

**FIRMS IN NETWORKS -**  
THE CASE OF SMEs IN  
PERIPHERAL, SPARSELY POPULATED REGIONS OF SWEDEN<sup>1</sup>

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*Paper presented at the 2010 Conference of the Regional Studies Association, Regional responses to global shifts, 24<sup>th</sup>-26<sup>th</sup> May 2010*

*Session: Regional development and Firms' networks*

**THE CASE FOR THIS PAPER**

Networking has become an important part of local economic development strategies. Those networking strategies often stress the necessity for local economic agents to increase their level of collaboration between them. In that process, the regional institutions, both public and private, are deemed to play a central role.

Endogenous development strategies should not be interpreted as inward-looking. Small scale economies need to be open in order to perform. The latter has been especially put forward in the case of small state islands (Read and Staines, 2004...). Yet, we deem that the same is true for other types of territories with geographic specificities. It has already been shown that, in many instances, sparsely populated areas have characteristics that liken the ones of islands (Gloersen, 2009). The smallness and loose settlement structure in those areas leads to a *de facto* isolation of the local economies.

A consequence of sparsity and peripherality on local economic development is that there are a limited number of possibilities for developing economic interactions with other agents both within the region (long distance between settlements) and to other regions (long distance to larger markets). For the more sparsely populated parts of North Sweden's inland, the situation is even more challenging as they tend to lose population, especially at the expense of regional cores on the coast, e.g. Umeå and Luleå. Consequently, for businesses, this implies a thinning out of possibilities for economic interaction. This specificity has a strong impact on how economic agents are developing networking strategies. Whereas, for actors in larger agglomerations, such networks may emerge from the range of possible relations, for actors in sparsely populated areas, the limited range of such relations necessitate a more selective process of

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<sup>1</sup> The paper presents preliminary results from the WP on "Global engagement and local embeddedness of rural businesses" of the DERREG project, financed by the 7<sup>th</sup> Framework Programme of the EU DG Research. DERREG is managed by Michael Woods from Aberystwyth University (UK).

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networking that cannot be based on ‘on-the-spot’ interactions, as well as more proactive efforts to ‘reach out’ to potential partners. Consequently, our hypothesis is that, for firms located in peripheral, sparsely populated areas, the development of a robust network for collaboration and support activity is a *sine qua non* condition for their performance and future development. In that regard, the academic debate on ‘proximity dynamics’ enable to shed a new light on the development of economic processes in our case study region.

The debate on regional development needs to open to other alternative than the ones provided by the forces of agglomeration economies, based on the understanding that proximity matters. Yet, if proximity does matter for development of firms and regions, recent academic debates (Torre & Gilly, 2000; Torre & Rallet, 2005; Boschma, 2005b) challenge the preconception of proximity as a purely physical or geographical phenomenon. The literature, both in economics and in economy geography, identifies several types of proximity: institutional, organizational, geographical, social, cognitive, cultural... Each type of proximity brings light on a specific mode of interaction between actors. Yet, in empirical works, models for organized interactions and their respective impacts are difficult to distinguish from each other. Other modes of proximity, besides geographical proximity, are labelled by Torre and Rallet (2005) under the generic term of ‘organized’ proximity.

The corpus of literature on ‘proximity dynamics’ takes an opposing view to classical lines of thought in economic geography: geographical proximity does not have a mechanical impact on interactions, but ought to be seen as complementary to other forms of proximity (institutional, organizational, social...) (Boschma, 2005b). Thus, geographical proximity has an add-on effect, and is not a sufficient condition in itself for the enhancement of economic interactions.

Clearly, the regional setting that we are investigating can be qualified as ‘weak’ in terms of geographical proximity. The (lack of) geographical proximity is a structural dimension for those territories, it is a territorial precondition that actors have little influence upon: in our framework of analysis, we consider it as a fixed parameter. Smallness of the local economies, scattered nature of the settlement structure, combined with long distances to larger domestic (Stockholm, Gothenburg, and Malmö) and foreign agglomerations constrain the “spatial-economic horizon” of these territories, to take the metaphor used by Rallet (2002). Consequently, geographical proximity is an important issue because it bears a permanent cost for the local economies and societies.

Yet, our argument is that this relative ‘isolation’ in terms of geographical proximity do not entail weak levels of organized proximity, as Lagendijk and Lorentzen (2007) suggested it would be the case of rural regions, in their geographical-organizational proximity matrix.

On the contrary, our assumption is that the smallness and relative geographical isolation of the local economies in Northern Sweden exacerbate the need for local economic agents to establish interactions with actors located outside the local territory.

## **REGIONAL DEVELOPMENT AS A COLLECTIVE AND RELATIONAL PROCESS**

Working with the notion of proximity presupposes that the pattern of interactions bears an organizing principle that helps understanding their structure. Conceptually, a significant difference between geographical and organized proximity relates to the measurement of the distance. In the case of geographical proximity, the distance is measured by calculating the physical distance between the locations of the two organizations; in organized proximity, it is the nature and intensity of the relationship itself that characterises the distance between organizations: “organized proximity is not geographical, but relational” (Torre and Rallet, 2005).

The notion of proximity (geographical and organized) provides a conceptual framework for approaching economic interactions as a territorial phenomenon (Rallet, 2002). This territorial approach is advocated by the fact that “the geographic framework of economic interactions is largely conditioned by the role of institutions” (Torre and Rallet, 2005). Consequently, the economic space is not only composed of economic agents (i.e. firms) in transactional interactions. It involves as well more informal, less tangible forms of interactions and collaborations with other types of organizations, for instance, public agencies, educational centres or various kinds of associations. The role of such institutional actors is so important that Torre and Rallet (2005) even claim that “local policies produce geographical proximity institutionally as a privileged mode of economic interactions”.

In our framework of analysis, regional development relates to the idea that collective action creates the precondition for effective economic governance at the regional level. In that regard, the notion of organized proximity is instrumental for understanding regional development processes as it focuses on the spatial dimension of the coordination of economic development processes between actors (Rallet, 2002). More importantly than in any other types of territorial setting, the empirical work on proximity dynamics in sparsely populated areas ought to focus not only on the interactions produced by individual companies, but rather on the manner collective action (organizational, institutional and social) produce those economic interactions: “collective action is embedded in historically constructed economic structures and social institutions” (Torre and Gilly, 2000).

The importance of institutional actors in regional economic development processes is grasped through organizational proximity which is tightly connected to the notion of the “governance of territories” (Torre and Gilly, 2000), and ought to be thought as a framework for collective action. The importance of institutional actors in regional economic development processes was also previously emphasized through the works on Institutional Thickness, developed by Amin and Thrift (1994), Associational Economy, by Cooke and Morgan (1998), or Embeddedness (Granovetter, 1973; Uzzi, 1997).

Yet, the role of institutions in economic development processes should not be restricted to the regional/local dimension. Besides local institutions, the role of non-local institutions as shaping the spatial dimension of the economic process is seen as essential (Torre and Gilly, 2000).

