Toward developing measures of business relationships

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ABSTRACT

Using the IMP 2 database, this paper moves towards developing an expanded set of measures of the connectedness of business-to-business relationships. Our results reveal significant differences between countries and the intensity of response between firms in Europe (Sweden and Germany) and China

INTRODUCTION

The area of business-to-business (B2B) marketing is an important, but under studied area of marketing. It is of critical importance because most business is B2B in a typical OECD economy where more than 80% of GDP transactions are typically B2B. However, it has been under studied for many reasons, some historical, some practical. Historically, business-to-consumer (B2C) marketing received early attention because advertising, retailing and branding were familiar to both researchers and students: companies who marketed so-called fast moving consumer goods were among the first to collect data and formally study their consumers, and end-users were the early subjects of the developing field of consumer behavior (in which, to date, psychology has been the major contributor of theory and methodology).

B2B marketing has been under studied also for practical reasons. The natural sampling units in B2B are firms. There are frequently only a few firms in an industry and gaining access to them is difficult and/or time consuming.

If sufficient data is to be collected in order to test hypotheses in B2B, it must be collected from more than one industry and more than one country. Theories that have a chance of being tested in B2B settings must transcend industries and countries. Such theories must involve observations that plausibly may be made and must be about phenomena that exist in multiple industries and countries. An example of such an elemental theoretical unit of analysis is the "business relationship."

Scholars in marketing and other areas have argued that an understanding of business relationships is necessary to understand business performance. Some scholars further argue that relationships are embedded in networks of other relations, to which they are connected in various ways (Achrol and Kotler, 1999; Anderson et. al., 1994; Granovetter, 1985; Hakansson and Snehota, 1995; Rooks et. al., 2000). A significant body of research investigates the nature and performance of relationships between firms in business markets and channel systems. Among the leading contributors to research in the area are members of the Industrial Marketing and Purchasing (IMP) Group. Their work has resulted in numerous publications and research studies. For an overview of the group's historical and intellectual development, see Turnbull, et. al., (1996).

One of the major IMP contributions to the study of business relationships is a database established by the Industrial Marketing and Purchasing (IMP) Group international research project (IMP2). The data in the IMP2 database comes from an omnibus survey instrument that includes questions regarding a respondent firm's relationships with a specified other "important" firm. A series of questions ask whether the relationships with the selected firm are influenced by relationships with other categories of firms, specifically customers, suppliers and intermediaries. The questions asked regarding customers are shown in Table 1. Regarding the "important" focal firm, the respondent firm indicates the degree to which their relationship is influenced by "Other Relationships," e.g., the "Relationships Connected to the Customer Company" (questions 1.1 through 1.12).

The IMP2 database has additional information detailing the effect of the "Other Relationships." For each relationship for which the response to an "Other Relationship" question is (3) "to some extent," (4) "rather much," or (5) "very much," respondents are also asked to indicate the effect of the impact, e.g., "It affects the volume of our business," "It affects the manner in which we deal with …," etc.

Analyzing data from the effect questions is problematic because the number of responses differs from firm to firm depending on their responses to the "Other Relationship" questions. As a result, only limited attention has been given to the responses to these questions previously. For example, Blankenberg-Holm et al (1996) used the ratings of supplier and customer relations connected to the focal relationship from the European IMP2 data set; i.e. the suppliers of suppliers and other customers and

the customers of customers and other suppliers, to develop a measure of business network connection and used this in a model of relationship performance. Wiley et al (2002) extended this work and compared the model across European and Chinese contexts.

