

Trust and Interdependency in SMEs: A Firm-Level Survey in Japanese Manufacturing

Kazuo KADOKAWA *

Abstract

This paper investigates the influence of trust on local management of manufacturing SMEs by analysing new questionnaire survey data. The study found evidence that trust in management and transactions are only understood in the local presence of trust among enterprises. The management and transactions of local SMEs become more dependent upon larger enterprises as they become more trusted; otherwise, the dependency significantly declines. Moreover, trust among SMEs improves as they become more dependent upon regional enterprises rather than global enterprises. In addition, the type of dependency distinguishes the enlivenment of form of social and business activities, and trust within firms does not evenly contribute to collective and cooperative activities, but distinguishes them according to the production organization and firms' needs.

Keywords: Social Capital, Industrial Location, Institutional Environment, Regional Specialization, Economic Growth

JEL codes: L2; R11; Z13

1. Introduction

The concept of social capital has recently attracted an increasing number of researchers in the field of regional science (Glaeser et al. 2002; McCann et al., 2010; Roskrugue et al., 2012). Beginning in the latter half of the 1990s, the causal nexus between social capital and economic growth has been investigated by several authors such as La Porta et al. (1997), Knack and Keefer (1997), and Zak and Knack (2001). Since the theory has become commonly accepted by scholars, the role played by social capital in regional (Westlund,

* Junior Associate Professor, Dept. of Economics, School of Political Science and Economics, TOKAI University

2006; Glaeser & Redlick, 2009) and national (Castiglione et al., 2008; Svendsen and Svendsen, 2009) economic growth is now widely applied in economic literature (Roskrug et al., 2012).

In addition, the application of social capital has recently become much more common in the field of economic geography (Cooke et al., 2005; Iyer et al., 2005; Murphy, 2006; Holt, 2008; Huber, 2009; Rutten et al., 2010). According to Malecki (2011), social capital is the key to promoting regional, innovative learning and entrepreneurial activities, which suits the concept in the current issues of economic geography. In the same year, Farole, Rodrigues-Pose, and Storper (2011) reviewed industry-cluster literature and discussed how concepts of social capital, such as trust, social ties, and community identity, are theoretically associated with the institutional approach in economic geography¹⁾. With regard to these studies, 2010 might be viewed as the initial year when economic geographers began adopting a serious stance on the study of social capital.

Among wide-ranging applications of the concept of social capital, a number of recent studies have focused on the role of social capital and the locational decision-making process of firms in particular (Dahl & Sorenson, 2007; Glaeser & Kerr, 2009; Giannetti & Simonov, 2009; Lambooy, 2010; Audretsch et al., 2011). Among the studies that challenged the influence of social capital on locational choice, Feldman et al. (2005) theoretically specified the roles of horizontal networks in local firms and vertical ties between horizontally networked firms and the government. Dahl and Sorenson (2007) attributed the determinant of why entrepreneurs and managers prefer locations near their home base to locally accumulated social capital. In addition, Glaeser and Kerr (2009) highlighted the role of social capital in new entry rates of manufacturers and discovered that US manufacturing start-ups are generally attracted to small local suppliers and abundant workers in relevant occupations. Giannetti and Simonov (2009) and Malecki (2011) argued that social interactions are the key to facilitating local innovative and entrepreneurial activity. Additionally, a series of empirical studies by Klepper (2009) implies that many firms are launched in locations where the founders currently reside since they are socially embedded in their local communities and networks. In regard to the locational behavior of firms, many recent studies have highlighted the role of social capital, particularly in regard to the formation of industrial clusters and specialized industries among networked firms (Rutten et al., 2005; Cooke et al., 2005; Feldman et al., 2005; Stam, 2007; Staber, 2007; Huber, 2009; Tomlinson, 2011).

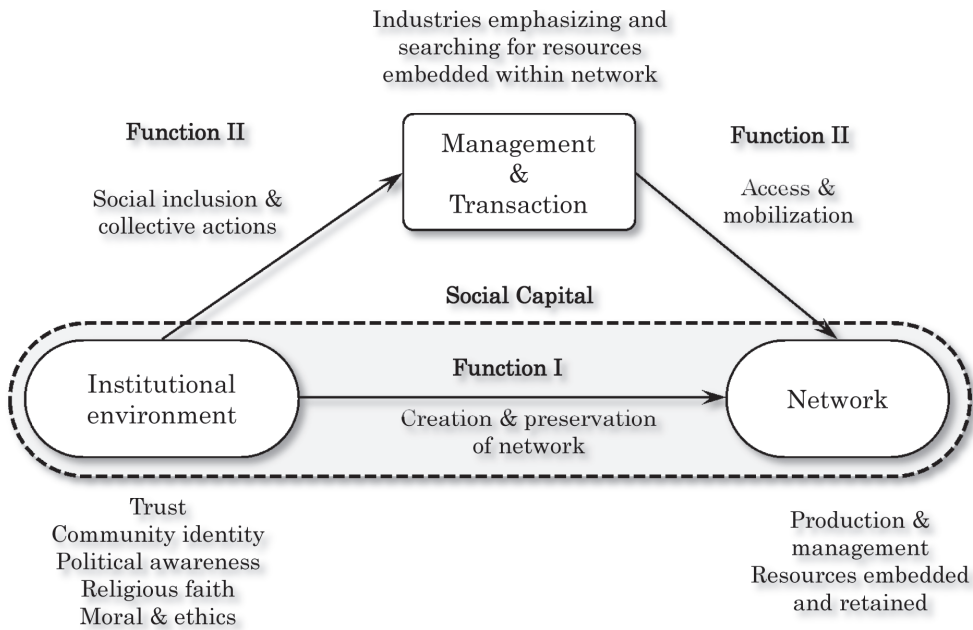


Figure 1: The casual mechanism how social capital contributes to local management and transaction

The literatures reviewed above more or less share a same causal mechanism in terms of how social capital is relevant to the local promotion of management and transaction, which is summarized in Figure 1. This figure represents the dual nature of social capital that consists of institutional environment and network, both of which are associated with local management in a specific way²⁾. First, social capital consists of institutional environment, such as trust, shared norms, beliefs and values, and better institutional environment contributes the creation and preservation of network within which various production and management resources are embedded and retained.

