Social Capital and Innovative Performance in Developing Countries
The Case of Ugandan Entrepreneurs

Gerrit Rooks

Eindhoven University of Technology /
Makerere University Business School
Den Dolech 2
Eindhoven, The Netherlands
Email: g.rooks@tue.nl
Phone: + 31 40 2475509
Corresponding Author

Adam Szirmai

UNU-MERIT
Keizer Karelplein 19,
6211 TC, Maastricht, The Netherlands
email: szirmai@merit.unu.edu

Arthur Sserwanga

Makerere University Business School
Plot 118, Old Port Bell Road, P.O. Box 1337, Kampala, Uganda,
Email: asserwanga@yahoo.com

1

Abstract

This paper examines the relationships between the characteristics of networks of small scale entrepreneurs and their innovative performance in a developing country context. It is based on a survey of entrepreneurs held in Uganda in May 2008. Networks represent social capital that can contribute to economic success and innovative performance. But sometimes networks can also act as obstacles to innovation. In the literature there are two opposing strands. The line of research initiated by Coleman points to the advantages of being embedded in tightly knit networks, which provide trust, support and access to innovation. Burt emphasizes the disadvantages and constraints of closed and dense networks, where many relationships are redundant and actors are isolated from the outside world. This paper applies these theories in a developing country setting, where they have so far not been studied. It provides an empirical synthesis between the Burt and the Coleman perspective. The relationship between network constraints and innovative performance is found to be curvilinear. Increasing density and constraint initially has positive effects on innovative performance, but beyond an optimum negative effects start to prevail. Network size and human capital have positive effects on innovative performance.

1 Introduction

This paper examines the relationships between the characteristics of networks of small scale entrepreneurs and their innovative performance in the context of developing countries. Networks represent the social capital of an entrepreneur. This social capital is a potential resource that may enhance innovative performance. Under some conditions, however, networks can also act as an obstacle to innovation. The aim of the paper is enhance our understanding of the potential contributions of social capital. It is a sequel to an earlier paper (Rooks and Szirmai 2009) which examined the substitutability of social and human capital in relation to economic performance and innovative performance. This paper is situated in the context of the debate between Coleman who argues that dense networks will have a positive influence on innovation and Burt who argues that network constraints (redundant contacts in a dense network) will act as an obstacle to innovation. These issues are examined in a developing country context.

Hypotheses about the impacts of social capital are tested using data from a recent survey amongst Ugandan entrepreneurs held in May 2008. Uganda has a population of about 30 million people, of which some 40 per cent is still living in poverty. Uganda is an interesting case for the study of entrepreneurship, since it has been said to be one of the most entrepreneurial countries in the world. It has a Total Entrepreneurial Average index (TEA) of 30% of the working population (Walter et al. 2004). Some 3.1 million people are estimated to be entrepreneurs, of which 65 per cent are males (Walter et al. 2003, 2004). The business failure rate is reportedly high. On average, 30% of the entrepreneurs shut down their businesses within of the first 12 months of operation. Rooks and Szirmai (2009) found that the great majority of enterprises were micro enterprises which showed little dynamism and growth. Of the total sample of 737 firms, only a small subset of 25-40 firms qualified as dynamic Schumpeterian entrepreneurs. Thus, the kinds of innovation that are examined in this paper are minor innovations which are new to the firm, rather than new to the market or new to the world. This is the context in which we are studying the determinants of innovative performance.