In a recent article about the role of institutions in regional economic change, Meric S. Gertler (2010) advocated the need for a ‘reconstituted institutional economy geography’. In this claim, Gertler urges coming work on the role of institutions in regional development to provide more room for the analysis of *agency*, in the form of individual economic agents and organizations (e.g. firms, unions, trade associations, universities), and the changing pattern of *interaction* between institutions.

As a concluding remark for this section, we stress that regional development needs to be understood as intrinsically relational in nature (Amin, 2002), and the interactions between economic agents depend strongly on the structural organization of the (regional/local) economy (Kirman, 1999 *in* Rallet, 2002).

## **FIRMS, INSTITUTIONS AND REGIONAL DEVELOPMENT IN SWEDEN**

The aim of this paper is to provide further empirical evidence on the interactions between firms and institutions in regional economic development processes in the peripheral, sparsely populated areas of Sweden. In that respect, we do not start from scratch. There is an abundant literature from Swedish research on that very topic; yet, we will discuss in this section the outcomes of two articles.

The work of Bengt Johannisson and his colleagues has been a cornerstone of Swedish research on that topic. In an article published in 2002, Johannisson and his colleagues delved deeper in “the institutional embeddedness of local inter-firm networks”, thus investigating the interplay between networks of firms and the regional institutional setting. The empirical work focused on firms belonging to a small-business community specialised in the branch of furniture manufacturing. The research design stratified embeddedness in several layers: “First, embeddedness may concern, on the one hand, the structure of relations that tie economic actors together (structural embeddedness) and, on the other hand, the social strands supplementing economic strands in each relation (substantive embeddedness)”. The research concluded that “formal economic and social institutions directly (second-order embeddedness) and indirectly (third-order embeddedness) organize business activities, both those of individual firms and those of the small-firm cluster at large” (Johannisson *et al.*, 2002).

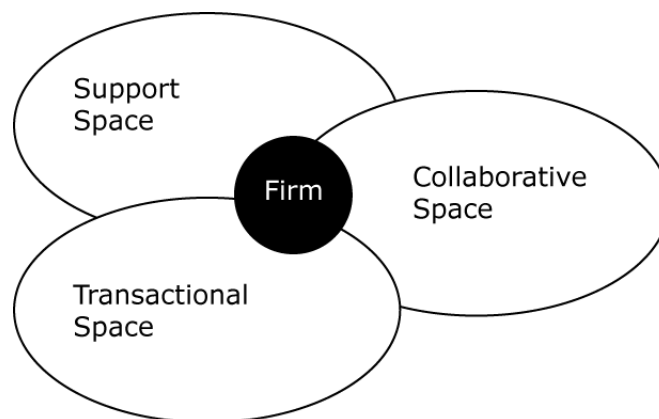
Engstrand and Sätre Åhlander published, in 2008, an article counting the outcomes of a research focusing on collaboration processes between firms, public agency and universities in two Swedish cities. The pair stresses from the outset the importance that the term ‘collaboration’ has been coined in the regional policy agenda in Sweden. Although they emphasize the fact that collaboration as a process is not new in regional development, the novelty comes from the fact that it is now “formalized and marketed, often as networks” (Engstrand and Sätre Åhlander, 2008). In their conclusions, the authors urges to have a more “realistic view of collaboration for economic development”, as collaboration does not automatically leads to economic development, i.e. to a better performance of the firms involved in such collaborative networks.

Our research differentiates itself from the previous empirical works on at least two points. First of all, our aim is to investigate the networking pattern of SMEs across a larger territorial setting consisting of the counties of Västerbotten and Norrbotten, and thus avoid to investigate this in a setting where agents, both private and public, are in a situation of geographical co-location (Johannisson and his colleagues focused on the small community of Lammhult, and Engstrand and Sätre Åhlander on clusters in Östersund and Karlskrona). In that regard, our aim is to ‘get away’ analytically from the possible effects on networking that might be attributed to geographical proximity rather than organized proximity. Second, we do not investigate a specific branch of activity in order to grasp the territorial aspects of networking rather than dimensions that may be connected to the way a particular sector of activity is organized.

### RESEARCH DESIGN AND DATA

The article presents empirical evidence of the analysis of the multiple networks in which SMEs are involved in. The article takes firms as a starting point for investigating the interaction between diverse agents and institutions, located both within and outside the borders of our case study area (i.e. the counties of Västerbotten and Norrbotten). The author has identified three main types of spaces in which the firm evolves: the *transactional space*, in which interaction are based on activities of selling and purchasing; the *collaborative space*, in which the firm develops interactions with other firms for the purpose of exchanges of information and knowledge for product, process and market development; and the *support*, in which the firm gets supports in terms of capital and information to develop further its activities.

**Figure 1: Division of the firm’s business network in three spaces**



Those spaces present a purpose-oriented division of the firms’ business networks. In many instances, those spaces are not mutually exclusive and are thus overlapping both in terms of geography and agency (an agent may belong to more than one).

This conceptual division of the firm's business network was mimicked for the sake of gathering of empirical data, through the structuring of an electronic survey. The electronic survey was created in the form of an interactive pdf form, translated in the national language (Swedish).

The first step of the empirical was to identify the sample of firms that would be targeted by our electronic survey. An extract of the *Affärsdata* database of registered Swedish limited company was performed using the following criteria: the firm should have more than 5 employees and less than 50 employees (in order to fit in the EU definition of small companies); the firm should be located in sparsely populated or 'urban-near' municipalities of the counties of Västerbotten and Norrbotten (using the delimitation of the former Swedish Agency for Rural Development, *Glesbygdsverket*). All sectors of activities, except the Agriculture, were considered in this sampling method, resulting in the identification of approximately 800 companies.

The second step consisted in contacting directly the firm in order to ask if they would be willing to participate to the survey. About 170 companies were contacted by the research team. The companies contacted were the ones for which the product offering was deemed to be potentially non-local, i.e. that the company had the potential to sell its products or services outside the local economy. The contact process followed the same pattern: the company manager was asked if he would like to take part in this survey; if the manager did not reject the offer, she was asked to provide us with her email address; and the electronic survey could be sent. From the companies contacted, 45 have completed, to date, our survey.

