



The role of personal networks in small firm development

Paper written for the 27th world congress of the IIS, Stockholm July 5-9 2005
Economic Sociology session D

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The purpose of this paper is to develop a communicative approach to small business development. The study elucidates key mechanisms of personal networks in the studied businesses and seeks to set these mechanisms in relation to an analysis of network structure. A model is developed that seeks to capture both informational advantages and coordination advantages of personal networks. The findings are both encouraging and puzzling. Firstly, it is demonstrated that personal networks of key actors in the firm are an important resource for firms and that analysis of network structure provides important insights as to network dynamics. Secondly, it is demonstrated that the structure of a person's network is shown to correlate with the ability and willingness of the individual to take part in firm problem solving and development. Thirdly, the same kinds of networks are also shown to be an important component of overall firm performance. These results confirm the value of a social network perspective. What is puzzling is the discrepancy between the mechanisms identified in the qualitative analysis and the mechanism that are held to be important in theory.

Introduction

There is a long history of research seeking to link structures of social networks with organizational processes and outcomes (Scott 2000). An extensive but disparate literature exists on the subject within anthropology, sociology, business administration and in the study of technology transfer. These works develop analytical tools to understand how social networks shape interaction in firms and in the market place. Some of these studies have enjoyed spectacular success; perhaps particularly those approaches that see social networks from an informational perspective, that is, where social networks are analysed in terms of the informational advantages they provide. For instance, personal relationships have been shown to be a quintessential part of the bazaar where networks are used to gain information by both buyer and seller (Geertz, et al. 1979). Job markets and careers have been shown to be shaped by personal networks that connect competence and opportunity (Burt 1992; Granovetter 1973). Widespread, boundary spanning personal lines of communication have been shown to be pivotal for the transfer of technical know-how (Allen 1978).

Nonetheless, it seems clear that there are limits to an informational approach when it comes to understanding communication and social interaction in organizations. At least, when collective outcomes are desired such as new products or processes, information must also be actively reworked into meaningful concepts, understandings and even concerted action. This is not to say that individual access to information is unimportant, only that the perspective should be complemented by an understanding of the communicative structures whereby information is put to meaningful collective use. The paper argues that some of these wider communicative processes may also be understood in terms of social network analysis. This paper is an attempt to make inroads toward a communicative approach to socio-economic

interaction that takes into account both an informational aspect and the need for inter-personal coordination.

The paper develops a model based on case studies of small manufacturing firms (Parker 2004). The focus is particularly on understanding value creation in these firms as a communicative process. Value creation is understood here as an essentially entrepreneurial activity of finding new opportunities and being able to coordinate action to exploit them. This may include solving an organizational problem to avoid bottlenecks in production, improvements in design or the successful development of new products and processes. The entrepreneurial activity of value creation hinges on effective communication. It requires both access to information and the ability to coordinate with others. It is argued that the capacity to conduct this kind of entrepreneurial activity is evident in the structures of social networks linking different key persons internally and in relation to external parties such as customers, suppliers and partner firms.

Field and methods

Research was conducted in small manufacturing firms (20-80 employees) in Southern Sweden. These firms used very similar production technologies which facilitated comparison between them.

The overall research strategy employed may be described as a mixed methods exploratory approach (Creswell, et al. 2003). The first phase was wholly qualitative while the second phase combined both formal network analysis and the collecting of qualitative materials. The initial in-depth exploration of the social context with careful attention to the quality of material was necessary given the lack of knowledge in this field and the sensitivity of the research focus.

The initial phase of qualitative and explorative research makes use primarily of interviews. Interviews take their starting point in critical incidents such as the development of new products, processes or other evident aspects of business development. These incidents provided focal topics on which different informants gave their perspectives and discussed their understanding. These different perspectives are used to piece together, reconstruct, an understanding of social process. The choice of critical incidents perhaps tended to bias beneficial aspects of personal networks but also provided a means of exploring their extent and dynamics. To capture varying perspectives different poles in key relations were interviewed such as customers, suppliers and different levels of management in the focal firm.

All in all 22 firms were involved in the first phase of research. Some of these firms were more important for the focal firms than others and consequently given more attention.

The first phase of research resulted in the identification of some important mechanisms of personal networks for firm development. However, it was still difficult to assess the overall impact of these mechanisms on firm development. It was also difficult to present the differences between networks in different firms in ways that could be easily understood.

These factors, combined with a desire to engage in constructive dialog with structural analysis of networks motivated the second phase of research.