Second, since firms are myopic (Maskell and Malmberg, 2007), their management decision is critically dependent upon the resources embedded and retained in local network, to which firms are potentially able to access and mobilize through the local capability of collective and cooperative actions. Resources here include various production knowledge, technologies, supplies, demands and public supports, which all embedded in trust-based and long-lasting network and beneficial for sustaining localized competitiveness (Portes and Sensenbrenner, 1993; Cooke and Morgan, 1998; Narayan, 2002; Inkpen and Tsang, 2005; Joshi 2006; Tura and Harmaakorpi, 2005; Lundvall, 2006; Moody and Paxton, 2009; Staber,

2011). Combining those two, the scholars argue that better institutional environment reinforces the development of network, local firms becomes more reachable to resources embedded and retained within network and consequently better institutional environment provides more effective management opportunities to local firms through locally accessed and mobilized network.

In essence, there are two functions in the concept of social capital consisting of local institutional environments and networks. First, a better institutional environment promotes the creation and preservation of inter-firm cooperative networks. Second, it improves the quality of collective actions by including firms in the cooperative network and helps firms to access and mobilize the resources embedded within the network for their management. Therefore, those two functions are the creation and preservation of network and the access and mobilization of network, where network is the central character of social capital.

However, as pointed out by the concept of relationship capital (McCann et al. 2010), some vagueness exists in the mechanism of social capital, associated with trust specific to a particular relationship. It may be too idealistic to imagine a situation in which firms mutually trust one another, and all related agencies that contribute to the development of networks for the entire group of member firms are also supportive and trustworthy. Instead, it is more realistic to imagine firms able to trust a few limited agencies and develop and strengthen relationships within only these few. In such a case, the degree of trust becomes specific to an individual relationship, but trusting other agencies in the overall community becomes irrelevant to the creation and preservation of the specific network. As long as firms can depend on related agencies only when those agencies are considered trustworthy, stronger trust should be seen in relationships of sturdy interdependency. But then, the question arises: Do the management and the transactions of firms become more dependent upon a specific enterprise — when they trust only the specific enterprise more?

In addition, there is a question in the territorial development of trust through mutual monitoring and enforcement. The concept of social capital is mainly a spatial concept (Putnam 2000), and Storper and Venables (2004), for instance, emphasize the role of face-to-face communications and 'local buzz' in trust and reputation-building within a specific region. When an industry network is particularly regionalized, firms gain greater incentive to act in the interests of reputation building and of sincere behavior in business transactions. If that is indeed so, then firms would be expected to perform more loyally to other firms because they are in a closed regional network that transmits information and reputation swiftly. Thus,

greater regional dependency is expected to result in stronger mutual trust. But then, another question arises: Does trust tend to develop as firms are more regionally interdependent and their management and transactions more regionalized?

Moreover, in addition to trust and reputation-building, regional integration of firms is expected to affect their participation rate in social and other business activities. As local firms become more interdependent and integrated into an industrial network, they experience increasing opportunities for face-to-face communication and local buzz. The formation of such an industrial community contributes to the smooth exchange of reputation among firms and provides strong incentive to behave collectively and cooperatively. The incentive to cooperate becomes even greater when the management and transactions are critically dependent upon a particular group of firms that are densely and strongly integrated within the region. If so, as firms experience opportunities of face-to-face communications due to regional integration, they are expected to behave collectively and cooperatively and increase participation in social and business activities. The next question then becomes: Do firms participate more in social and business activities as they become more integrated into local industrial networks?

This study aims to clarify the three questions asked above for small and medium-sized enterprises (SMEs) in Japanese manufacturing. The study of SMEs is one of the most appropriate in social capital because SMEs management and transactions are often ad-hoc, trust-based, and largely embedded in industry networks. And the three questions can be modified into certain hypotheses, explained in the next section.

2. Hypothesis

This study investigated five hypotheses, the dependent variable of which is the strength of dependency on other enterprises. In other words, the study intends to capture the density and strength of the networks in which the respondent SMEs are embedded by the degree of management dependency on other enterprises. Each hypothesis corresponds to a different type of dependency. More specifically, the dependent variable is characterized by three types of dependency — on large enterprises, small and medium-sized enterprises (SMEs), and regional enterprises. In the empirical examinations, the three types of dependency are compared with the degree of trust and social participation of each responding enterprise.

For the examination of trust in a specific relationship, this study distinguishes between

dependency on larger enterprises and dependency on other, local SMEs. This is particularly important because Japanese manufacturing organizations are often characterized by the *keiretsu* system, in which the management and transactions of local SMEs are significantly dependent upon large enterprises. Those two types of dependency — on SMEs and on large enterprises — are used for the examination of hypotheses I and II. The details of the hypotheses are discussed below.

Hypothesis I: *When SMEs' management and transactions become more dependent on large enterprises, their trust of large enterprises improves.*

Hypothesis II: *When SMEs' management and transactions become more dependent on other SMEs, their trust of other SMEs improves.*

Those two hypotheses are concerned with the pairwise specificity of trust and relationship. Two types of trust are discussed in this social capital study. One is a specific trust manifested in a particular relationship in inter-firm transactions. Another is general trust pertaining to the overall community in which the firms are located. Both of these hypotheses examine the role of specific trust and the correlation between the improvement of trust and growing dependency on the trusted enterprises. Specifically, hypothesis I examines the correlation between trust of large enterprises and expected vertical dependency on large enterprises. Hypothesis II applies the correlation to horizontal interdependency among SMEs.

In addition, the idea that trust is untradeable and specific to relationship is particularly important in the *keiretsu* system in Japanese manufacturing because it predicts that trust of large enterprises contributes to the creation and preservation of strong ties to large enterprises in the *keiretsu* system. From the perspective of the *keiretsu* system, hypothesis I is more important because it examines the influence of local SMEs' trust on large enterprises on their vertical transactions and the endurance of the *keiretsu* system as a whole.