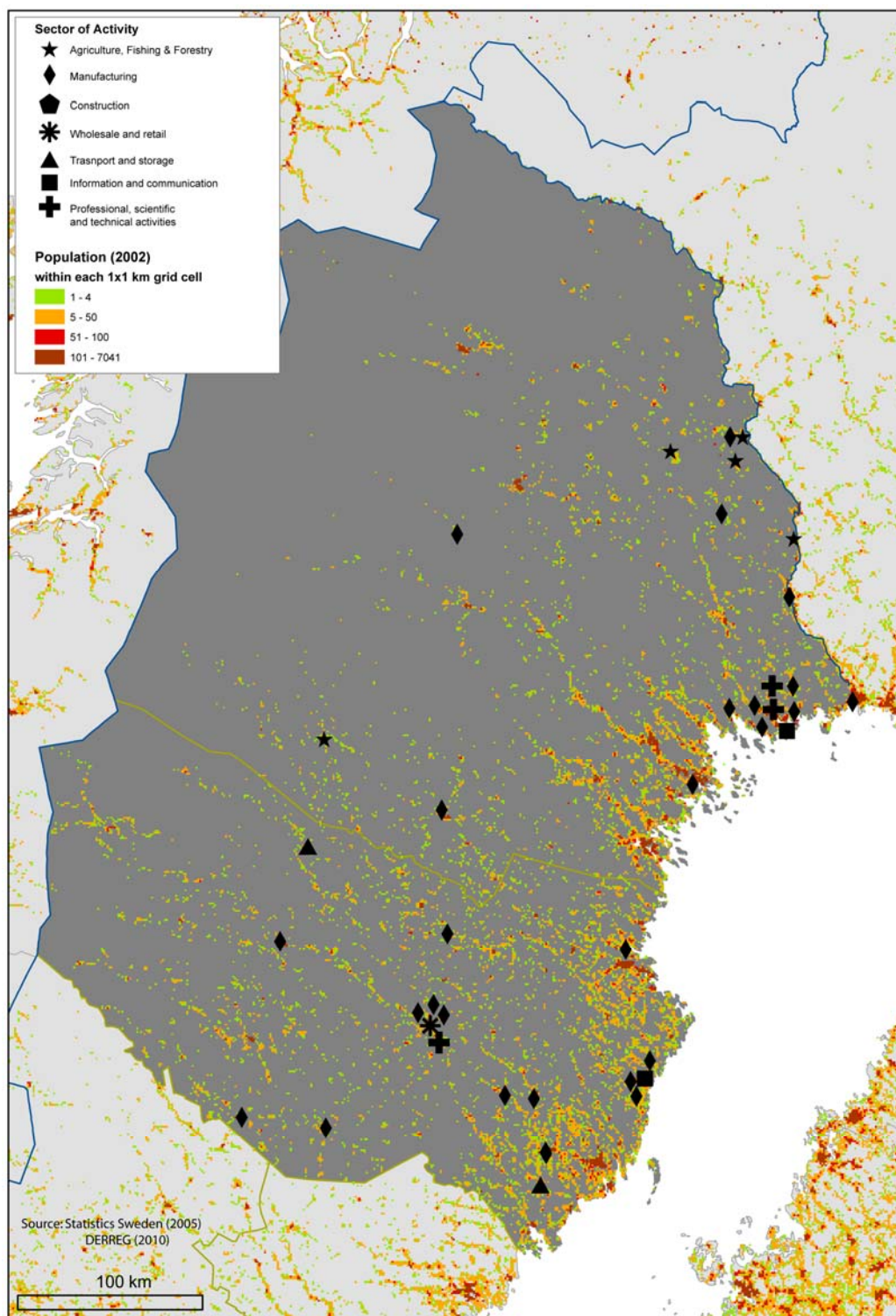
In the questionnaire, the respondent had to assess their degree of interaction with a set of actors divided into 4 territorial scales: regional, national, European and the rest of the world. The topics were: clients and suppliers; collaboration with other companies; support from institutional actors, sources of financing, membership in formalized networks and associations. For each of the topic, the respondent had to score their level of interaction with those actors from 0 (no interaction) to 4 (strong interaction). In the question relating to clients and suppliers, the respondent had to provide estimated proportion of sales and purchases occurring at the 4 different territorial levels. Finally, the respondent had to assess the impact of the recent global financial crisis on their relationship with the previous actors-by-scale.

Our 'territorial division of the world' intends to combine features of a geographical approach, from the nearer to the firm (regional) to the farther (the world), to a territorial one: indeed, the regional, the national and the European levels are governance levels that have a say in territorial development policies. Consequently, our approach of territorial proximity brings together aspects that can be found in both the notions of geographical proximity and institutional proximity, but transcends it by advocating the embeddedness of regional agents in rings of territorial development policy realms. Moreover, the territorial scale also relates to aspects that are usually attributed to institutional proximity, based on shared norms, customs and institutions (Knoben and Oerlemans, 2006; Boschma, 2005b): at the regional level, it is mainly about trust between actors; at the national level, it is more about language and shared policy praxes; at the European level, it is about common sets of rules.

**Table 1: Main characteristics of responding firms**

	Location	Firm start	Firm ownership	Branch	Firm size	Perceived level of global integration
Firm 2	Åsele	2002	National	Manufacturing	Small	Low
Firm 4	Pajala	1979	Independent firm	Manufacturing	Small	Low
Firm 6	Robertsfors	1999	Independent firm	Construction	Micro	Low
Firm 7	Robertsfors	1999	Independent firm	Professional, Scientific and Technical activities	Micro	Low
Firm 8	Kalix	1994	Independent firm	Information and Communication	Small	Low
Firm 14	Kalix	2001	Independent firm	Manufacturing	Small	Low
Firm 15	Vännäs	2004	Independent firm	Manufacturing	Micro	Low
Firm 17	Vindeln	1907	Independent firm	Manufacturing	Small	Low
Firm 18	pajala	1997	Independent firm	Manufacturing	Small	Low
Firm 22	Lycksele	1993	local/regional	Manufacturing	Small	Low
Firm 25	Robertsfors	1984	Independent firm	Manufacturing	Micro	Low
Firm 32	Kalix	2002	National	Professional, Scientific and Technical activities	Medium	Low
Firm 33	Sorsele	1959	Independent firm	Transport and Storage	Small	Low
Firm 41	Storuman	1986	Independent firm	Manufacturing	Small	Low
Firm 42	Kalix	1997	Independent firm	Manufacturing	Micro	Low
Firm 3	Vindeln	1988	Independent firm	Manufacturing	Small	Average low
Firm 5	Ånäset	2003	Independent firm	Manufacturing	Small	Average low
Firm 9	Lycksele	2007	Independent firm	Wholesale and retail trade	Micro	Average low
Firm 10	Övertorneå	1985	Independent firm	Manufacturing	Small	Average low
Firm 12	Nordmaling	1954	Independent firm	Transport and Storage	Small	Average low
Firm 13	Pajala	1850	Independent firm	Agriculture, Forestry and Fishing	Micro	Average low
Firm 19	Kalix	2009	Independent firm	Manufacturing	Small	Average low
Firm 24	Pajala	1987	Independent firm	Manufacturing	Small	Average low
Firm 28	Norsjö	1985	Independent firm	Manufacturing	Small	Average low
Firm 29	Lycksele	1967	National	Manufacturing	Small	Average low
Firm 30	Lycksele	1995	Foreign	Manufacturing	Small	Average low
Firm 31	Kalix	1980	Independent firm	Manufacturing	Micro	Average low
Firm 38	Robertsfors	1998	Independent firm	Information and Communication	Small	Average low
Firm 1	Pajala	1953	Independent firm	Agriculture, Forestry and Fishing	Small	Average high
Firm 11	Skellefteå	1940	local/regional	Manufacturing	Small	Average high
Firm 21	Arjeplog	1985	Independent firm	Agriculture, Forestry and Fishing	Small	Average high
Firm 26	Övertorneå	2007	Independent firm	Agriculture, Forestry and Fishing	Small	Average high
Firm 27	Pajala	1929	Independent firm	Agriculture, Forestry and Fishing	Small	Average high
Firm 34	Luleå	1993	Independent firm	Manufacturing	Small	Average high
Firm 36	Kalix	1995	Independent firm	Manufacturing	Small	Average high
Firm 39	Kalix	2004	Independent firm	Information and Communication	Micro	Average high
Firm 40	Arvidsjaur	1939	Independent firm	Manufacturing	Small	Average high
Firm 16	Robertsfors	1978	National	Manufacturing	Small	High
Firm 20	Dorotea	1990	Independent firm	Manufacturing	Small	High
Firm 23	Lycksele	1992	Independent firm	Professional, Scientific and Technical activities	Micro	High
Firm 35	Vännäs	1985	Independent firm	Manufacturing	Small	High