The second phase of research also sought to provide a more encompassing picture of the central production networks in the firms so that structural aspects of these networks could be set in relation to other overall aspects of the firm's development. This was intended to remove a weakness of the initial phase of research which provided insights into mechanisms but at best a fragmented understanding of the situation in the firm as a whole

To map network structures in these firms a short formal survey was conducted and a snowballing technique was used to find respondents. Starting from identified key roles in

production, each person was asked to name a number of persons most important for their development of production related know-how. The contacts named by the original interviewees were then asked the same questions in a snowballing procedure. This provides a map of exchanges of information and knowledge in and between firms with respect to the specified domain of interaction.

Functions of personal networks

Personal networks in business are in many cases difficult to separate from business relations. The two are clearly intertwined. Nonetheless they are not identical. Personal networks carry emotional connotations of trust and even friendship. Moreover personal contact networks often support a high quality communication built on shared context which is specific to individuals. Network contacts are usually marked by an orientation toward joint problem solving. Finally, personal networks in business frequently outlast specific employers. It was not uncommon to hear comments like: “we have been doing business with X for many years” even though X assumed their current position only a short while ago.

Generally speaking, personal networks are important in order to handle the considerable uncertainty in business transactions. This uncertainty is evident in all kinds of interactions. To take but one example: the focal firms in this study were involved in the manufacture of plastic items. Competition in the industry revolves mainly around getting new productions, but each new production requires a substantial investment in a new mold. In order to make a bid for a production run the firms need to assess not only their own costs in direct production but also the substantial costs of a supplier who makes a complex and unique mold and the supplier's costs in turn for design of this mold which is seldom conducted in house. Moreover, even direct production costs will depend substantially on different aspects of quality of the mold. Conversely, estimating the costs of make a complex mold is time consuming. Mold

manufacturers will be unwilling to do this unless they believe that the purchasing firm is serious and has a good chance of getting an order. Finally, problems always do arise in setting up production and this may cause costly delays. An attitude of joint problem solving between plastics firm and mold manufacturer greatly facilitates this process. So, making a competitive and realistic bid for production in the plastic manufacturing firms hinges on having good working relations with suppliers with different specializations. In the study four aspects or functions of personal networks were identified. These four functions are similar to earlier findings (Uzzi 1996; Uzzi 1997).

Firstly, personal networks remain important for communication and knowledge development because they enable *trust*. The concept of trust is used here to indicate two intertwined aspects of a relation. Firstly, trust in the other's goodwill (Boone and Holmes 1991; Hosmer 1995). Secondly, that the other has the needed competence and know-how. The need for trust in routine production is exemplified above in the relation between manufacturing firms and their suppliers. Trust is not less important in developmental initiatives. For instance one of the firms in the study specializes in product development. The process of product development is fraught with uncertainty and good relations embodying trust and high quality of communication is a necessary component of a successful process. Customers of this firm normally pay on an hourly basis for the firms services. Customers have little ability to assess progress in the product development process. Even in retrospect it may be difficult to evaluate the relative success of this process.

Secondly, personal networks may provide *quality of communication* which minimizes the effort needed to coordinate activities. Communication is predicated on that the parties share context which means both shared orientations and cues (Sperber and Wilson, 1995).

Particularly when it comes to specialized work, quality of communication may hinge on having similar lines of work, sharing an educational background or having other social,

historical and physical contexts in common. However, in the final instance such common sets of cues do not in themselves guarantee communicative quality. It is only the combination of shared cues and mutual orientations that can form the basis for the transfer and development of tacit or underconceptualized knowledge. Personal networks make it possible to build a more refined, if specific, context and allow a more finely honed negotiation of appropriate focus. They thus provide a higher quality of communication and a higher extent to which underconceptualized knowledge can be conveyed. This is why people often have to be in direct contact with each other in order to understand each other and transfer knowledge (Polanyi 1998).

Thirdly, although some information is essentially easily expressed, and thus transportable, both persons and organizations need timely and highly specific information. Timely information about job or business opportunities, about market or technological developments may be of great value. Similarly, highly specific knowledge about who can repair a certain machine on short notice, or what kinds of changes are taking place in competitor firms, customers or suppliers can be highly significant. But these kinds of information are not available by general, impersonal means. The specific and time bound nature of the information of interest makes the development of impersonal channels unlikely. Valuable information of this kind flows through the conduits of personal networks. Some parties are systematically favored in such flows, that is, have *informational advantages* due to better personal networks (Burt 1992). A striking example of informational advantages is provided by one of the focal firms in the study. The firm was recently bought by a new set of owner-managers. The firm had been declining for a number of years and had a negative growth rate of 18%. But by the first year after the take-over the firm had turned around and achieved a positive growth of 60%, the subsequent year growth was 100% and the year after that roughly 50%. The owner-managers describe this turn around as largely due to their prior personal

contacts on the customer side. The turn around was in any case brought about with marginal changes in personnel and production technology.