3

In the last two decades there has been a surge of interest in the concept of social capital. Social capital has been used to explain a variety of topics, such as economic growth (Knack and Keefer, 1997; Akcomak and ter Weel, 2009), school performance (Coleman, 1988), firm dissolution (Pennings, Lee and Witteloostuijn, 1998), organizational advantage (Nahapiet and Ghoshal, 1998), entrepreurial success (Brüderl and Preisendörfer, 1998), innovation at the country level (Dakhli and De Clercq, 2003), and supplier performance (Raub, Rooks and Tazelaar, 2007). Within the social capital literature, we can distinguish two main strands: a macro strand focusing on characteristics of countries such as trust or levels of skill, expertise and capabilities and a micro strand focusing on social capital embodied in social networks of economic actors. The micro concept of social capital has clear parallels with the economic concepts of human and physical capital. Like human capital or physical capital, the creation, expansion and maintenance of networks requires investment of scarce resources such as time, energy or money

While the role of social networks and social capital in entrepreneurship has been studied in the literature, the relationships between social capital and entrepreneurial innovation have been somewhat neglected. The focus of social network studies has mainly been on topics such as business and start up success (Brüderl and Preisendörfer,1998; Anderson and Miller, 2003), the reproduction of network structure (Walker, Kogut and Shan, 1997), the likelihood of starting up a business (Davidson and Honig, 2003), or the survival of an enterprise (Bosma et al., 2004). The role of social capital in innovative entrepreneurship has been less extensively studied. An early exception is the study of biotechnology start-ups by Shan, Walker, and Kogut (1994) who predicted and found that the number of collaborative relationships that a firm had formed, was positively related to its innovation output.

A second shortcoming of the literature on social capital and entrepreneurship is its focus on the advanced economies, while it has been argued that social capital is of special importance for developing countries (Woolcock, 1998). The neglect of developing countries is not restricted to the social capital literature. It has been identified as a flaw in the entrepreneurship literature in general (Naudé 2007; Bruton, Ahstrom and Obloj, 2008; Szirmai, Naudé and Goedhuys, forthcoming).

In the context of developing countries there has been extensive study of social capital in the form of family and kinship ties, but this has so far not been integrated in the modern literatures on networks and entrepreneurship. The evidence on the role of family and kinship ties is mixed. On one hand, it is argued that kinship ties can be mobilised for capital accumulation, as is the case in East Asia (e.g. Perkins, 2000).,On the other hand the redistributive obligations within kinship networks in African and Middle Eastern countries are seen as acting as a drain on entrepreneurial resources and an obstacle for entrepreneurial dynamism (see early anthropological contributions such as Dorjahn, 1962; Hunter, 1962; Khalaf, and Shwayri, 1966).

In this study we try to address the three shortcomings, focusing on the effects of social capital on innovative performance of small scale entrepreneurs in Uganda.

2 Theories and Concepts

2.1 Social Capital

Reflecting our increasing understanding of the processes of economic growth and development, the concept of capital has gradually been broadened over time. In the fifties, the emphasis was on physical capital accumulation and its contribution to economic growth. It turned out that physical capital accumulation left large portions of growth unexplained. In the sixties and seventies Denison, Schultz and Becker introduced the notion of human capital, where investment in the education and the quality of labour was seen as at least as important as investment in physical capital goods. In the nineties knowledge capital and R&D stocks were incorporated in the analysis of economic growth. Social capital is a further extension of this line of reasoning.

Social capital originates in sociology and forms a potentially interesting bridge between the disciplines of economics and sociology. It refers to the social resources which can be drawn upon in the process of entrepreneurship and production. Parallel to the emergence of the concept of social capital, economists started introducing terms such as 'absorptive capacity', 'networks' and 'social capabilities' which emphasized the social framework in which human, physical and knowledge capital can productively be employed. Social capital also drew our attention to the role of the entrepreneur, who had completely disappeared from sight in the black box of the modern economic production

function. In the Schumpeterian tradition, the entrepreneur is the key actor in economic development who creatively combines resources to create new economic activities, new products, new markets, new forms of organisation and new combinations of inputs.