Figure 2: Geographical location of responding firms



## THE TRANSACTIONAL SPACE OF NORTH SWEDISH SMEs

The investigation of the transactional space of our sample of firms is based on the analysis of the empirical data gathered through the question in the electronic survey dedicated to ‘clients and suppliers’. Indeed, responding firms had to assess the proportion of their sales and purchases that are made in our four territorial scales (regional, national, European and the rest of the world).

The data was processed using the SME Index of Globalisation, developed by the OECD, as a basis for developing a typology of SMEs that is based on the territorial distribution of both sales and purchases. This index of globalisation has been already used in the case of SMEs located in rural peripheries (Herdzina *et al.*, 2004).

The index is based on the idea that the penetration of a firm in market will show a sort of continuous gradient across territorial scales. To give a concrete example, it seems unlikely that a firm combines sales 50% at the regional level and 50% outside Europe. It is more likely that it is 50% in the region, 30% in the country, 15% in Europe and 5% in the rest of the world. The assumption is thus that the curve displaying the transactional space of our SMEs across the scales is shaped as an ‘inverse U’ rather than as a ‘U’.

The combination of the sales and purchase profile of SMEs resulted in a typology of firms according to the degree of internationalisation of the firms’ transactional space. Five main types of firms were derived:

- *Local* firms (light blue): firms that have sales and purchases in majority occurring within the region;
- *Domestic* firms (light green): firms that have sales and purchases that are balanced between the regional and the national level;
- *National powerhouses* (grey): firms that have sales and purchasing markets essentially at the national level;
- *Internationalized interfaces* (orange): firms that have a marked internationalisation of either their sales or their purchases;
- *Globalized* (purple): firms that have both sales and purchases that are taking place outside the national borders.

**Table 2: Typology of firms according to their transactional space**

		S A L E S					Total	
		Local	Domestic	National	Internationalized	Globalized		
PURCHASES	Local	4	1		1		6	
	Domestic		1	1		4	6	
	National		4	1	5	1	2	13
	Internationalized		1	1	1	1	1	5
	Globalized			1	3	1	5	10
	Total	9	5	10	4	12	40	

The results show that the transactional space of SMEs is in no way confined to the regional scale. The importance of national and international

markets for those firms, either for selling their products and services or for getting the material inputs for their production, is marked. Out of the 40 valid responses, only six companies are deemed to be *local*, i.e. with sales and purchases taking place within the regional borders. In addition, half of the responding companies are partly or strongly involved in international trade: 13 firms belong to the category *internationalized interfaces* and 8 to the category of *globalized* firms.

The age of the firm is often used as an explanatory variable for internationalisation of their activities. In that respect, two perspectives can be opposed: on the one hand, internationalisation can be seen as the result of a maturation process, with firm starting their activities locally and gradually expanding their transactional space; on the other hand, some firms are considered as 'born-global' firms, with a 'niche' offering that already bears the potential for quick internationalisation.

In the case of our companies, the age of the company does not provide a clear-cut explanation. Out of the 21 firms that are deemed to have international activities of some extent, 4 were grounded before 1970, 5 in the seventies-and-eighties period, 4 in the 1990s and finally 8 since the turn of the century.

The results from our survey highlight the fact that belonging to peripheral, sparsely populated areas is not a defining factor for the geographical extent of the firms' transactional space. The simplistic assumption that such firms are bounded to the regional market does not hold, with the results of our empirical work as evidence. The location in sparsely populated areas is a not a constraining factor *per se* for small firms to develop international activities.

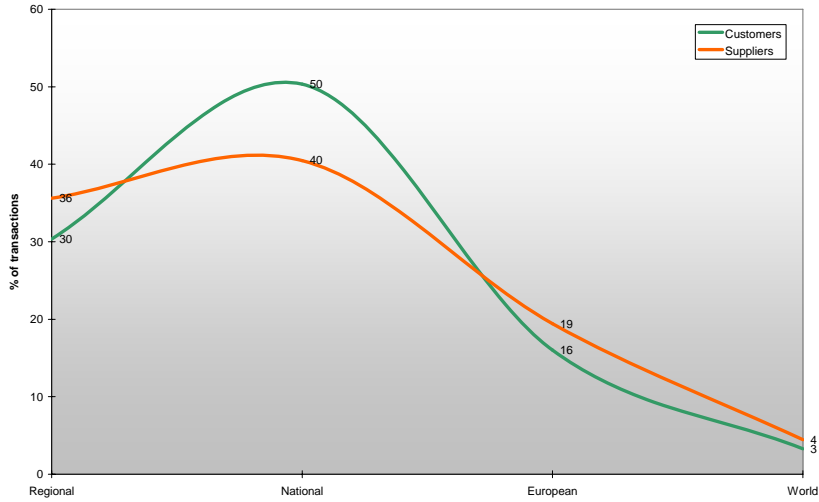
Figure 3 shows that, on average, suppliers located within the regional level correspond to 36% of total purchases, and the clients to 30% of the total purchases. This highlights the fact that most of the firm's activities are taking place outside the regional setting.

The results displayed in figures 4 and 5 show that, even for firms that have a strong international profile, only a fraction of the total transaction is taking place outside the European continent. For *Globalized* firms, about 55% of the clients and 50% of the suppliers are located in Europe, and less than 10% of them outside Europe.

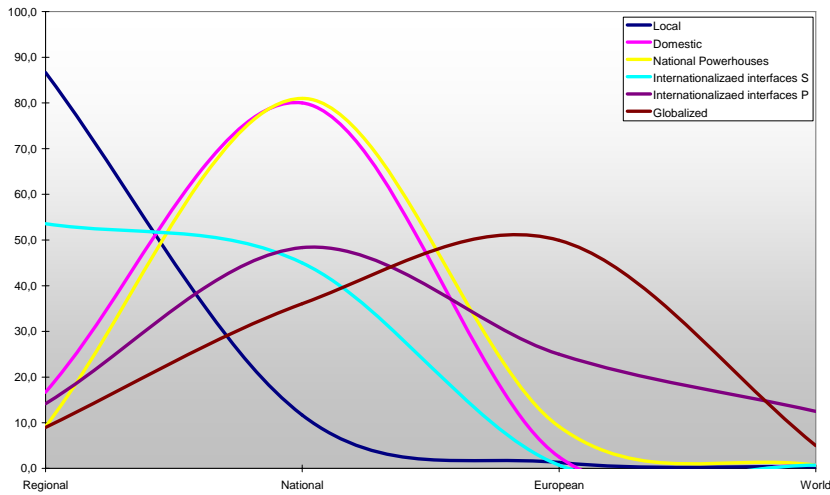
Yet, one should not restrict the importance of clients and suppliers only in terms of importance for the transactional space. In the light of Granovetter's "The strength of weak ties", we can deem that even the small number of 'global' clients and suppliers that those firms have may play a big role for them to be engaged in global networks, such companies acting as 'door-openers'.