Table 1. **Relationship Connected to Customer Company Questions**

Other Relationships	***Effect***
To what extent is your business with this specific customer *Affect*ed by his own relationships with some of the following.	How does the relationship to the 3d party specified (by responding 3, 4, or 5 to questions on left) *Affect* your business with the primary customer?
Any customer of the customer's? Any supplier of products competing with yours? Any supplier of products complementary to yours? Any other unit of customer's firm? Any other unit of your own firm (excl. intermediary)? Any bank or other financial organization? Any law firm or other legal organization? Any consultant or research institute? Any trade union or other social body? Any government agency? Any international organization? Any other relevant organization?	It *Affect*s the volume of our business with the customer. It *Affect*s the manner in which we deal with the customer. It *Affect*s the effort we put into the relationship. It has an impact on our product quality. It has an impact on our production technology. We and the customer exchange information on our relationship to this 3rd party. People from out firm have met with people from this organization. We have a relationship of their own with this organization.
1=not at all, 2=only a little, 3=to some extent, 4=rather much, 5=very much, 9=do not know.	

The objective of the present paper is to take the first steps toward developing an expanded set of measures of business relationships that combine the "Other Relationship" and "Effect" responses in the IMP2 database. Such measures will allow further testing of the importance and impact of connected relationships.

METHODOLOGY AND SAMPLES

Two parts of the IMP data set were used in this study. Using a common instrument (the IMP2 questionnaire) researchers in Europe and Australasia have collected data from five and four countries respectively.

European Data

The part of the European database used in this study concerns data gathered on dyadic business relationships of firms in Germany and Sweden. Interviews were conducted with marketing executives, who were asked to select one of the firm's most important customers in a specific country. The respondents were also asked to select a customer relationship they were responsible for and of which they had personal experience. Judgemental sampling and personal contacts were used to select companies and respondents. Targets varied as the immediate purpose of the research (e.g. research thesis, research group goals) varied by country.

Chinese Data

The IMP2 questionnaire was translated into Chinese and back translated by independent native bilingual Chinese speakers. For details of this see Dawson *et. al.,* (1997). The sample of Chinese suppliers with international business customers was developed in cooperation with the Chinese Bureau of Statistics. The sampling frame was based on the database of the "Third Industrial Census" and the database of the "First National Basic Business Census" developed by the Chinese Bureau of Statistics. For the purpose of sampling, the frame was stratified into Northern (Beijing as the center), Eastern (Shanghai as the center), Southern (Guangdong as the center) and Middle western (Sichuan and Chongqing as the representative regions) and a target sample size of 100 was set based on interview costs.

Approximately 200 suppliers in each region were selected for the initial sample, including Sino-Foreign joint ventures, large-sized industrial enterprises and those involved in import and export. The specific respondent was determined by telephone pre-interview, to establish they satisfied relevant conditions and if they were willing to cooperate in the study. Officers from the Chinese Bureau of Statistics conducted personal interviews using the full IMP2 questionnaire. Interviews continued until the target sample size of 100 was achieved.

Analysis strategy

Our analysis strategy has three steps. The first step in the analysis is reorganising the data into an analyzable form. The second is to describe responses to the "Other Relationships" questions and their associated "Effect" questions. The third step is to test the following hypotheses to assess the capabilities of the "Effect" questions as measures of connectedness:

H1: ***There are no effects of "Other Relationships" questions on the "Effect" questions***

H2: ***There is no country effect on responses to the "Effect" questions***

H3: ***There is no effect of the response to the "Other Relationships" question on the responses to the "Effect" questions***

H4: ***There are no interactions between the above effects and responses to the "Effect" questions***

Reorganising the Data

As a first step, we created a new database in which there is a respondent record for each "Effect" question answered by a respondent firm. In the European sample, there were a maximum of four such records per respondent firm; that is, there are four records in the new data file for each case in the original file. Each record in the new file has variables indicating the respondent, the sample (Chinese, Swedish, or German), the "Other Relationship" question (1 through 12), the responses to the "Effect" questions, and a code indicating the "Other Relationship" question to which the "Effect" question refers. In the Chinese sample, respondent firms occasionally responded to more than five "Effect" questions. For this sample, one record was created for each "Effect" question to which the firm responded.