While human capital is by now widely accepted, the concept of social capital is still contested. Economists such as Arrow and Solow have questioned whether social relations are really forms of capital, since relationships are not the results of investment and are difficult to quantify in cost-benefit analysis. Other authors counter that this criticism might just as well be directed at human capital (e.g. Weslund and Bolton, 2003). Besides critical voices, there are those who celebrate social capital as a promising unifying concept. For instance, Woolcock (1998: 153-154) believes that the concept of social capital can serve as a bridge between theories and disciplines "The idea of social capital is both appealing and promising precisely because it offers a potential strategy for obviating these concerns while bridging theoretical and disciplinary divides." However, precisely the advantage of being a relatively broad, unifying and open concept has been also been mentioned as one of the main weaknesses of the concept, since social capital has so many different interpretations (see for reviews Woolcock, 1998; Portes, 1998; Adler & Kwon, 2000; Westlund & Bolton, 2003; Akçomak and ter Weel, 2006).

Definitions of social capital vary depending on whether they focus on the substance, the sources, or the effects of social capital. Some definitions focus attention on the macro level, indicating that trust and social capabilities influence the performance of regions and nations. Other definitions focus on the social capital of actors at micro level, with a focus on networks and social relationships. Definitions also vary depending on whether they focus on relationships, the structure of the relationships or the type of relationships between people (e.g information relationships, personal relations, or economic relationships) (Adler & Kwon, 2000).

Although the definitions differ, many of them do have something in common (Akcomak, 2006). Social capital is mostly conceived as the possession of resources that are inherently associated with having a network of relationships. Those resources, which can be situated at the micro level, such as social support or access to venture capital, or at the macro level, such as norms and trust. Another common feature of definitions is that social capital does not only consist of the networks of social relationships themselves, but

also of the various kinds of resources that can potentially be mobilised through the social relationships. A third common feature is that individuals need to invest in social capital to generate future benefits. This feature is most obvious at the micro-level where it is clear that one needs to invest time and energy into the creation and maintenance of social relationships, even in the case of 'inherited' relationships like family relationships.[1] Finally, although one may think that more capital is always better, this need not always be the case for social capital. Social capital can have positive effects on economic and innovative performance, but it can also act as a constraint (negative social capital)

Our study can be situated in the micro tradition. We adopt a very general definition of social capital, that includes both `bridging' and `bonding' aspects of social capital. The bridging view focuses primarily on social capital as resources that are intrinsic to social networks which connect an actor to the outside world. Bridging forms of social capital are about an actor's external linkages and the resources that can be accessed through these linkages. The bonding view focuses primarily on the internal characteristics of collective actors. In the bonding view the focus is more on a collectivity (which can be an enterprise, village, community and so on), and the social structure of that collectivity. Both perspectives generate interesting hypotheses about the effects of social capital.

Bourdieu was one of the first authors to give a systematic account of social capital. He defined it as "the aggregate of the actual or potential resources which are linked to the possession of a durable network of more or less institutionalized relationships of mutual acquantance or recognition" (Bourdieu, 1985: 248). As Portes (1998) notes this definition makes clear that social capital consists of two elements: first the network of the relationships which allows individuals to access resources possesed by their associates, and secondly the quantity and quality of resources possessed by member of a network.

Our view of social capital is best reflected in the definition of Nahapiet and Ghoshal (1998: 243): "the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or

---

[1]   Family relationships are inherited through the accident of birth. On first sight, the connection with investment in social capital is not immediately obvious here. Nevertheless, even family relationships require a continuous investment of time, energy and other scarce resources for their maintenance and strengthening. If such investment is lacking, the members of the network will be less able to draw on the various resources of family networks. Social capital will deteriorate.

social unit. Social capital thus comprises both the network and the assets that may be mobilized through that network."

In a previous paper (Rooks et al, 2009), we analysed the relationships between network resources and innovative behaviour. Our empirical analysis confirmed the theoretical expectation that there were signficant positive effects of network resources on innovative behaviour. In the present paper, we are specifically interested in the effects of the structural characteristics of networks and will not include resource variables.[2]

2.2 Entrepreneurship

In the rapidly growing literature on entrepreneurship, two classes of definitions can be distinguished: functional definitions which focus on entrepreneurship as a form of creativity, irrespective of the type of organisation (privately-owned small firms, public organisations, foreign multinationals, publicly listed companies or non-profit organisations) and definitions focusing on a specific kind of actor, namely the owner-operator of a small or large enterprise (see Szirmai, Naude and Goedhuys, forthcoming). In this paper, we focus on the entrepreneur as owner-operator. We analyse a sample of entrepreneurs who own and operate their own enterprises (predominantly, small and micro enterprises).