From these three aspects of personal networks follows a fourth quality which is important for understanding network development. In discussing quality of communication, trust and informational advantages the emphasis has been on an individual's ability to acquire information and knowledge but very little has been said about motivations for passing on knowledge. Yet this is clearly an important aspect of understanding how personal networks develop (Portes 1988). The personal networks in this study can be understood as exchanges. The object of exchange is information and knowledge necessary to successfully navigate the wider business environment. Thus the networks are separate from but important for business activities. The individual's ability to take part in the exchange of information and knowledge in these networks rests not only on acquiring relevant information and knowledge but also having channels in which this can be passed along and exchanged. From an individual perspective the same kind network relations that provide ability to acquire knowledge and information also provides motivation and incentive to pass on relevant knowledge. These individuals have an advantageous social infrastructure for exchange of information and exchange is an important part of maintaining their position. For instance, developing trust in a relationship provides an improved means of communication but it also provides an obligation to pass on knowledge relevant to the other, to look out for the other's interests. This is an important part of maintaining a good relation. Having complementary sources of information provides an improved ability to pick up information relevant to the other and therefore increased ability to take part in information exchange. To continue to fulfill the role of brokering information the individual must also maintain these relations through exchange.

The important point is that personal networks have a role in the creating both *ability and willingness* to take part in knowledge development. The structure of an individual's personal

network is a key to understanding if he or she is likely to have anything to gain in one form or another from gathering information, reworking it and passing it on to other relevant parties.

Persons that have a high quality of communication and trust with their contacts and enjoy informational advantages have the best opportunities to contribute to knowledge development in a way that earns recognition. These persons have developed channels of acquiring and passing on relevant knowledge. This argument can be summarized in the following proposition:

Ia

Individuals who have networks conducive to the development of trust, quality of communication and informational advantages will be more able and willing to take part in the firm's problem solving and knowledge development.

While the interrelation of different functions of network relations may seem a complex mesh, the difficulties need not be insurmountable. It seems that these four relevant functions of networks, trust, quality of communication, informational advantages and motivation coincide to a great extent with two basic aspects of network structure namely *strong reciprocity* and *network diversity*.

Strong reciprocity, indicated by dyadic reciprocal exchange is taken as an indicator of trust, quality of communication and mutual orientation (Burt and Knez 1996; Granovetter 1982; Krackhardt 1992). In the analysis of personal networks in these firms reciprocity is gauged by noting the number of dyadic two-way relations in which a person takes part. Having several strong reciprocal ties provides means of getting the job done efficiently and solving work-related problems (Morey and Luthans 1991; Wenger 1998)

Network diversity is measured following Burt and the measure of effective network size (Burt 1992). This measure seeks to capture the informational advantages that accrue to different positions within a contact network. Burt's arguments are very similar to the arguments on gatekeepers previously put forward by Allen (Allen 1978). In light of these operationalizations it becomes possible to rephrase the hypothesis above:

1b

Individuals who have networks characterized by a high level of reciprocity and diversity will be more able and willing to take part in the firm's problem solving and knowledge development.

Value creation and personal networks

The image of business that arises from the material is one in which uncertainty is the rule rather than the exception. Finding new opportunities and connecting them with available resources is a work of continuous small scale entrepreneurship. This activity may be understood as a kind of continual problem-solving.

The studied businesses are always in the process of navigating a dynamic environment. Successful coordination of customers, internal processes and suppliers is the central component of value creation in these firms.. When this coordination works well the firm grows when this ceases to work well the firm declines.

I have argued that personal networks are an essential resource in the activity of coordinating customers, suppliers and internal processes. Personal networks provide the informational basis and coordination that enable resources to be connected and combined in an appropriate manner. It is therefore to be expected that personal networks are an integral part of value creation in the firms. This can be stated as an hypothesis:

2a

Diverse and reciprocal personal networks of key personnel provide a key resource of firm value creation.

Mapping personal networks

In an attempt to assess the impact of personal networks in these firm and to better understand the overall structure network graphs were constructed starting from key roles in coordinating production. These roles were defined at the outset as

- Persons with an overall responsibility for production
- Persons who do purchasing for production
- Persons that have technical discussions with customers

These individuals were identified with the help of management in the firm. People fitting these roles provided the starting points for mapping the informal organization. The underlying assumption is that these individuals are central in the activity of coordinating production with suppliers and customers. The number of persons thus identified varied from firm to firm, in some firms all of these roles were filled by a single individual in others two, three or four.