Indeed, interactions with other firms do not solely occur in the context of transactions. Storper (1997) acknowledges the idea that collaboration between firms is also grounded on extra-transactional interactions, that he generically termed as "untraded interdependencies". This web of interactions shapes the 'Collaborative Space' that we present in this paper.

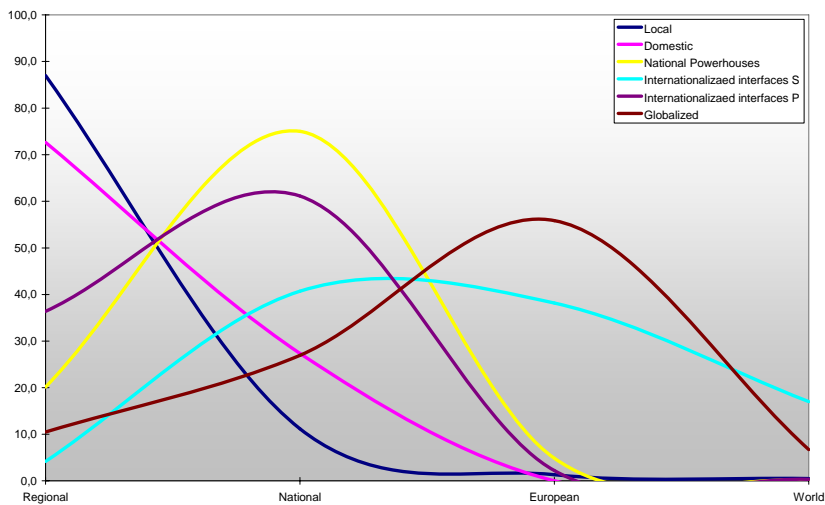
The two Spaces are not mutually exclusive. Previous European research has shown that most firms have few informal links which are not based on contacts developed through formal transactions (Tödting and Kaufmann 1999, Kaufmann and Tödting 2000).



**Figure 3**  
Average proportion of transaction taking place at different levels for all valid (40) responses



**Figure 4**  
Average proportion of purchases taking place at different levels by type of firms, according to the Index of Globalization



**Figure 5**  
Average proportion of sales taking place at different levels by type of firms, according to the Index of Globalization

## THE STRUCTURE OF SMEs' COLLABORATIVE SPACE

Firms do not only interact with other firms for transactional purposes. Interaction with other firms is indeed very important in the process of product and process development, as well as for market consolidation and expansion. These interactions are especially important for small firms as these do not have the necessary size to internalise all these types of activities (e.g. R&D, marketing). In order to palliate this, small firms engage themselves in collaborative interactions with other firms. Yet, this need for establishing collaborative requires an effort for the firms, and this, despite the recent technological advances in transport and ICT. In that regard, firms located in peripheral, sparsely populated areas have a clear disadvantage, compared with firms in other territorial settings.

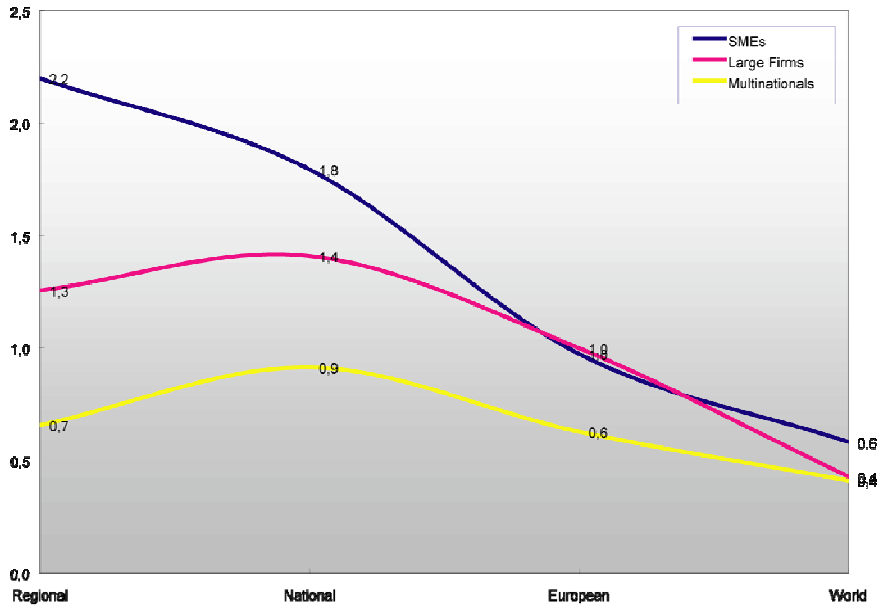
This section of the paper explores the structure of the network consisting in collaborative linkages between our sample firms and other firms. In our electronic survey, the respondents were asked to assess the level of frequency/intensity (from 0 to 4) of their interactions with defined types of firms according to size (other SMEs, Large firms, and multinational companies), located in our four territorial levels of focus (regional, national, European and worldwide). This way of proceeding enables us to measure the strength of the relationship between our sample of SMEs and other private actors.

Two main dimensions are used in this question in order to understand the structure of the firms' collaborative space. The first dimension relates to what we identified as territorial proximity. A basic assumption is that SMEs have a closer relationship with actors are belonging to the same territorial level, and that this relationship weakens when we focus on more 'distant' territorial levels. This has been corroborated in recent European research (Tödting and Kaufmann 1999, Kaufmann and Tödting 2000). The second dimension refers to the degree of operational similarity between private actors. Our hypothesis is operational similarity plays an important role for enabling collaboration ties between two private actors: SMEs are more likely to develop strong relationships with national SMEs than with regional large firms; and even less likely to have strong relations with multinational companies. The reason behind this is that we deem that firms having equivalent levels of operational similarity understand better how their collaborator works, thinks and expects in this relationship.

The results provided by the 43 respondents on the question about "Collaboration with other companies" are gathered into a 43\*12 matrix (there are 12 choices: 3 firm types by 4 territorial levels). Respondents are asked to assess their relation with these 12 types of firms, but are not compelled to do it.

A simple way to analyse this data is to calculate an average of the expressed scoring, so without taking into consideration 'blank' responses. The results of this calculation are displayed in figure 6.

