs, and industry-specific characteristics are available.

It was assumed that the relationship between the size of an enterprise and the propensity for joining inter-firm cooperation is generally positive. The results show it is true for international cooperation but not for domestic activities. Also, the manager's capabilities have a different impact on the cooperation behavior depending on the context of cooperation. Whereas the number of domestic cooperation activities and cooperation with domestic partners decreases with the capabilities of the manager, the impact on foreign cooperation and cooperation with foreign partners is positive. Further, decision makers with a preference for stability tend significantly to refuse cooperation abroad or with foreign partners. The impact of the sector of industry to which an enterprise belongs cannot be confirmed. Finally, the fact that the relationship between negative changes in supply markets and domestic cooperation and cooperation with domestic partners is negative cannot be explained without further examination.

The longitudinal analysis of the general cooperation behavior did not provide satisfactory results. But separated analyses with regard to the place of cooperation and the type of cooperation partner show significant results for enterprise-, behavioral-, and industry-specific characteristics. The size of an enterprise, the manager's capabilities, and the preference for stability are predictive for the propensity toward international cooperation. The capabilities of the manager and changes in supply markets seem to have an influence on domestic cooperation.

Endotes

1. The Interstratos group (Internationalization of Strategic Orientations of Small and Medium-sized European Enterprises) was founded in 1989 by Rik Donckels, Erwin Froehlich, Antti Haahti, and J. Hanns Pichler. The objective was to investigate internationalization and strategies of adjustment of firms in five annual surveys during the years 1991 through 1995 (Haahti, 1998).
2. Austria, Belgium, Finland, Great Britain, the Netherlands, Norway, Sweden, and Switzerland.
3. Textiles/clothing, electronics, food, metal/machinery, and furniture making.
4. Extension of product range, R&D, raising funds, sales, market research, after-sales service, purchase/sales, advertising/promotion, transport/warehousing, manufacture, administration, and electronic data processing.

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Figure 1: Potential influence factors on the cooperation behavior

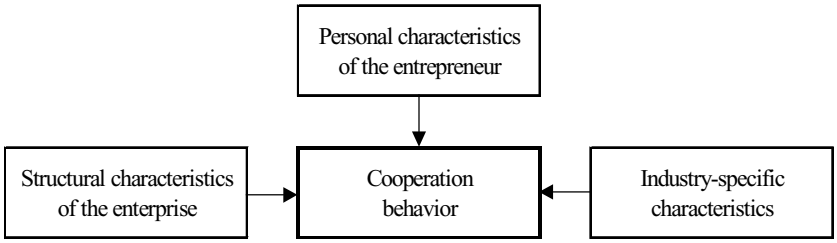

Table 1: Regression coefficients for the years 1991 through 1995

		1991	1992	1993	1994	1995
	Intercept	1.607 **	2.408 **	1.990 **	1.667 **	1.285 **
Structural characteristics	Employees	0.001	-0.003	0.005	0.002	0.001
	Subsidiary	1.709 **	0.858 *	0.601	1.108 *	0.756 *
	Family business	-0.302	-0.450	-0.075	-0.419	-0.254
	Legal status	-0.666 *	-0.775 *	0.523	0.066	-1.589 **
Personal characteristics	Years of experience	0.008	-0.019	-0.010	0.007	0.026 *
	Capability of manager	0.007	-0.117	-0.355 *	-0.363 *	-0.107
	Planning preference	-0.574 **	0.249	-0.255	-0.361 *	-0.222
	External intervention	-0.015	-0.187	0.102	-0.008	-0.183
	Preference of stability	0.331	-0.251	-0.146	-0.073	-0.091
Industry-specific characteristics	Textiles/clothing	-0.368	-0.543	-0.118	-0.245	-0.620
	Electronics	-0.010	0.108	0.314	1.036	-0.464
	Food	-0.084	0.131	-0.950 *	0.082	-0.085
	Metal/machinery	0.119	-0.425	-0.527	-0.626	-0.363
	Furniture making	reference	reference	reference	reference	reference
	Changes in labor markets	0.298 *	-0.139	-0.137	-0.207	-0.113
	Changes in supply markets	-0.342 *	-0.605 **	-0.363 *	-0.384 *	-0.342 *
	Changes in sales markets	0.279 *	-0.059	-0.299	-0.178	-0.288 *
	Changes in capital/credit markets	-0.035	0.178	0.524 **	0.301 *	0.192
	Test statistics					
	Sector of industry (Chi2/df)	1.464 (4)	5.229 (4)	6.249 (4)	10.695 (4) #	3.246 (4)
	-2 LogLikelihood	465,544	556,254	331,150	426,227	486,876
	McFadden-R2	0.175	0.187	0.143	0.153	0.192
	Observations	448	514	400	455	430

*/** Wald test significant at the 5%/1% level; # Chi2 significant at the 5% level.

Table 2: Regression coefficients depending on the place of cooperation and the cooperation partner (1994)

		Domestic partners	Foreign partners	Domestic cooperation	Foreign cooperation
	Intercept	1.105 **	-1.035 *	1.423 **	-1.116 **
Structural characteristics	Employees	-0.001	0.004 *	-0.002	0.005 **
	Subsidiary	0.276	0.761 **	0.409	0.548
	Family business	0.028	0.019	-0.309	0.174
	Legal status	0.157	-0.110	0.117	0.097
Personal characteristics	Years of experience	0.008	0.007	0.005	0.014
	Capability of manager	-0.369 **	0.390 **	-0.298 *	0.420 **
	Planning preference	-0.243	0.066	-0.192	-0.193
	External intervention	-0.017	-0.003	-0.028	0.024
	Preference of stability	0.111	-0.439 **	0.048	-0.322 *
Industry-specific characteristics	Textiles/clothing	-0.960 **	0.483	-0.642	0.036
	Electronics	-0.007	0.606	0.206	0.449
	Food	-0.059	0.032	0.295	-0.551
	Metal/machinery	-0.500	-0.232	-0.318	0.040
	Furniture making	reference	reference	reference	reference
	Changes in labor markets	-0.025	-0.194	-0.222	-0.059
	Changes in supply markets	-0.347 **	-0.153	-0.440 **	-0.100
	Changes in sales markets	-0.129	-0.023	-0.042	-0.157
	Changes in capital/credit markets	0.171	-0.031	0.140	0.098
	Test statistics				
	Sector of industry (Chi2/df)	11.287 (4) *	7.991 (4)	7.996 (4)	6.343 (4)
	-2 LogLikelihood	531,679	583,413	503,276	562,481
	McFadden-R2	0.075	0.138	0.084	0.125
	Observations	447	422	447	406

*/** Wald test significant at the 5%/1% level; # Chi2 significant at the 5% level.