Hypothesis III: *When SMEs' management and transactions become more dependent on regional enterprise, their trust on larger enterprises improves.*

Hypothesis IV: *When SMEs' management and transaction become more dependent on*

regional enterprise, their trust on other SMEs improves.

Moreover, hypotheses III and IV are associated with the role of geographical proximity in trust and reputation building. First, local SMEs become a group based on their dependency on regional enterprises. Hypotheses III and IV examine whether trust of large enterprises and other SMEs improves when SMEs' management and transactions become more integrated with regional enterprises. As long as trust and reputation are built within a region among geographically close firms, trust of other firms should improve as they become more closely tied to regional than to global enterprises. This idea is supported by the argument that trust develops through face-to-face communication and local buzz. We expected that these two hypotheses would be proven correct because, as the transactions of local SMEs become increasingly confined regionally, those SMEs adopt the role of reputation mediator, and other enterprises gain incentive to act loyal to the SMEs.

Hypothesis V: *When SMEs' management and transaction become more dependent on other enterprises, participation in social and business activities increases.*

In addition, hypothesis V examines the external impact of firms' strong interdependency within a network. The frequency of participation in social and business activities is often perceived to indicate the local stock of social capital. The more firms are integrated within a network, the more local firms enjoy frequent face-to-face communication and local buzz; they provide strong incentive to behave collectively and cooperatively in the interests of trust and reputation building. Differences in firms' behavior should be observed through the participation rate in social and business activities rather than through formal transactions. This hypothesis examines whether SMEs are more dependent upon large enterprises, other SMEs, or regional enterprises.

3. Data and Survey Design

The questionnaire survey was designed by the author and conducted in January and February of 2012 by commissioning to Teikoku Data Bank Co., Ltd. The questionnaire was sent to managers of 500 manufacturing SMEs over FAX, which was randomly chosen out of 14,467 potential respondents.

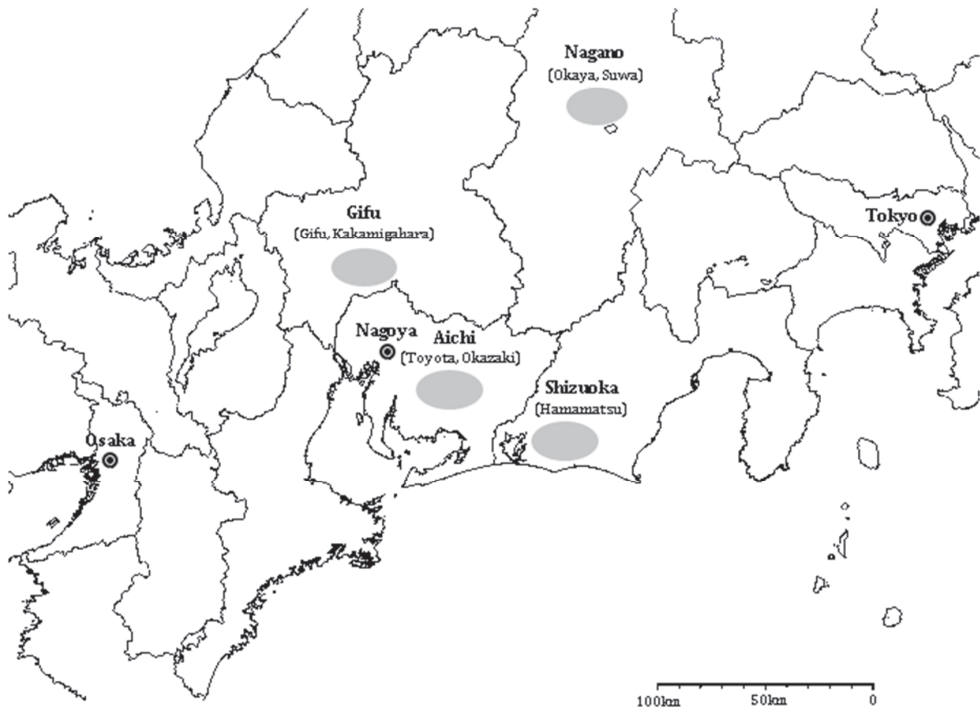


Figure 2: A map of Chubu-Tokai region in Japan and three cities for the questionnaire survey.

Table 1: The share of respondent industries and the rate of collection for each prefecture

	Nagano	Gifu	Shizuoka	Aichi	Total
Fabricate and non-ferrous metal	24.6%	31.1%	11.5%	11.5%	27.8%
General machinery	11.5%	18.0%	17.3%	17.3%	13.6%
Electrical machinery	27.9%	9.8%	21.2%	21.2%	17.8%
Transport equipment	4.9%	19.7%	36.5%	36.5%	15.4%
Precision instrument	26.2%	8.2%	1.9%	1.9%	13.0%
Miscellaneous	4.9%	13.1%	11.5%	11.5%	12.4%
Number of sample	61	61	53	47	221
Collection rate	52.8%	49.2%	43.1%	37.6%	46.5%

For the sample selection, three SMEs groups in different regions are deliberately selected. The first group is SMEs in Toyota and Okazaki cities of Aichi prefecture as well as Hamamatsu city in Shizuoka prefecture. Particularly, Aichi encompasses the largest share of manufactures and the greatest manufacturing producer in Japan. Also, Toyota and Okazaki

cities, which are adjacent to one another, are the manufacturing center of Aichi and major manufacturing enterprises are densely located. Therefore, we expect that SMEs in those cities gain more opportunities of transaction and business partnership to larger enterprises and the management tends to be increasingly dependent upon large enterprises, which entails a great contrast to SMEs in other regions.

The second group is SMEs in adjoining Gifu and Kakamigahara cities, whose distance to Toyota and Okazaki cities are almost 100km. They are chosen for the sample because the characters of those SMEs are typical and average, and they are not particularly characterized by anything in terms of the geography, economy and manufacturing concentration. This study intends to use the sample as average SMEs that are to be compared with unique SMEs in Aichi and following Nagano.