2.3 Innovative Performance

The literature based on the increasing number of innovation surveys distinguishes three types of innovation: innovation new to the world, innovation new to the (domestic or local market) and innovation new to the firm (Fagerberg, 2005). In the context of micro-enterprises in Uganda, innovative performance will predominantly refer to process, product or organisational innovations that are new to the firm.

---

[2] One needs to choose between these concepts, because in empirical reality network characteristics and the resources one can access through networks are strongly related. If one enters resource variables, the network structure variables become non-significant. Here we are specifically interested in these network chacteristics.

2.4 The Potential Benefits of Social Capital

In order to develop hypotheses about the effects of social capital on innovative performance, we need to specify the different resources and benefits (and associated mechanisms) that are embedded in the network (alternative formulation: can be mobilised). The first and most often mentioned benefit is access to *information*. Markets are often imperfect, because economic actors have only limited amounts of (often flawed) information at their disposal. Networks facilitate access to broader sources of information and improve information quality, relevance, and timeliness (Adler and Kwon, 2002). Access to information through networks is one of the classic research topics in network research. The much cited classic article "Strength of weak ties" by Granovetter (19) is an example of a study of the effects of networks on knowledge of job opportunities. Networks also are helpful for gaining information about innovations (Burt, 1987; Coleman, Katz, & Menzel, 1966; Rogers, 2003; Kesidou and Szirmai, 2008), for the exhange of fine-grained information (Uzzi, 1997), for gaining information about entrepreneurial opportunities (Burt, 1992) or for information about mobility opportunities for newly arrived immigrant etnic entrepreneurs in the US (Portes & Sensenbrenner, 1993).

A second type of network benefits consists of *material resources*. Power can be used to mobilise resources. On the one hand, actors that are located centrally in a network are believed to have greater power (Ibarra, 1993). Burt (1992) focuses on control or power benefits that are the result of structural holes in networks. Actors that are situated between otherwise disconnected groups have brokerage advantages. In this paper, we are not interested in power relationships a such, but in the use of power to mobilise material resources. The structural hole reasoning can thus be applied to material resources that can be mobilised through networks.

Access to resources can also be realised through mechanisms of solidarity, reciprocity and resource sharing. Networks that are very dense, or high in closure - meaning that contacts of an entrepreneur have relationships amongst themselves - are thought to have strong compliance to social norms; trust is high. Individuals in dense networks tend to show more solidarity with each other (Coleman 1988; Ahuja, 2000).

A third benefit of networks is the emotional and social support that is provided through the mechanisms of solidarity and reciprocity.

Social networks may also have a downside (Powell, 1990; Uzzi, 1998; Portes, 1998; Gabbay & Leenders, 1999). Each contact in a network can be a source of conflict as well as harmony (Powell, 1990). The claims that network members have on each other may also act as a constraint for actors in general and for entrepreneurs in particular. Social ties give access to information, however in cases where economic actors have too many strong ties, this may lead to a form of social `blindness'. The network closes in on itself and becomes isolated from the outside world. Thus, Uzzi (1998) showed that firms that had embedded relations with other business enjoyed advantages such as trust, flexibility and fine-grained information transfer. However after a while, some of the business firms tended to become `overembedded'. They had very strong relations with only a relatively small number of suppliers and buyers. This made them vulnerable to exogenous shocks and deprived them of fresh market information. As a consequence those firms had lower survival rates than their less overembedded counterparts.

Networks also involve aspects of dependency and a loss of autonomy. Portes (1998) denominates the risk and liabilities of social networks as negative social capital, which he demonstrates with ethnic entrepreneurs. Social networks are initially critically important to ethnic entrepreneurship. An immigrant can compensate for a lack of physical and human capital via ethnic ties. Later on, the same ties prevent immigrant from breaking away into new markets and new social settings.