Describing Responses to Other Relationship and Affect Questions

Table 2 summarizes the number of firms responding to each of the 12 "Other Relationship" questions with "top box" scores, i.e., a 3 (to some extent), 4 (rather much), or 5 (very much). It is evident from Table 2 that the first three "Other Relationship" questions are the only ones receiving more than 10% top box scores in all three countries. These questions refer to customers of customers, competing products, and complementary products. "Other units of the customer firm" receives more than 10% top box scores in Sweden, but not in the other two countries. Government agencies

receive more than 10% top box scores in Germany, but not the other two countries. There are no other questions about actors other relationships the respondent that more than 6% response in any country.

Table 2. Top Box Scores (i.e. 3, 4, or 5)

Other Relationship Questions By Respondent Country

			Respondent Country		
			Sweden	Germany	China
Other Relationship Question	1.1 Customer of customer	Count	32	15	29
		% w/in Country	16.3%	23.4%	20.1%
	1.2 Competing Product	Count	65	17	60
		% w/in Country	33.2%	26.6%	41.7%
	1.3 Complementary Prod.	Count	32	12	25
		% w/in Country	16.3%	18.8%	17.4%
	1.4 Other Unit of Customer Firm	Count	24	4	8
		% w/in Country	12.2%	6.3%	5.6%
	1.5 Other Unit of Own Firm	Count	12	2	7
		% w/in Country	6.1%	3.1%	4.9%
	1.6 Bank	Count	6		3
		% w/in Country	3.1%		2.1%
	1.7 Law Firm	Count			4
		% w/in Country			2.8%
	1.8 Consultant	Count	8	1	3
		% w/in Country	4.1%	1.6%	2.1%
	1.9 Trade Union	Count	3	1	1
		% w/in Country	1.5%	1.6%	.7%
	1.10 Government	Count	11	8	3
		% w/in Country	5.6%	12.5%	2.1%
	1.11 International	Count	2	3	1
		% w/in Country	1.0%	4.7%	.7%
	1.12 Other	Count	1	1	
		% w/in Country	.5%	1.6%	

Table 3 presents the frequency with which each of the scores 3, 4, or 5 are used in each of the three countries. Chinese respondent firms are more likely to give lower responses than the European countries. Swedish firms are more likely to respond with a 3 or 5 than are German firms. The difference in the frequencies across countries is significant with $\div^2 = 12.0$, d.f. = 4, p = .018. We conclude that there is a difference between countries in the intensity of responses to the "Other Relationships" questions. Subsequent analysis shows this difference to have only a main-effect on "Effect" scores.

Table 3.

Intensity of Response (3, 4, 5) By Respondent Country

			Respondent Country		
			Sweden	Germany	China
Intensity of Response (3, 4, 5)	3	% w/in Country	49.2%	42.6%	57.8%
	4	% w/in Country	24.6%	32.8%	30.4%
	5	% w/in Country	26.2%	24.6%	11.9%

Table 4 summarizes responses to the "Effect" questions across countries. Focusing on scores of 3, 4, or 5, the single greatest "Effect" item is "It affects the volume of our business with the customer." There is little difference between countries in the use of top box scores for this question. The item appearing next most frequently is "It affects the effort we put into the relationship." Germany is notably lower in the use of top box scores on this item and China is notably higher in its use. Germany is also notably lower than other countries on: "It affects the manner in which we deal with the customer," and "The customer has a relationship of his own with this organization." Sweden is notably higher than the other countries on: "We and the customer exchange information…" and "People for the customer's firm have met with…". Finally, China is notably lower than the other countries on "It has an impact on the our production technology."

Hypothesis Tests

We now turn to the final step in our analysis of the "Other Relationship" and "Effect" questions, the formal test of hypotheses regarding main effects and interactions between the "Other Relationship" questions, "Other Relationship" question response, and respondent country factors.

Table 5 provides the results of a multivariate analysis of variance that tests the above four hypotheses as regards the "Effect" question. Since the results for this study are for a survey (not an experiment), the effects estimated are not orthogonal. Notably, the estimates for the main effects and interactions are non-orthogonal.