**Figure 6: Averaged expressed scores to the question on “collaboration with other firms”**



The results in figure 6 corroborate our hypothesis on operational similarity: at each territorial level, our SMEs have established stronger relational ties with SME than with large firms, and thirdly with multinational companies. On the other hand, the results show mixed messages concerning our second hypothesis that assume that firms will establish strong relational ties with firms in closer territorial scales. If this is corroborated for SME-SME relationships, it is not the case for SME-Large firms and SME-multinational relationship. In both cases, the strength of relationship is higher at the national level than at the regional level. Yet, from the national to the global level, the hypothesis holds as relationships are stronger, for each type of relation, at the national level than at the European than at the global level. Clearly, this first overview of the results shows that a purely territorial approach to the collaborative space is not enough.

One weakness in this way of proceeding analytically is that it is unable to grasp the structure of the whole collaborative space: it measures relations on-by-one. Yet, we argue that the relational ties between our SMEs and other types of private actors cannot be investigated in isolation: this is the whole concept of a network! Consequently, we need to insert the individual relations into the relational context of our SMEs.

In order to do so, we use tools and methods stemming from the Social Network Analysis (Wasserman and Faust, 1994), enabling us to analyse the responses as a holistic network, instead of individual set of relationships. In general, social network analysis (SNA) has been developed in order to identify the structure of the relations between a set of actors, and to analyse the role and position of actors in that network. In usual terms, the network is composed of nodes (the actors) and links (the relations connecting two actors). The empirical work on network analysis has been performed using the UCINET<sup>3</sup> software.

<sup>3</sup> Borgatti, S.P., Everett, M.G. and Freeman, L.C. 2002. Ucinet for Windows: Software for Social Network Analysis. Harvard, MA: Analytic Technologies.

The analysis of the structure of the collaborative space using Network Analysis method has been performed using three different groupings of our sample of firms: the whole 40 firms (with valid responses on the transactional space); the 19 firms that have been classified as local, domestic or national in our index of globalisation; and the 21 firms that have been classified as internationalized or globalized in the same typology. In distinguishing our sample of firms in two groupings based on the degree of internationalisation of their transactions, we expect to know more about the correlation between the territorial extent of the transactional space and the collaborative space of SMEs.

For each of the three groupings of SMEs, we transform the matrices of size respectively 43\*12, 19\*12 and 21\*12 into three co-occurrence matrices of size 12\*12. The co-occurrence matrix is calculated by computing, for each possible pair the cross-product method takes each entry of the column for actor A in the original matrix, and multiplies it times the same entry for actor B, and then sums the result<sup>4</sup>. The associations between pairs are non-directional in nature.

How are those co-occurrence matrices useful for our analysis of SMEs' collaborative space? They give us the possibility to create a first mapping of the structure of the whole collaborative network based on individual attributes of the relational ties. They also enlighten us on the possible associations in the individual relational ties; for instance, that a strong relation with regional SMEs is cited at the same time than a strong relation with national SMEs.

Based on these co-occurrence matrices, we are, in a second step, able to calculate the degree centrality of each 12 possible actors with whom our SMEs are related to. Degree centrality is defined by Wasserman and Faust in the following terms:

*The simplest definition of actor centrality is that central actors must be the most active in the sense that they have the most ties to other actors in the network or graph.*

Wasserman and Faust, 2006, p178

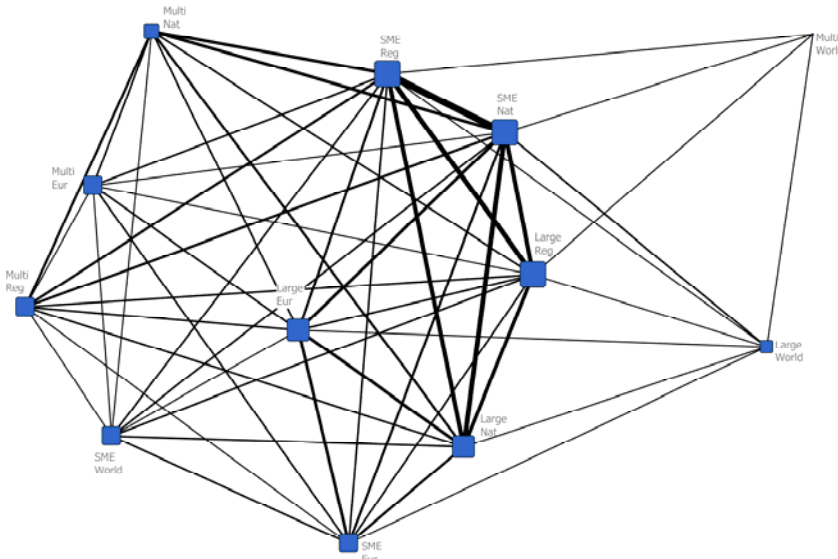
The algorithm used for calculating Degree Centrality is the one developed by Linton Freeman (1979). In concrete terms, the degree centrality of an actor is based on the number and strength of its association with other actors.

The results of the calculation of the co-occurrence matrix (strength of the association between possible pairs) and the degree of centrality are displayed in the form of graphs for our three cases: the whole sample, the local-domestic-national sample and the internationalized-globalized sample.

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A UCINET tutorial by Bob Hanneman & Mark Riddle is available at <http://faculty.ucr.edu/~hanneman/nettext/>

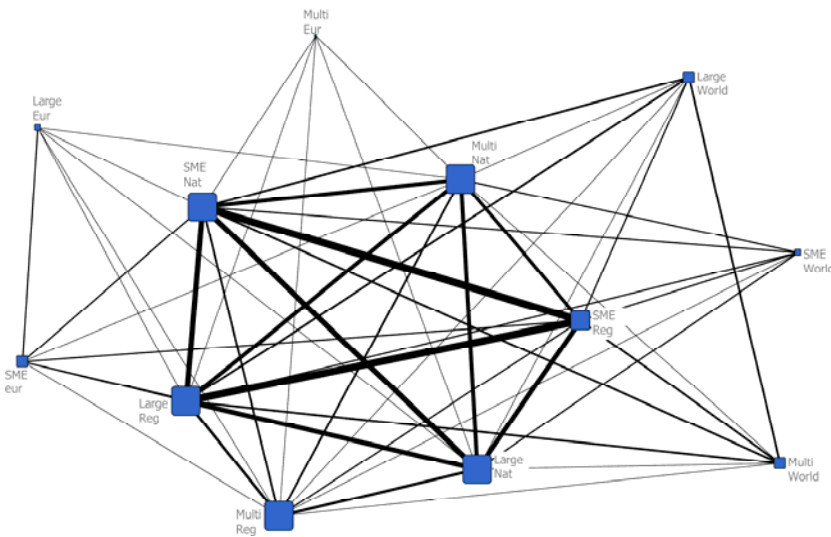
<sup>4</sup> Extracted from UCINET tutorial by Bob Hanneman & Mark Riddle is available at <http://faculty.ucr.edu/~hanneman/nettext/>



**Figure 7**

Strength of the association between pairs of relation of our SMEs with other firms (size of the link) and degree centrality of each types of actors in the network (size of the nodes)