Third, Okaya and Suwa cities in Nagano prefecture are selected because SMEs in the cities are one of the most studied group of SMEs by Japanese Economic Geographers and widely known for the success of the well-functioning industry network among local SMEs in Japan (Braun 2002; Izushi 2003). Since the objective of this research is the investigation of the correlation between trust and dependency, the industrial network spread over Okaya-Suwa area is the idealist subject for the examination the influence of trust on industry network. The rate of collection and share of respondent industries in the three prefectures are organized in Table 1.

The questionnaire items are group into three categories in Table 2. The first category is network category, used to organize the dependent variable, and this is to measure how much the management and transactions of SMEs are embedded in and dependent upon industrial network. Since network is a vague concept and hardly cognitive even by person in the network, the questionnaire queried how much management and transactions of enterprise are interdependent among enterprises, which is intended captures the density and strength of industry network.

In order to help the questions being specific, three types of dependency are arranged in the items. First, this category queries the dependency of the management of SMEs on large enterprises, which is to capture vertical network between large enterprises and respondent SMEs. The relationship might represent upstream-downstream, parent-affiliation or contractor-subcontractor relationship. Second, it also asks the dependency on other SMEs and this is concerned with the presence of horizontal network among SMEs with homogenous size. Third, in addition to the distinction between the two sizes of enterprise,

this question adds a regional axis and characterizes how much the industry networks are localized in the own region. Since social capital tends to develop among enterprises at high densities, this category also considers the specific dependency on regional enterprises. This regional dependency is inquired for both current and future dependency because it is useful to make sure that the dependency is currently present and expected to last long in the region.

The Second category is trust category and this is used for the examination of hypothesis I, II, III, and IV for each dependency on large enterprises, SMEs and regional enterprises. The most important types of trust in this study is trust to larger enterprises and SMEs, which are expected to reinforce industrial ties to large enterprises and SMEs, respectively. Therefore, coefficients and significances of those variables becomes the basis for the examination of hypothesis I and II. In addition to that, the current study attempt to discover growing trust as managements becomes more embedded in relationships with regional enterprises, which are shaped by hypothesis III and IV.

The third category is social and business activity and the result is used for the examination of hypothesis V. As the management and business transaction become increasingly

Table 2: The questionnaire items classified into three categories

Category	Variable	Statement
Network	Large enterprises	The management and transaction of your company is dependent upon large enterprises.
	SMEs	The management and transaction of your company is dependent upon other SMEs.
	Regional enterprises (current)	The management and transaction of your company is currently dependent upon regional enterprises.
	Regional enterprises (future)	The management and transaction of your company will continue being dependent upon regional enterprises.
Trust	Large enterprises	Large enterprises are trustworthy.
	SMEs	SMEs are trustworthy.
Activity	Personal	Personal ties with business partners are important in the management and mutually help one another.
	Inter-firm	Business inter-firm relationships are important and often voluntary support for other firms.
	Public	Public industry associations are important and often join in activities with public agencies
	Technological	Technological cooperation are important and often join in such trade and cross-industrial activities

dependent upon specific networks, other social cooperation and collective activities, such as personal, voluntary, public, and technological activities, becomes less meaningful to be invested. Four types of business activities are chosen for this category, which are personal business partnership, voluntary bilateral cooperation between firms, participation to public association of commerce and industry, and technological cooperation and exchange with other enterprises.

The respondents evaluate each statement by the following Likert scale in five degrees; 5, 4, 3, 2 and 1, for “agree very much”, “agree”, “neutral”, “disagree” and “disagree very much”. These responses are directly used for the independent variables.

4. Result

Logit analysis was performed for independent variables in trust and activity categories. The analysis was performed on firm-level data, that is, individual responses from sample SMEs. The dependent variable was a binary datum, either 1 or 0 for all examinations. More specifically, the dependent variable was 1 when the SMEs were strongly dependent (responses of 5 or 4) and 0 when they were not dependent (responses of 3, 2 or 1).

Table 2 shows the result of the first logit analysis on the five models. Model 1 includes all independent variables; models 2 and 3 include only variables in trust and activity categories, respectively. Model 4 considers only trust of SMEs for the independent variable. For Model 5, the independent variables are selected based on the stepwise method, and the selection is designed to maximize AIC for the fittest combination of the variable. Finally, the lower half of Table 2 presents the average, standard deviation of each group and their t-statistics.

The dependent variable shown in Table 2 is management dependency on large enterprises; firms are classified as ‘dependent’ when the response is either 5 or 4 and ‘not dependent’ otherwise. The important finding in Table 2 is that the management and transactions becomes increasingly dependent on large enterprises as trust to large enterprises improves. In contrast, the trust of other SMEs is indefinite or even negative due to the insignificant negative coefficient. At least, the former result supports the idea that trust of large enterprises is specific to the relationship with large enterprises; therefore, hypothesis I is confirmed. Regarding the activity category, we found a positive correlation in personal cooperation and a negative correlation in inter-firm cooperation. This implies that strong dependency on large enterprises erodes horizontal cooperative networking among firms, but

Table 3: Logit Analysis for Dependency on Large Enterprises; Dependent Variable is 1 for 5, 4 and 0 for 3, 2, 1

	Trust			Activity				AIC
	Intercept	Large enterprises	Local SMEs	Personal	Inter-firm	Public	Technological	
Model 1	-2.163 0.35977	0.855 0.00558**	-0.131 0.74324	0.833 0.03844*	-0.648 0.03765*	0.119 0.66057	-0.099 0.73086	164.68
Model 2	-0.849 0.67274	0.932 0.00171**	-0.480 0.17144					164.39
Model 3	-1.521 0.3851			0.894 0.0109	-0.516 0.0513*	0.073 0.7707	-0.115 0.6656	165.99
Model 4	0.481 0.626		-0.06238 0.823					170.97
Model 5	-3.155 0.05618	0.7538 0.0055**		0.8589 0.01509*	-0.7382 0.00787**			155.64
Average and standard deviation								
Avg. 5, 4		3.41	3.47	4.24	3.29	2.99	2.94	
Avg. 3, 2, 1		3.02	3.49	3.96	3.53	3.15	3.13	
Stdv. 5, 4		0.83	0.68	0.52	0.77	1.06	0.95	
Stdv. 3, 2, 1		0.77	0.64	0.71	0.80	0.79	0.79	
t-test between groups								
t-value		2.73	-0.16	2.43	-1.66	-0.99	-1.21	
p-value: one tail		0.0037	0.4364	0.0085	0.0498	0.1620	0.1142	
Boundary: one tail		1.66	1.66	1.66	1.66	1.66	1.66	
p-value: two tail		0.0073	0.8728	0.0170	0.0996	0.3240	0.2284	
Boundary: two tail		1.98	1.98	1.99	1.98	1.98	1.98	

The level of significance is 0.05 for *, 0.01 for ** and 0.001 for ***

personal exchanges are important for smooth transactions in vertical linkages known as the *keiretsu* system.