For this reason, we test the hypotheses in two steps. First, we test hypothesis H4 that interactions are insignificant. Given that the null hypothesis is accepted, we re-estimate and test hypotheses H1 – H3 using a main effects only model. Table 5, Panel A provides results for Hypotheses H4. Based on these results, we accept the null hypothesis that the interactions among the variables are insignificant.

Table 4. Summary Affect Questions Across Countries

		Respondent Country		
		Sweden	Germany	China
		Col %	Col %	Col %
It affects the volume of our business with the customer	Top Box (3, 4, or 5)	82.5%	85.7%	78.0%
It affects the manner in which we deal with the customer	Top Box (3, 4, or 5)	56.0%	37.1%	62.1%
It affects the effort we put into the relationship	Top Box (3, 4, or 5)	64.4%	50.0%	71.9%
It has an impact on our product quality	Top Box (3, 4, or 5)	49.0%	51.6%	27.8%
It has an impact on our production technology	Top Box (3, 4, or 5)	32.5%	23.0%	28.6%
We and the customer exchange information on our	Top Box (3, 4, or 5)	57.2%	47.5%	38.3%
People from the customer's firm have met with people	Top Box (3, 4, or 5)	54.2%	40.0%	34.4%
The customer has a relationship of his own with	Top Box (3, 4, or 5)	52.8%	28.6%	41.2%

Given the non-significance of the two and three-way interactions, we re-estimate the model without interactions. The results for this analysis are provided in Table 5 Panel B. Based on these results, we reject the null hypothesis H1. We conclude that the main effects of "Other Relationships" questions on the "Effect" questions are significant, i.e., that the mean responses on the "Effect" questions differ across "Other Relationship" questions. We also conclude that the main effect of country of respondent is significant and that the main effect of intensity of response (i.e. use of top boxes) to the "Other Relationship" questions are significant. In other words, the mean responses to the "Effect" questions differ depending on whether the response to the "Other Relationships" questions are 3, 4, or 5. Figures 1 and 2 illustrate the effects with respect to the most widely encountered "Effect" question: "It affects the volume of our business with the customer."

Table 5.

Effect	Value	F	Hypothesis df	Error df	Sig.
H4: Other Relationship by Intensity of	.54	.95	144	1888	.65
H4: Other Relationship by Country	.58	1.15	128	1888	.12
H4: Intensity by Country	.18	1.39	32	928	.07
H4: Three-way Interaction	.44	1.07	104	1888	.30

(A) Pillai's Trace Statistics Fully Saturated Model

Main Effects Only Model Estimates	Value	F	Hypothesis df	Error df	sig.
H1: Other Relationship	.47	1.80	80	2296	.00
H2: Country	.18	3.56	16	562	.00
H3: Intensity of Response	.11	2.07	16	562	.01

(B) Pillai's Trace Statistics Main Effects only Model

Note: Pillai's trace provides a multivariate test of significance that can be transformed to approximate an F statistic.

Figure 1 illustrates the main effect impacts of Respondent Country on the mean responses to the "It affects the volume of our business with the customer" question. As regards this question, the "Other Relationships" questions with the highest scores are Q1.2 Competing products, Q1.4 Other units of customer firm, Q1.1 Customer of customer, Q1.6 Bank and Q1.3 Complementary products. The "Other Relationships" questions with the lowest scores are Q1.7 Law firms, Q1.12 Others, Q1.11 International, and Q1.8 Consultants. Germany generally responds with slightly higher scores and China responds with slightly lower scores. The implication of the two-way interactions being insignificant is that the pattern of Germany responding higher and China responding lower generalizes across "Effect" questions.