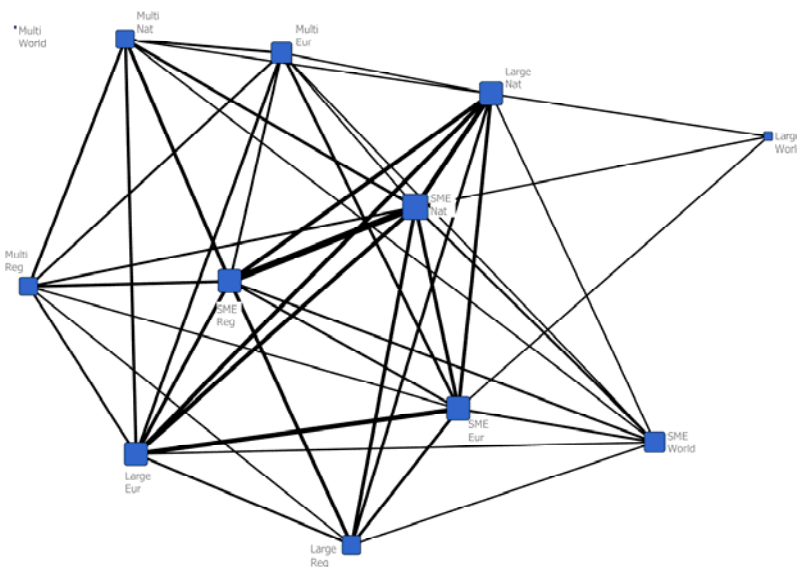
Whole sample (40 firms)



**Figure 8**

Strength of the association between pairs of relation of our SMEs with other firms (size of the link) and degree centrality of each types of actors in the network (size of the nodes)

Local-domestic-National firms (19)



**Figure 9**

Strength of the association between pairs of relation of our SMEs with other firms (size of the link) and degree centrality of each types of actors in the network (size of the nodes)

Internationalized-Globalized firms (21)

Decreasing Territorial Proximity →

	Regional	National	European	World
SME	741 (2)	767 (1)	430 (7)	311 (10)
Large Firm	593 (4)	643 (3)	480 (5)	259 (11)
Multinational	370 (8)	456 (6)	324 (9)	230 (12)

↑ Increasing Operational Similarity

Figures represent the calculated degree of (Freeman) centrality. The arrows follow the ranking of the collaboration with each type of companies (from the most central to the least one).

**Table 3**

Degree Centrality measure for the different actor-types

(Ranking into parentheses)

Whole sample (40 firms)

Decreasing Territorial Proximity →

	Regional	National	European	World
SME	259 (3)	272 (1)	41 (10)	52 (9)
Large Firm	264 (2)	213 (4)	30 (11)	65 (8)
Multinational	110 (6)	178 (5)	26 (12)	74 (7)

↑ Increasing Operational Similarity

Figures represent the calculated degree of (Freeman) centrality. The arrows follow the ranking of the collaboration with each type of companies (from the most central to the least one).

**Table 4**

Degree Centrality measure for the different actor-types

(Ranking into parentheses)

Local-domestic-National firms (19)

Decreasing Territorial Proximity →

	Regional	National	European	World
SME	428 (2)	443 (1)	341 (5)	211 (10)
Large Firm	260 (6)	357 (4)	381 (3)	125 (11)
Multinational	235 (9)	253 (7)	250 (8)	108 (12)

↑ Increasing Operational Similarity

Figures represent the calculated degree of (Freeman) centrality. The arrows follow the ranking of the collaboration with each type of companies (from the most central to the least one).

**Table 5**

Degree Centrality measure for the different actor-types

(Ranking into parentheses)

Internationalized-Globalized firms (21)

The strongest associations between actor types for our whole sample of firms (figure 7) are SME Regional-SME National (160), SME Regional-Large Firm Regional (122) and SME National-Large Firm Regional (105). In the case of the sub-sample of firms that have a transactional space mainly bounded by the domestic market (local-domestic-national types), the strongest associations between actor types are as well SME Regional-SME National (69), SME Regional-

Large Firm Regional (67) and SME National-Large Firm Regional (51). Finally, for our sub-sample of firms with an internationalized transaction market, the strongest associations displayed are SME Regional-SME National (90), SME National-Large National (66) and SME European-Large European (59).

The measurement of the Degree Centrality shows that the relationship between Territorial Proximity and Operational similarity is much more complex in the collaborative space of our sample of SMEs (See tables 3, 4 &5). It shows as well that the structure of the collaborative space is different for firms that have, on the one hand, transactions within national boundaries and, on the other hand, the ones that have a more internationalized market.

In the case of domestic firms, there is a clear distinction between the domestic space, represented by the regional and national categories, and the external space, categorized through European and World levels. Within the domestic space, multinational companies are ranked lower, which corroborates our assumption that those companies, operationally the most distant to our SMEs, are less central in our firms' collaborative space. Yet, multinational companies may act as a bridge for our domestic SMEs between the domestic realm and the extra-national one. Indeed, multinational companies at national, regional and world level are respectively ranked in 5<sup>th</sup>, 6<sup>th</sup> and 7<sup>th</sup> position in terms of degree centrality. The passage from multinational regional companies to multinational world companies as a bridge between the two spaces is clearly shown in table 4. The close collaborative space of our domestic companies is composed of SMEs and Large Firms at the regional and national level. Here, it seems that the importance of territorial proximity and operational similarity for shaping this domain is not clear-cut. The correlation between the two dimensions is indeed  $\alpha$ -shaped: with SME national been most central, then Large Firm Regional, then SME Regional and, finally, Large Firms National. In the extra-national part of the collaborative space, the interplay between territorial proximity and operational similarity is even trickier. First of all, the World level is most central than the European one, for all size of collaboration partners. This could be interpreted more as a defiance to the European level than an embracement of the global one. Second, at the World level, it seems that the size of the companies is important in order to establish collaborative relationships: multinational companies are more 'spottable' for our Swedish SMEs, and collaborating with larger entities in farther territories may reduce the risk inherent to the establishment of extra-national relationships. Third, despite the generally low centrality of the actors at national level, the ranking of its actors follow the assumption of increasing operational similarity.

The case of internationalized firms shows many differences when compared to the more domestic ones. First of all, the 'cut' in the collaborative space in terms of territorial proximity occurs at the border of Europe: the three types of economic agents representing the World level takes the three last places in the ranking. At the World level, it seems that, unlike in the case of domestic firms, increasing operational similarity engenders a least central position in the overall network. This may suggest that, unlike the 'domestic' firms, 'international' firms are more used to dealing with non-national firms and that they do not perceive the establishment relationships with foreign small firms as risky. Within Europe, it seems that the level of operational similarity has more influence than the degree of territorial proximity: multinational companies representing the regional, national and European levels are ranked the lowest within that space.

Finally, the most central part of the collaborative space for our ‘internationalized’ SMEs consists of SMEs and Large Firms at the regional, national and European levels. Here, it is difficult to highlight any clear structure. As in the case of ‘domestic’ firms, the national SMEs show the highest level of centrality. A substantial ‘jump’ in both ranking is the case of European Large Firms which are ranked third in terms of centrality for ‘internationalized’ firms, whereas it was at the 11<sup>th</sup> place for ‘Domestic’ firms. This highlights the central role played by those firms in the internationalisation process of our sample of SMEs.