In network theory the advantages and disadvantages of networks also come to the fore in the discussion between the network tradition of Coleman and that of Burt. According to the Coleman tradition, dense, tightly knit networks are kind of social capital which is important for entrepreneurial success and entrepreneurial innovation. According to the Burt tradition, too dense networks are replete with redundant contacts (constraints) which can act as obstacles to innovation. Actors in open networks with many structural holes will benefit from diverse information and will tend to be more innovative. We will develop this contrast further below in section 3.2.

2.5 Overlapping Networks

As indicated in the preceding sections, one can distinguish different types of networks which give access to different kinds of resources. We distinguish personal networks providing social and emotional support, information networks providing access to information and resource networks providing access to material resources. These different networks can overlap. This is particularly the case in a developing country context where the personal network can also be the network that provides information and access to reports. In a different terminology this is referred to as 'interlocking markets'. When network overlap or multiplexity is very pronounced, this could also have negative effects on the freedom of the entrepreneur to undertake risky types of innovative behaviour. The effects of multiplexity will be further examined in this paper.

3 Hypotheses

In this paper, we will use data from a recent survey held amongst small Ugandan entrepreneurs in 2008. Among others, this survey collected information on innovative performance and very detailed information about the social networks of the entrepreneurs.

The questionnaire included questions about three different types of entrepreneurial networks and their interrelationships. The first type of network is the network of personal relations. The second is the network of entrepreneurs who serve as information sources, the business advice or information network. The third is the network of entrepreneurs who potentially provide material support to the entrepreneur, the business support network. For each of these types of networks, we have included questions about the resources which are accessed through the network.

One could examine each of these networks separately. We will not do this in this paper. We merge the information about the three networks to construct the overall network of the entrepreneurs. However, we do use information about the people in the different networks to measure the degree of network multiplexity or overlap.

Subsequently, hypotheses about the relationships between network characteristics network characteristics (size, structure, multiplexity) and innovative performance.

3.1 The Effects of Network Size on Innovative Performance

Social capital is about having social relationships. Empirical research on entrepreneurial social capital often equates social capital with social network size. In the literature it is often assumed that the more social relations an entrepreneur has, the better the entrepreneur is connected, the more and better access the entrepreneurs has to information and other resources, and consequently the better the entrepreneur will perform. Strong relations between economic actors enable those firms to share knowledge and other resources. Moreover, in some cases of close collaboration (for instance in the case of Research & Development projects), social relationships can create economies of scale (Ahuja, 2000).

With regard to information networks, our expectation is that network size is positively related to innovative performance. Each individual contact of an entrepreneur can be regarded as a channel of communication between that entrepreneur and many other indirect contacts (Mizruchi, 1989; Ahuja, 2000). The actors in the entrepreneur's network each have their own knowledge and experience, which they have, at least partially, acquired through their relations with others (Gulati & Garguilo, 1999). It has been argued that the role of communication is especially important in the context of innovative activities (Powell, Koput, & Smith-Doerr, 1996). Innovation requires knowledge and information. The relations in a network can be a means to collect and process information. Which new products or technologies are on the market? How promising are they?

The commercialization of an innovation or new idea also requires economic resources. In more dynamic economies venture capital and other forms of business finance will supply such resources for innovation. In the Ugandan setting of imperfect capital markets, networks may replace these institutions as sources of finance for the small scale and micro enterprise sector.

On the basis of the network literature we formulate the following general hypothesis with regard to network size.

Hypothesis 1: The larger the network size, the more innovative the entrepreneur will be.

3.2 The Effects of Network Structure on Innovative Performance: Network Closure versus Structural Holes.

In the literature there has been a debate about effects of network structure on business performance. According to one view dense networks, with many linkages between an entrepreneur's relations, are to be preferred, because cooperation is facilitated in such networks. According to the other view more sparse networks with structural holes are preferable. Structural holes are gaps in the network structure: one's contacts do not know each other. The holes in the network imply that since contacts are not acquainted, it is likely that they provide more diverse and heterogeneous information.