As Table 3 shows, SMEs' trust of large enterprises declined as the management and transactions became more integrated with other SMEs, even though the significance is weakly held at the 10% level. This suggests that trust might have a critical role in the vertical disintegration of production organizations. In the meantime, no clear result was found in the coefficient of trust in other SMEs, which implies that management dependency on SMEs is not necessarily supported by trust to them. Therefore, for hypothesis II and the industry networking among SMEs, we do not conclude that dependency on other SMEs is undergirded by trust. In addition, in social and business activities, the coefficient of inter-firm cooperation was significant; it indicated that collective and cooperative behavior can be promoted as enterprises become more dependent on other SMEs, as seems reasonable.

The analysis of the territorial scope of interdependency and comparing SMEs more and less dependent on regional enterprises, shown in Table 4 is important to the extent that local

Table 4: Logit Analysis for Dependency on SMEs; Dependent Variable is 1 for 5, 4 and 0 for 3, 2, 1 for 3, 2, 1

	Trust			Activity			AIC	
	Intercept	Large enterprises	Local SMEs	Personal	Inter-firm	Public		Technological
Model 1	-4.921 0.046*	-0.541 0.071	0.312 0.430	0.170 0.667	0.467 0.145	-0.134 0.636	-0.084 0.778	157.98
Model 2	-4.562 0.0367*	-0.468 0.097	0.424 0.0991					153.22
Model 3	-3.267 0.0859*			0.246 0.4849	0.503 0.0768	-0.072 0.7872	-0.034 0.9027	155.18
Model 4	-1.9183 0.0787		0.3103 0.3076					152.67
Model 5	-4.6814 0.0285*	-0.3958 0.1224			0.5454 0.0551*			149.29
Average and standard deviation								
Avg. 5, 4		3.14	3.57	4.22	3.59	3.03	3.00	
Avg. 3, 2, 1		3.29	3.44	4.08	3.31	3.07	3.03	
Stdv. 5, 4		0.89	0.60	0.67	0.72	0.93	0.97	
Stdv. 3, 2, 1		0.80	0.68	0.60	0.80	0.97	0.85	
t-test between groups								
t-value		-0.92	1.02	1.05	1.96	-0.23	-0.19	
p-value: one tail		0.1807	0.1554	0.1481	0.0271	0.4089	0.4251	
Boundary: one tail		1.67	1.67	1.67	1.67	1.67	1.67	
p-value: two tail		0.3613	0.3109	0.2962	0.0541	0.8177	0.8503	
Boundary: two tail		2.00	1.99	2.00	1.99	1.99	2.00	

The level of significance is 0.05 for *, 0.01 for ** and 0.001 for ***

networks transmit the reputations of individual firms through face-to-face communications and local buzz. Local networks also provide incentives to behave trustworthily with regional enterprises. The significantly positive coefficients of both trust to large enterprises and to other SMEs supported this supposition. Unlike the previous two cases, however, technological cooperation improved as local SMEs became more embedded in a regional network, but the role of public association declined.

Finally, Table 5 exhibits the result for the future dependency on regional enterprises. Contrary to the current dependency, the future dependency includes why local SMEs decided to continue utilizing the local industry network. The result was quite similar to the previous result. Both large enterprises and other SMEs were trustworthy, and participation in technological exchanges improved. In addition, personal ties impacted relationships positively, and this implies that long-term commitment to a regional industry network is also supported by personal exchanges.

The combination of results shown in Table 4 and Table 5, clearly indicate that an SME's

Table 5: Logit Analysis for Current Dependency on Regional Enterprises; Dependent Variable is 1 for 5, 4 and 0 for 3, 2, 1

	Trust			Activity			AIC	
	Intercept	Large enterprises	Local SMEs	Personal	Inter-firm	Public		Technological
Model 1	-3.673 0.12174	0.740 0.01773*	0.160 0.681	0.412 0.30143	-0.091 0.77071	-1.094 0.00159**	1.035 0.00335**	159.05
Model 2	-2.503 0.2114	0.671 0.0164*	0.259 0.4452					167.72
Model 3	-2.382 0.18211			0.333 0.3162	0.210 0.42889	-0.876 0.00325**	0.951 0.00244**	163.18
Model 4	-2.1409 0.0374*		0.5867 0.0432*					168.55
Model 5	-2.9367 0.01058*	0.8689 0.00144**				-1.0021 0.00181**	1.0187 0.00212**	151.37
Average and standard deviation								
Avg. 5, 4		3.48	3.60	4.19	3.45	2.90	3.16	
Avg. 3, 2, 1		3.03	3.37	4.06	3.34	3.20	2.91	
Stdv. 5, 4		0.82	0.62	0.54	0.80	1.04	0.87	
Stdv. 3, 2, 1		0.77	0.67	0.68	0.78	0.85	0.88	
t-test between groups								
t-value		3.14	2.01	1.16	0.73	-1.76	1.56	
p-value: one tail		0.0011	0.0235	0.1249	0.2336	0.0406	0.0604	
Boundary: one tail		1.66	1.66	1.66	1.66	1.66	1.66	
p-value: two tail		0.0022	0.0470	0.2497	0.4671	0.0811	0.1207	
Boundary: two tail		1.98	1.98	1.98	1.98	1.98	1.98	

The level of significance is 0.05 for *, 0.01 for ** and 0.001 for ***

greater dependency on a regional industry network improves trust of large enterprises as well as of other SMEs. Furthermore, inter-firm trust takes an important role in promoting the solidarity and cohesiveness of regional enterprises. Thus, both hypotheses III and IV are confirmed.