Our assumptions about the influence of both operational similarity and territorial proximity for shaping the collaborative space showed mixed results. For some sub-spaces, the influence played by either of them holds true, but it is not the case for the collaborative space in its entirety. Yet, it seems that there is a strong correlation between the structure of the transactional space and the collaborative space. This has been highlighted by comparing the variation in the ranking of different actor-types for ‘domestic’ and ‘internationalized’ firms. Beyond the frontiers of the transactional space, the interplay between operational similarity and risk can be advanced as parameter for explaining the structure of the network in a rather straightforward manner. Within the transactional space, this influence of operational similarity is illustrated by the low ranking of multinational companies.

### **THE SUPPORT OF SWEDISH SMEs**

In the fourth section of this paper, we have introduced our conceptualisation of the division of SMEs’ business networks into three, partly overlapping, spaces: the transactional space, the collaborative space and the support .

The Support corresponds to the web of relationships that SMEs establish with agents that can be considered as ‘public’ agents (although the actors itself may not be publicly owned). As we have developed in the introductory chapters, by taking an institutional approach to regional development, we acknowledge the fact that such non-economic agents are strongly involved in economic development processes. Such agents can be public agencies, universities, sectoral & business associations, universities, business consultants/incubators or banks.

In our survey, we have asked the SME managers to assess, on the same principle than in previous question, the importance of their relationship of the above mentioned actors, still divided into our four territorial scales (regional, national, European and world). In order to analyse the structure of this Support , we have used the same procedures than described for the case of the collaborative space. Consequently, we will focus in the rest of this section on the results from this analysis and not on the procedure itself.



In all three cases (entire sample, domestic firms and internationalized firms), the three most central actors are respectively regional banks, national trade/sectoral associations and regional trade/sectoral associations.

For each of the two sub-groups, i.e. independently from the territorial extent of the transactional space, the support is split between, on the one hand, regional and national support agents that take all the top 10 rankings, and, on the other hand, the European and World support agents that take the bottom 10 rankings. Clearly, for SMEs, the establishment and maintenance of relations with support agents within Sweden is central.

A marked difference in the structure of the intra-national support space, between domestic and internationalized firms, is the position of regional educational centres and national public agencies: for internationalized firms, regional universities are ranked higher (6<sup>th</sup> rank) than for domestic firms (10<sup>th</sup>); and national public agencies lower (8<sup>th</sup> compared to 5<sup>th</sup>).

**Table 6: Comparison in Degree Centrality ranking**

	Firms with Local/Domestic markets		Firms with international markets	
	Freeman Centrality	Rank	Freeman Centrality	Rank
Bank Regional	790	1	733	1
Trade Assoc. National	712	2	704	2
Trade Assoc. Regional	710	3	596	3
Bank National	484	6	561	4
Research Centres National	498	4	546	5
Research Centres Regional	344	10	538	6
Public Agencies Regional	433	7	459	7
Public Agencies National	484	5	458	8
Business consultants National	392	9	386	9
Business consultants Regional	422	8	379	10
Trade Assoc. European	95	13	342	11
Research Centres European	135	11	304	12
Business consultants European	58	17	260	13
Trade Assoc. World	67	16	256	14
Business consultants World	35	20	244	15
Research Centres World	73	14	207	16
Public Agencies European	131	12	203	17
Bank European	46	18	200	18
Public Agencies World	67	15	128	19
Bank World	46	19	80	20

\* Spearman Rank Correlation  $r=0.90$

In the extra-national part of the support space, the most interesting differences between domestic and internationalized firms correspond to the lower ranking of public agencies at European level for internationalized firms (17<sup>th</sup>) than for domestic ones (12<sup>th</sup>), and an increase in centrality of European and World Business consultants for Internationalized firms compared to domestic ones (respectively 13<sup>th</sup> and 15<sup>th</sup> compared to 17<sup>th</sup> and 20<sup>th</sup>).

Consequently, if the territorial extent of the support space seems to be a fixed parameter for our SMEs, the importance of certain support agents as central nodes in the support space varies. The support agents that are gaining ranks for internationalized firms compared with domestic ones are the ones that may be connected to new knowledge regarding innovation and R&D (universities) or

market information (business consultants). While on the contrary, the support agents that rank higher for domestic firms compared with internationalized ones are public agencies, with relationships based on subsidies and programmatic support.

## **DISCUSSION AND CONCLUDING REMARKS**

In setting the case for this paper, we have highlighted that the main challenge for local economies in peripheral, sparsely populated areas is their relative small-size and isolation. This specific feature brings a paradox for local economic development. The small-size of the local economies requires that firms, in order to sustain their activities, need to find potential clients, suppliers and partners that are located beyond the local economic territory, as the number of potential economic interactions is too endogenously. Consequently, local economic development in such territories needs to be conceived as an outward-looking process. However, their relative isolation, which is similar to some extent with the challenges faced by island states and regions, is a limiting factor for doing so. The fact that those territories are both sparsely populated and peripheral engenders a higher cost for local firms to project themselves outside the local market, whether to other markets within the region or to more distant markets, both nationally and internationally. For such small firms, the cost engendered by the development of their activities outward is supplemented by increased risk-taking that is inherent to it and to the loosening of the coupling between their activities and known institutional and cultural settings. This was highlighted by our concept of territorial proximity.

Yet, in spite of that, our investigation has shown that most of the SMEs that participated to our survey have managed to overcome this limitation: most of them are quite active nationally, and half of them have even international operations. Consequently, regional economic development, understood as the development of firms that are located in the region, is essentially taking place in through interactions with companies outside the region. These results blur the simple boundary that is often made between endogenous and exogenous development.

The analysis presented in this paper has revealed that there is a correlation between the territorial shape of the transactional and collaborative networks. This correlation was illustrated by investigating the collaborative space of ‘domestic’ and ‘internationalized’ firms. Yet, further research needs to be made in order to know more on the causal links between the two: is the transactional space an outcome of the collaborative space? Or is it the contrary?

This research has nevertheless shown that the territorial extent of the support space, consisting in the web of relational ties developed by our SMEs and ‘public’ actors, is, in the state of things, a fixed parameter, confined to the regional and national domains. And this is the case for both ‘domestic’ and ‘internationalized’ firms.

The ultimate aim of this paper is to raise questions on what types of local development strategies are needed for peripheral, sparsely populated areas in

Sweden, but also for territories with similar territorial specificities in the rest of Europe. As it is too often the case, regional development policies for such territories are flagged as ‘endogenous’, but are in fact only self-centred strategies. Such territories need both strategies that are endogenous, in the sense that they enable a better exploitation of the regional assets, and outward-looking, meaning that this ought to be implemented through interactions with actors located outside the region. For those interactions, development opportunities thus need to be shaped through new forms of cooperation between actors and integration between public and private actors (Nordregio *et al.*, 2010).

In that respect, it seems that inter-regional types of territorial cooperation, which have been strongly emphasized in the context of territorial cohesion at the European level, may play a central role in this process. Such cooperation would provide incentives for expanding the support space of local economic actors by connecting them to other actors in European regions using their established regional support relations as ‘gateway’.

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