Figure 1

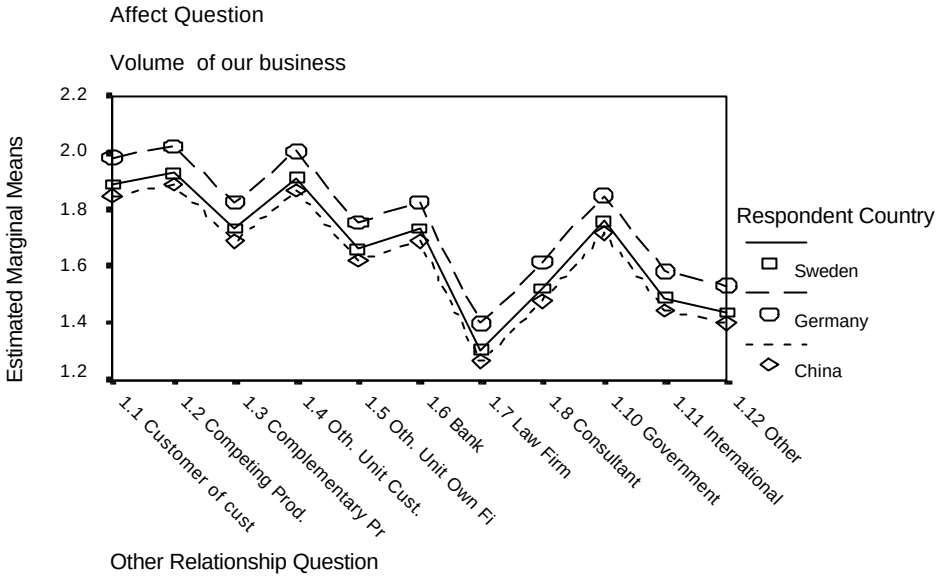
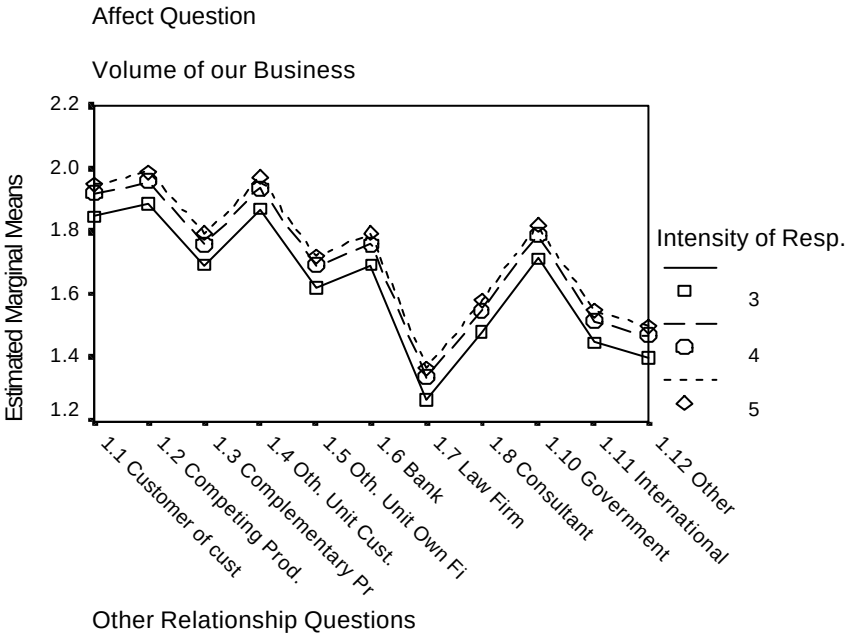


Figure 2 illustrates the main effect impacts of Intensity of Response (use of 3, 4, or 5) on the mean responses to the "It affects the volume of our business with the customer" question.

Figure 2.



Since the results are for a main effects only model, the order of the mean responses across questions is the same as for Figure 1. The interpretation of the intensity of response effects is the following. The mean expected response to the "Volume" question is lower if the respondent made a lower response to the "Other Relationship" question. Conversely, the higher the response to the "Other Relationship" question, the higher the response to the "Affect" Question. The implication of the two-way interactions being insignificant is that this pattern of lower responses to the "Other Relationship" question being associated with lower responses to the *Affect* questions, and vice versa, generalizes across *Affect* questions.