Finally, regarding hypothesis V, we found a unique activity that significantly improved as the management and transactions of local SMEs became embedded in industry ties for each dependency. This information is presented in Table 6. First, personal exchanges increased as local SMEs were increasingly tied to large enterprises. Since trust to large enterprises simultaneously improved, such personal exchanges might stand for associations between managers of local SMEs and large-enterprise employees in charge of transactions with the SMEs. In addition, as SMEs became mutually interdependent, inter-firm cooperative activities increased.

This suggests that horizontal cooperation among SMEs is facilitated as they become embedded in an industrial network supported by relatively stronger trust. Moreover,

Table 6: Logit Analysis for Future Dependency on Regional Enterprises; Dependent Variable is 1 for 5, 4 and 0 for 3, 2 and 1

	Trust			Activity				AIC
	Intercept	Large enterprises	Local SMEs	Personal	Inter-firm	Public	Technological	
Model 1	-2.601 0.2797	0.512 0.0888*	0.449 0.258	0.823 0.0478*	0.174 0.5814	-0.442 0.1383	0.712 0.0233**	154.16
Model 2	-0.198 0.9225	0.520 0.0616*	0.654 0.0636*					156.18
Model 3	-3.866 0.0353*			0.420 0.2134	0.444 0.0957*	-0.350 0.1921	0.719 0.0121*	161.37
Model 4	-2.4366 0.0229*		0.8344 0.007**					159.60
Model 5	-0.8592 0.6885	0.531 0.0531*	0.7679 0.0301*	0.6345 0.0896*				153.91
Average and standard deviation								
Avg. 5, 4		3.43	3.61	4.17	3.51	3.08	3.17	
Avg. 3, 2, 1		2.96	3.27	4.04	3.21	3.02	2.79	
Stdv. 5, 4		0.81	0.63	0.58	0.73	1.01	0.91	
Stdv. 3, 2, 1		0.77	0.64	0.68	0.85	0.86	0.80	
t-test between groups								
t-value		3.23	2.89	1.11	2.05	0.35	2.45	
p-value: one tail		0.0008	0.0023	0.1359	0.0216	0.3647	0.0079	
Boundary: one tail		1.66	1.66	1.66	1.66	1.66	1.66	
p-value: two tail		0.0017	0.0047	0.2718	0.0433	0.7294	0.0157	
Boundary: two tail		1.98	1.98	1.99	1.99	1.98	1.98	

The level of significance is 0.05 for *, 0.01 for ** and 0.001 for ***

Table 7: Significant Coefficients of Social and Business Activities in the Results; the plus (+) Sign Stands for Positive Correlation and the (-) Sign Represents Negative Correlation of Dependency

	Personal	Inter-firm	Public	Technological
Large enterprises	+	-		
SMEs		+		
Regional (current)			-	+
Regional (future)	+			+

participation in technological exchanges increased as local SMEs became more involved in a regional industry network; at the same time, this contributed to trust in other enterprises. Such result suggests that SMEs within a region enjoy more opportunities for technological exchange, and the suggestion becomes even stronger when the SMEs are integrated into a region through an industry network. Since the SMEs share a stake in formal business transactions, this seems reasonable. Although significant improvement was not found in all

social and business activities, each dependency was uniquely associated with the enhancement of specific social and business ties. In that sense, hypothesis V— 'When SMEs' management and transactions depend more on other enterprises, participation in social and business activities increases' — is confirmed.

5. Conclusion

To sum up our findings, when local SMEs were increasingly dependent on larger enterprises, only the trust of large enterprises improved; therefore, trust is specific to relationship on a one-on-one level. Thus, the study confirms hypothesis I. For hypothesis II, the study could not find significant evidence and found only a decline of trust in large enterprises as they became increasingly networked to other SMEs. Therefore, this study rejects hypothesis II and finds that trust specific to relationship is not applicable to industry networking among SMEs.

Moreover, as to hypotheses III and IV, both trust of large enterprises and of SMEs were significantly improved as local SMEs are more oriented towards regional interdependency. This was confirmed for both current and future dependency and provides reasonable evidence that trust was built in the local community through face-to-face communication and local buzz via the regionally integrated network.

Finally, regarding hypothesis V, the type of dependency distinguishes the enlivenment of form of social and business activities. As summarized in Table 6 each social and business activity is specifically improved for each dependency. Therefore, trust within firms does not evenly contribute to collective and cooperative activities, but distinguishes them according to the production organization and firms' needs.

Note

- 1) Regarding empirical studies, Cooke et al. (2005) evaluated the impact of social capital on the performance of local small- and medium-sized enterprises in 12 UK regions. Beugelsdijk and Schaik, (2005) investigated the regional differences in the social capital index across western European regions and its influence on regional economic development. Iyer et al. (2005) examined the spatial variety of social capital in the US, while Miguélez et al. (2005) determined that enhanced regional social capital yielded more patents. In addition, many recent studies emphasized the role of social capital in the regional innovation process (Hauser, 2007; Echebarria & Barrutia, 2011).

- 2) Moody and Paxton (2009) argue that, among many definitions of social capital, two things are in common. First, the certain social and economic actions are facilitated through the access and mobilization of social ties, and second the access and mobilization of social ties are supported by the quality of institutional factors such as trust, shared norms, beliefs and values (Lin 2008)