The view that dense networks are to be preferred is associated with Coleman (1988). Coleman argued that networks with closure are a source of social capital. In networks with closure everybody knows each other. In such close-knit dense networks, Coleman argues, social control occurs through sanctions. Those sanctions are "…agreed upon by an extended process of gossip and applied by individual actions, principally snubbing, shunning, ostracism, and insult." (Coleman 1991: 11). Hence, gossip is a vehicle. Through gossip actors in a network create reputations and norms (Rooks, Snijders & Tazelaar, 2009; Macaulay, 19..).

As the anthropologist Merry (1984: 283) indicates.

> "Gossip flows most readily in highly connected, morally homogeneous social networks, and it is here that its impact is greatest. For gossip to occur, the two participants must know a third party in common. The more mutual friends they have, the more people they can discuss. Every individual is at the center of a network of people they can discuss. The extent to which the members of this network know on another, independent of their relationship to ego, can be described as their "degree of connectedness." Gossip flourishes in close-knit, highly connected social networks but atrophies in loose-knit unconnected ones."

The development of shared norms can facilitate cooperation. In general the density of a social network improves the prospect of collective action (Marwell, Oliver and Prahl, 1998). Dense, close-knit networks can solve knowledge sharing dilemmas, and hence greatly increase knowledge sharing between economic actors (Dyer and Noboeka, 2000). Through repeated interactions in such networks shared under-standings emerge that facilitate fine-grained information transfer (Uzzi, 1997). It has often been found that dense ties curbe opportunism (e.g. Coleman, 1988; Gulati, 1995). Since innovation is an information demanding, and risky activity, based on the arguments above, dense networks would foster innovative entrepreneurship.

In the opposite perspective it is argued that social capital is a function of brokerage opportunities that are offered by structural holes in the network. Social capital is created by the absence of redundant relationships. Social capital is reduced by redundant relationships referred to as *constraints*. The basic argument is that within groups information tends to be more homogeneous than between groups. Having contacts in multiple groups thus yields certain information advantages. Hence, economic actors should prefer networks where many of their partners do not know each other. According to Burt (1992; 2000), the economic actor who is in between others, i.e. the tertius gaudius, is the entrepreneur in the literal sense. She is the person who adds value by brokering the connection between others.

The evidence for positive effects of having networks with structural holes on performance is mainly based on intra-organizational research. Managers with sparse networks with many structural holes, have more valuable ideas (Burt, 2009). One study that directly tested effects of structural holes on innovation is Ahuja (2000), who studied innovation in the chemical industry. He found a *negative* effect of the amount of redundant contacts (constraints) on the number of patents that a firm produced.

The density and constraint hypotheses are opposite poles of a single dimension. The more dense a network, the more constraints there will be. The more sparse a network, the less constraints there will be. This is confirmed by the high correlation between our operationalisations of density and constraint (see also Burt, 19 , p.). Therefore, we do

not need to formulate separate hypotheses for density and constraint. Hypotheses 2 couches the argument in terms of the degree of constraint of a network.

Hypothesis 2: *The higher the constraint of the network of an entrepreneur, the less innovative the entrepreneur will be.*

We will also explore a non-linear version of this hypothesis, which argues that increasing the degree of constraint will have positive effects on innovative performance, up to some optimum, and negative effects beyond that optimum, when increasing constraint results in isolation of the group and the prevalence of 'group think'. This results in hypothesis 3, which provides a synthesis between the Coleman and Burt theoretical perspectives.