These persons formed the basis of the first wave of interviews.

The next step in the mapping process entailed interviewing the identified key personnel and asking them to identify the contacts most relevant for *their* problem solving and development of production know-how. This was done by means of standardized questionnaire filled out in my presence. The key questions on which the maps of the informal organization are built are the following:

1. With whom do you preferably discuss technical solutions, problems, work organization or discuss ideas related to production?
2. Assess the importance of each of the contacts identified in question one on a scale of one to five with respect to their importance for your development of production know-how (five being 'very important' and one being 'less important').

The questions are intended to elicit the essential contacts of a key person with respect to the development of their production know-how and problem solving capacity. The question is open ended enough to allow the participants to relate it specifically to their practice. The aim is to identify a group of persons that are relevant for actually getting the job done as these individuals experience it.

The resulting network graphs are analyzed in two different ways. Firstly, it is possible to compare different individuals in key roles regardless of which firm they are employed in. This enables a closer look at how network structure affects a person's contribution to problem solving in the firm. Secondly, it was possible to conduct a comparative analysis of the networks of different firms and where the firm is treated as a whole.

Problem solvers

The networks showed that different individuals take part to a greater or lesser extent in knowledge development in the firm. In other words certain persons are named often as important sources of knowledge. In a given group facing collective problems there will be persons that take on a more central role.

A simple way of measuring an individual's contribution to problem solving in the network data is provided by the extent that a person is indicated as an important contact. For analytical purposes a person's *significance as a problem solver* in firm production may be measured by

summing the values for the relations where the person is indicated. For instance, if three persons (and only three) identify X as an important contact and each of these persons value this contact highly (four on a five-degree scale) then the measure for this person's *significance as a problem solver* is $3*4=12$. This value is clearly a rough indication of a person's significance as a problem solver in a firm but it does provide a simple metric for relative evaluations of different roles. It provides some idea of the contours of the micro-social landscape in each firm and makes comparisons across firms possible¹.

The measure 'significance as a problem solver' has been calculated for each of the persons in the first wave of interviews, that is, those 23 persons that were identified as having key roles in production. Data for these 23 persons is complete and all statistical tests in the following are based on this set.

Setting reciprocity against a person's significance in firm problem solving yields a discernable positive trend although with certain outliers.

Generally speaking reciprocity in an individual's network also increases the person's propensity to take part in the development of know-how in the firm. A one-tailed spearman rank order correlation yields a value of 0.658** which is significant using a 1% threshold.

The finding supports the notion that the two measures are linked. However a certain amount of care has to be taken in interpreting the results. Care is warranted because the variables are not completely separated.

A test of the relationship of network diversity and significance as a problem solver yields a significant correlation, though somewhat less strong than in the case of reciprocity. A one-tailed Spearman rank order correlation yields a value of 0.438* which is significant at a 5%

¹ The notion of problem solvers is strongly reminiscent of Allen's gatekeepers (Allen 1979).

threshold. Once again care has to be exercised in interpreting the results as an extent of overlap exists in the independent variables.

While these statistical results are encouraging the argument is not really adequately captured by treating reciprocity and diversity in personal networks as separate variables. In the previous arguments these factors were understood to aspects of beneficial situation that are somewhat complementary. Highly diverse networks are beneficial for gaining access to valuable information but trust and quality of communication are necessary for this information to be put to meaningful collective use. It would therefore be preferable to treat diversity and reciprocity in an individual's network as indices of *individual problem solving capacity*. This is a somewhat clumsy terminology but what I am trying to capture is actually quite similar to notions of social capital (Lin 2001) except that I am concerned not with individual but collective returns. A first measure of these collective returns lies in the extent that the person contributes to problem solving and development in the firm.

Testing the index variable individual problem solving capacity against the person's significance as a problem solver yields, as expected, a strong correlation (0,839**). As a first indication this is encouraging. It seems that the combined measure of network position is extraordinarily strongly associated with the significance a person has as a problem solver in the firm. If so, then this measure provides an excellent means of uncovering discussing important aspects of informal organization. However, as noted these results may be too optimistic. There is an issue of overlap between dependent and independent variables which will be treated presently. The overlap between dependent and independent variables lies in that each is affected by indegree (the number of persons that state a given person as a contact). We can eliminate this overlap by controlling for indegree in a Pearson partial correlation test. In the partial correlation test the two variables still display a strong correlation. (coefficient of 0,587**) significant using a 1% threshold.