References

- Alexander, J. C. (2006) *The Civil Sphere*, New York: Oxford University Press.
- Amin, A. (1999) An Institutional Perspective on Regional Economic Development, *International Journal of Urban and Regional Research*, 23: 65-78
- Amin, A. and Thrift, N. (1994) Living in the Global. In *Globalization, Institutions and Regional Development in Europe*, (eds.) A. Amin and N. Thrift, 1-22, Oxford, U.K.: Oxford University Press.
- Arregle, J., Hitt, M. A., Sirmon, D. G. and Very, P. (2007) The Development of Organizational Social Capital and Attributes of Family Firms, *Journal of Management Studies*, 44 (1): 73-95
- Audretsch, D. B., Aldridge, T. T. and Sanders, M. (2011) Social Capital Building and New Business Formation: A Case Study in Silicon Valley, *International Small Business Journal*, 29 (2): 152-169
- Bade, F. J. and Nerlinger, E. A. (2000) The Spatial Distribution of New Technology-based Firms: Empirical Results for West-Germany, *Papers in Regional Science*, 79: 155-176
- Baker, W. E., and Faulkner, R. R. (1993). The social organization of conspiracy: Illegal networks in the heavy electrical equipment industry. *American Sociological Review*, 58, 837-860
- Bathelt, H. and Glückler, J. (2011) *The Relational Economy, Geographies of Knowing and Learning*, Oxford, Oxford University Press.
- Beugelsdijk, S. and Van Schaik, T. (2005) Differences in Social Capital Between 54 Western European Regions, *Regional Studies*, 39: 1053-1064
- Burt, R. S. (1992) *Structural Holes: The Social Structure of Competition*. Cambridge, MA: Harvard University Press.
- Bowles, S. and Gintis, H. (2002) Social Capital and Community Governance, *The Economic Journal*, 112 (November): F419-F436
- Braun, B., Gaebe, W., Grotz, R., Okamoto, Y., and Yamamoto, K. (2002) Regional networking of small and medium-sized enterprises in Japan and Germany: evidence from a comparative study, *Environment and Planning A*, 2002, 34 (1): 81-99
- Camagni, R. eds. (1991) *Innovation Networks: Spatial Perspectives*, London, Belhaven Press.
- Coleman, J. (1988) Social Capital in the Creation of Human Capital, *American Journal of Sociology*, 94: 95-120
- Coleman, J. (1990) *Foundations of Social Theory*, Cambridge, MA: Harvard University Press.
- Cooke, P. and Morgan, K. (1998) *The Associational Economy, Firms, Regions and Innovation*, Oxford: Oxford University Press.
- Cooke, P., Clifton, N. and Oleaga, M. (2005) Social Capital, Firm Embeddedness and Regional

- Development, *Regional Studies*, 39: 1065-1077
- Dahl, M. and O. Sorenson, 2007, Home Sweet Home: Social Capital and Location Choice, *Paper for the DRUID Summer Conference 2007*
- Durlauf, S. N. (2002) On The Empirics of Social Capital, *The Economic Journal*, 112 (483): F459-F479
- Echeberria, C. and Barrutia, J. M. (2011) Limits of Social Capital as a Driver of Innovation: An Empirical Analysis in the Context of Europe, *Regional Studies*, iFirst article: 1-17
- Evans, P. (1996) Government Action, Social Capital and Development: Reviewing the Evidence on Synergy, *World Development*, 24 (6): 1119-1132
- Farole, T., Rodrigues-Pose, A. and Stoper, M. (2011) Human Geography and the Institutions that Underlie Economic Growth, *Progress in Human Geography*, 35 (1): 58-80
- Feldman, M. P., Francis, J. and Bercovitz, J. (2005) Creating a Cluster While Building a Firm: Entrepreneurs and the Formation of Industrial Clusters, *Regional Studies*, 39 (1): 129-141
- Fine, B. (2001) *Social Capital versus Social Theory: Political Economic and Social Science at the Turn of the Millennium*, Routledge.
- Fox, J. (1996) How Does Civil Society Thicken? The Political Construction of Social Capital in Rural Mexico, *World Development*, 26 (4): 1089-1103
- Fukuyama, F. (1995). *Trust: The social virtues and the creation of prosperity*. New York: Free Press.
- Giannetti, M. and Simonov, A. (2009) Social Interactions and Entrepreneurial Activity, *Journal of Economics & Management Strategy*, 18 (3): 623-663
- Glaeser, E. and Kerr, W. R. (2009) Local Industrial Conditions and Entrepreneurship: How Much of the Spatial Distribution Can We Explain?, *Journal of Economics & Management Strategy*, 18 (3): 623-663
- Granovetter, M. (1985) Economic Action and Social Structure: The Problem of Embeddedness, *American Journal of Sociology*, 91: 481-510
- Guizo, L., Sapienza, R. and Zingale, L. (2003) People's Opium? Religion and Economic Attitudes, *Journal of Monetary Economics*, 50 (1): 225-285
- Guizo, L., Sapienza, R. and Zingale, L. (2006) Does Culture Affect Economic Outcomes? *Journal of Economic Perspective*, 20 (2): 23-48
- Hauser, C. (2007) The Learning Region: The Impact of Social Capital and Weak Ties on Innovation, *Regional Studies*, 41 (1): 75-88
- Hayami, Y. (2009) Social Capital, Human Capital and the Community Mechanism: Toward a Conceptual Framework for Economists, *Journal of Development Studies*, 45 (1): 96-123
- Heckman, J. (2000) Causal Parameters and Policy Analysis in Economics: A Twentieth Century Retrospective, *Quarterly Journal of Economics*, 115: 45-97
- Heller, P. (1996) Social Capital as a Product of Class Mobilization and State Intervention: Industrial Worker in Kerala, India, *World Development Report*, 24: 1055-1071
- Holt, L. (2008) Embodied Social Capital and Geographic Perspectives: Performing the Habitus, *Progress in Human Geography*, 32 (2): 227-246
- Huber, F. (2009) Social Capital of Economic Clusters: Towards a Network-Based Conception of