DISCUSSION AND CONCLUSIONS

The types of connected relations perceived as having a greater impact are similar across the three samples. One exception is the more frequent nomination in the Chinese sample of competing suppliers having a top box score effect (42% versus 33% for Sweden and 27% for Germany). This may reflect China's stage of development in international trade including the extent to which they have been able to develop closer more stable relations with their customers. In the Chinese sample, the average duration of supplier-customer relations is only 5 years compared to 22 years for European firms. Also, China is usually seen as a source of low cost labor inputs and competes with other countries in Asia as well as elsewhere in this regard in terms of costs and price. German suppliers are more likely to nominate government agencies than Chinese or Swedish suppliers, which may say something about the nature of the organization of German industry and the role of government.

In terms of the types of effects connected firms have, Table 4 shows that German firms are more likely to rate several types of impacts lower i.e. effects on "the manner we deal with the customer", "the effort we put into the relationship" and "we have a relationship of our own with this organization". These results seem to reflect a lack of relationship-type responses to the impact of connected relations compared to Chinese and Swedish firms. Could this reflect a "stiffness" and lack of flexibility in relations by Germans? Swedish and German firms are more likely to report a stronger impact of a connected relation on product quality than Chinese firms, which could reflect the more complex nature of the industrial products involved. They are also more likely to report a strong

impact on "We and the customer exchange information on our relations with this third party," and "People from our firm have met with people from this third party." This in part reflects the mix of types of connected relations. As noted above, Chinese firms are more likely to rate the impact of competing suppliers as strong and it is more difficult to establish personal relations with such firms or to get customers to share information about competition that may weaken their bargaining strength.

The above results and interpretations are only preliminary. The next stage of our analysis will compare these results with the nature and impact of relations connected to the customer as perceived by customers and make similar comparisons in terms of relations connected to suppliers. Lastly, we are developing a model of the impact of connected relations in terms of product, market and relationship factors.

REFERENCES

Achrol, Ravi S. and Philip Kotler (1999), Marketing in the Network Economy. *Journal of Marketing*, 63 (Special Issue): 146-163.

Anderson, C., Hakan Hakansson, and Jan Johanson (1994), Dyadic Business Relationships Within a Business Network Context. *Journal of Marketing*, 58, (October): 1-15.

Blankenburg-Holm, Desiree, Kent Eriksson and Jan Johanson (1996), "Business Networks and Cooperation in International Business Relationships," *Journal of International Business Studies*, 27 (5), 1033-1053.

Dawson, Bonnie, Ian Wilkinson, and Louise Young (1997), Conceptual and Methodological Issues in Translation of a Business Questionnaire into Chinese in Scott M. Smith, (editor), *Proceedings of Sixth Symposium on Cross Cultural Consumer and Business Studies*, Hawaii, Dec 10-13th Utah: Brigham Young University 183-187.

Granovetter, Mark S. (1985), Economic Action and Social Structure: The Problem of Emeddedness *American Journal of Sociology*. 91, 481-510

Gundlach, Gregory T., Ravi S. Achrol, and John T. Mentzer (1995), The Structure of Commitment in Exchange, *Journal of Marketing*, 59 (January): 78-92

Hakansson, Hakan and Ivan Snehota (1995), *Developing Relationships in Business Networks.* London: Routledge.

Rooks, Gerrit, Werner Raub, Robert Selten and Frits Tazelaar (2000), How Interfirm Co-operation Depends on Social Embededness: A Vignette Study. *Acta Sociologica*, 43(2): 123-137

Turnbull, Peter, David I. Ford, and Malcolm Cunningham (1996), Interaction, Relationships and Networks in Business Markets: an evolving perspective, *Journal of Business and Industrial Marketing,* 11(3/4): 44-62.

Walter, A., Thomas Ritter, and Hans George Gemunden (2001), Value Creation in Buyer-Seller Relations, *Industrial Marketing Management,* 30, 365-377.

Wiley, James, Wilkinson, Ian F. and Young, Louise (2002), *"Evaluating a Model of International Business Relationship Performance: A Comparison of European and Chinese results using the IMP Data Base"* Working Paper School of Marketing, UNSW