While this is an interesting finding the partial correlation network diversity and significance as a problem solver is also strong. Including a role for trust and quality of communication, indicated by network reciprocity adds something but perhaps not as much as one might expect.

Formal network analysis thus supports the idea that individuals who display qualities of problem solvers and are essential to the know-how development in the firm to great extent also have specific kinds of networks. The findings are not unexpected as the arguments draw on previous work on informational advantages. Nonetheless, it seems an individual's contribution to problem solving in a firm is less individual and more social than normally assumed.

Combining the aspects of communicative quality with informational value seems intuitively sensible. It also provides a strongly supported explanation of observed differences in the extent that individual's contributes to the development of production related know-how in a firm. However, it is questionable in this case whether the wider communicative approach adds significantly to explaining the material.

It should be pointed out that emphasis on structural or positional aspects of personal networks does not in anyway imply that this is a zero-sum game. The networks analyzed here are not predefined and limited. It is perfectly possible for either no one or many individuals in an organization to have networks characterized by high levels of diversity and reciprocity. However, it is to be expected that an organization displaying network structures rich in both reciprocity and diversity would be one where coordination between key actors is of high quality and one in which the individuals have highly complementary information and skills. It remains to be tested if this does in fact translate into other firm level effects.

Dynamic firms

The previous section explored the role of personal network structures and how these shape an individual's ability and willingness to contribute to problem solving and knowledge development in the firms. The section ended with a suggestion that it should be possible to understand dynamics of value creation in a firm in terms of structures of personal networks among key actors in the firm's central production network. The upshot is that if this network is characterized by a high extent of diversity and reciprocity then it is to be expected that the firm affords a dynamic atmosphere of interaction. It should be a firm that can tap a wide set of different inputs and integrate them meaningfully in its production. The present section explores this idea in terms of some simple firm level statistics.

An important part of the exploration is to construct a firm level variable for firm problem solving capacity. There are several possible ways to do this based on the previous network analysis. However, the most straightforward construction would seem to be to aggregate values of individual problem solving capacity for the key actors. This construction implies that firm problem solving capacity should increase with the number of persons in key roles and the diversity and reciprocity of their contact networks. Firm problem solving capacity can then be set against measures of economic dynamism, particularly the firm's organic growth. The data includes only eight firms so the sample is small. Nonetheless setting firm problem solving capacity against organic growth in a spearman rank order test yields an exceptionally strong correlation (Spearman's rho 0,905**) which is significant using a 1% threshold of significance.

The results of the wider communicative approach including both informational advantages and coordination advantages must be set in relation to a straightforward informational approach. A firm-level variable measuring informational advantages can be constructing in a

parallel manner by aggregating the values for network diversity of key actors in each firm.

Once again we find that a straightforward informational also yields strong results (Spearman's rho 0.881**)

Conclusions

It was argued at the outset that social network analysis has been particularly successful in assessing informational advantages but that the informational perspective represents a rather limited view of social interaction. The qualitative study of personal networks in small manufacturing firms leads us to expect that other aspects of relations such as trust, communicative quality and motivation would also be important. It was argued that it should be possible to assess these aspects as well in a formal analysis of social networks.

The model developed in this paper seeks to combine a burtian approach to informational advantages with the coordination advantages afforded by dyadic reciprocity. I have tried to develop a model of the individual's problem solving capacity, that is, the extent that a person can and is willing to use his or her networks to achieve collective ends. This is essentially an attempt to assess how the individual contributes to value creation in a firm. The findings strongly confirm that personal networks are a key ingredient. An individual's contribution to problem solving and knowledge development appears from this perspective to be highly dependent on his or her networks.

The study also sought to connect firm level network structures with firm dynamism. It was argued that personal networks of key personnel provide the firm with considerable informational and coordination advantages. These advantages are critical in the process of finding new opportunities and coordinating different parties internally and externally. It is precisely this small scale entrepreneurial activity that allows value to be created in the studied

firms. The strong correlation of personal network structure and the firm's organic growth is which is found in the material is therefore to be expected.

The formal network analysis, both on the individual and firm levels does show somewhat stronger correlations of the wider communicative approach developed in the paper than for a straightforward informational approach. However, the differences are not as large as might be expected based on the qualitative study. I am inclined toward the following: Despite rhetoric to the contrary the analysis of informational advantages actually includes essential aspects of trust and quality of communication. Strong reciprocity therefore adds something but not as much as would be expected.

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