- Social Resources, *Tijdschrift voor economische en sociale geografie*, 100 (2): 160-170
- Iannaccone, L. (1988) A Formal Model of Church and Sects, *American Journal of Sociology*, 94: 241-268
- Inkpen, A and Tsang, E. (2005) Social Capital, Network and Knowledge Transfer, *Academy of Management Review*, 30 (1): 146-165
- Iyer, S., Kitson, M. and To, B. (2005) Social Capital, Economic Growth and Regional Development, *Regional Studies*, 39 (8): 1015-1040
- Izushi, H. (2003) Impact of the length of relationships upon the use of research institutes by SMEs, *Research Policy*, 32: 771-788
- Joshi, A. (2006) The Influence of Organizational Demography on the External Networking Behavior of Teams, *Academy of Management Review*, 31: 583-595
- Krippner, G., Granovetter, M., Block, F., Beamish, T., Hsing, Y. et al. (2004) Polanyi Symposium: A Conversation on Embeddedness, *Socioeconomic Review*, 2: 109-135
- Lambooy, J. G. (2010) Knowledge Transfers, Spillovers and Actors: The Role of Context and Social Capital, *European Planning Studies*, 18 (6): 873-891
- Layman, G. (1997) Religion and Political Behavior in the United States: The Impact of Beliefs, Affiliations, and Commitment from 1980 to 1994, *Public Opinion Quarterly*, 61: 288-316
- Lee, R. (2009) Social Capital and Business and Management, *International Journal of Management Review*, 11 (3): 247-273
- Levinson, A. (1996) Environmental Regulations and Manufacturers' Location Choices: Evidence from the Census of Manufacturers, *Journal of Public Economics*, 62: 5-29
- Lundvall, B. A. (2006) Interactive Learning, Social Capital, and Economic Performance, in Kahin, B. and Goray, D. (eds.) *Advancing Knowledge and the Knowledge Economy*, pp. 63-74, MIT Press, Cambridge, MA.
- Malecki, E. J. (2011) Regional Social Capital: Why It Matters, *Regional Studies*, iFirst article: 1-17
- Malmberg, A and Maskell, P. (1999) Localized Learning and Industrial Competitiveness, *Cambridge Journal of Economics*, 23: 167-185
- Manza, J. and Brooks, C. (1997) The Religious Factor in U.S. Presidential Elections, *American Journal of Sociology*, 103: 38-81
- Martin, R. and Sunley, P. (1996) Paul Krugman's Geographical Economics and Its Implications for Regional Development Theory: A Critical Assessment, *Economic Geography*, 72: 259-292
- Miguélez, E., Moreno, R. and Artís, M. (2011) Does Social Capital Reinforce Technological Inputs in the Creation of Knowledge? Evidence from the Spanish Regions, *Regional Studies*, 45: 1019-1038
- Murphy, J. T. (2006) Building Trust in Economic Space, *Progress in Human Geography*, 30 (4): 427-450
- Narayan, D. (2002) Bonds and Bridges: Social Capital and Poverty, in J. Isham, T. Kelly, S. Ramaswamy (eds.) *Social capital and economic development: well-being in developing countries*, Edward Elgar Publishing
- Ostrom, E. (1996) Crossing the Great Divide: Coproduction, Synergy and Development, *World Development*, 24 (8): 1073-1087

- Patulny, R. V. and Svendsen, G. (2007) Exploring the Social Capital Grid: Bonding, Bridging, Qualitative, Quantitative, *International Journal of Sociology and Social Policy*, 27 (1,2): 32-51
- Pearson, A. W., Carr, J. C. and Shaw, J. C. (2008) Toward a Theory of Familiness: A Social Capital Perspective, *Entrepreneurship Theory and Practice*, 32 (6): 949-969
- Putnam R. D. (1993) *Making Democracy Work: Civic Traditions in Modern Italy*, Princeton University Press.
- Putnam, R. D. (2000). *Bowling alone: The collapse and revival of American community*. New York: Simon and Schuster.
- Portes, A. and Sensenbrenner, J. (1993) Emeddedness and Immigration: Notes on the Social Determinants of Economic Action, *American Journal of Sociology*, 98: 1320-1350
- Rutten, R., Westlund, H. and Boekema, F. (2010) The Spatial Dimension of Social Capital, *European Planning Studies*, 18 (6): 863-871
- Staber, U (2007) Contextualizing Research on Social Capital in Regional Clusters, *International Journal of Urban and Regional Research*, 31 (3); 505-521
- Staber, U. (2011) Partners Forever? An Empirical Study of Relational Ties in Two Small-Firm Clusters, *Urban Studies*, 48 (2): 235-252
- Staber, U. and Sautter, B. (2010) Who Are We, and Do We Need to Change? Cluster Identity and Life Cycle, *Regional Studies*, i-First article
- Stam, E. (2007) Why Butterflies Don't Leave: Locational Behavior of Entrepreneurial Firms, *Economic Geography*, 83 (1): 27-50
- Stoper, M (1997) *The Regional World: Territorial Development in a Global Economy*, New York: The Guilford Press.
- Storper, M. and Venables, A. J. (2004) Buzz: Face-To-Face Contact and the Urban Economy, *Journal of Economic Geography*, 4: 351-370
- Svendsen, G. L. H. and Svendsen, G. T. (2003) *The Creation and Destruction of Social Capital: Entrepreneurs, Co-operative Movements and Institutions*, Cheltenham, UK: Edward Elgar.
- Tocqueville, A. (1988) *Democracy in America* (J. P. Mayer eds., Lawrence, Trans.) New York: Harper & Row
- Tendler, J. (1997) *Good Government in the Tropics*, Baltimore: The Johns Hopkins University Press.
- Tomlinson, P. R. (2010) Co-operative Ties and Innovation: Some New Evidence for UK *Manufacturing, Research Policy*, 39 (6): 762-775
- Tura, T. and Harmaakorpi, V. (2005) Social Capital in Building Regional Innovative Capability, *Regional Studies*, 39 (8): 1111-1125
- Uslaner, E. (2002) *The Moral Foundations of Trust*, Cambridge University Press, Cambridge.
- Wade, R. (1985) The Market for Public Office: Why the Indian State is not Better at Development, *World Development*, 13 (4): 467-497
- Weber, M. (1958) *The Protestant Ethic and the Spirit of Capitalism*, New York: Charles Scribner's Sons.
- Woolcock, M. (1998) Social Capital and Economic Development: Toward a Theoretical Synthesis and Policy Framework, *Theory & Society*, 27: 151-208

Trust and Interdependency in SMEs: A Firm-Level Survey in Japanese Manufacturing

Woolcock, M. and Narayan, D. (2000) Social Capital Implication for Development Theory, Research, and Policy, *World Bank Research Observer*, 15: 225-249