Hypothesis 3 : *At lower levels of constraint, increases in constraint are associated with increases in innovative performance. Beyond some optimum, increases in constraint are associated with decreases in innovative performance.*

3.3 Network Multiplexity and Innovative Performance

Multiplexity is the degree to which the members of a network have multiple types of relations with each other: family and personal relations, financial relations, political relations, business relations and so forth. Multiplexity is about the degree to which network relationships are multidensionsal (Ibarra, 1995). In other words multiplexity is about network overlap: different types of network are concentrated in one person (Granovetter, 1973).

In the interlocking markets literature in development economics, it has often been argued that family and kinship relations play a pivotal role in many African micro enterprises Relatives are often business advisers, sources of finance, employees or employers.

Building on the previous theoretical discussion, we could identify the following possible impacts of multiplexity of networks. 1: if kin and information networks coincide, access to information will be less diverse/heterogeneous. As in the case of closed, highly constrained networks this should have a negative impact on innovative performance. 2: if

kinship and business networks coincide, redistributive kinship obligations are seen as acting as a drain on entrepreneurial resources and an obstacle for entrepreneurial dynamism and innovation This effect has been documented in anthropological studies of African and Middle Eastern entrepreneurship (see early contributions such as Dorjahn, 1962; Hunter, 1962; Khalaf, and Shwayri, 1966).Thus, multiplexity should have a negative impact on innovative performance. 3. On the other hand Uzzi (1997), argues that multiplexity, allows for better and more `fine grained information transfer'. This reasoning reflects the network density social capital arguments which focus on trust, and shared values in dense networks. In contrast to the previous arguments, this line of reasoning suggests that entrepreneurs with multiplex networks will be more innovative rather than less. We formulate the hypothesis in negative terms, following arguments 1 and 2.

Hypothesis 4: The higher the multiplexity of the relations of an entrepreneur, the less innovative the entrepreneur will be.

4 Data and Operationalisations

4.1 Data Collection and Sample

To test our hypotheses we make use of a recent survey amongst Ugandan entrepreneurs held in May 2008. There are no adequate sampling frames of entrepreneurs available in Uganda. We therefore employed a sampling procedure based on the Global Entrepreneurship Survey approach for selecting respondents (See Walter 2003, 2004 for more details on the GEM in Uganda). For budgetary reasons the sample area was restricted to two districts in Central Uganda: Kampala, which is the capital city and leading commercial town of Uganda, and one more rural area, namely the Mpigi district, which is largely a rural .

The sample was selected in a number of steps. First, in each district three parishes were randomly selected. In the next step local officials provided us with lists of

households, indicating in which households one (or more) of the member was an entrepreneur. From these lists 750 entrepreneurial households and a control group of 250 non-entrepreneurial households were selected. The selection of households and subsequently the respondents within the households was done randomly. If there were more than one entrepreneurs within one household, the adult entrepreneurial family members were numbered according to their age, assigning number one to the oldest and the highest number to the youngest household member The respondent was selected according to a random number chosen from a random number table: the second oldest person was selected if the random number chosen was a two, the fifth oldest if the random number was a five etc..

Since in Uganda questionnaires cannot be mailed, faxed or couriered to respondents, the data had to be gathered via face-to-face interviews. The interviews were carried out by a team of 10 interviewers. All but one interviewer had extensive previous experience as an interviewer working for the Global Entrepreneurship Monitor projects of 2003 and or 2004. During the training, sampling procedures, translations of key terms in the questionnaires and handling of respondents was stressed. The interviewers were finally field tested to assess their ability to handle the data collection, before they embarked on the data collection exercise.

The data collection took place in the first two weeks of May 2008. In almost all cases the selected respondent was willing to participate in the study. In Kampala there were 5 refusals; in Mpigi two persons refused to participate. Hence, we reached an unusually high response percentage of about 99.3%. Each interview continued until the informant had completely described the above issues. On average an interview took 45-60 minutes.

In total the sample consists of 993 respondents aged 16-64 years of which 737 were entrepreneurs and 256 were a control group of non-entrepreneurs. Since the goal of our analysis is to explain innovative entrepreneurship, all the non entrepreneurs are removed from the dataset. After the interview with a respondent, the interviewer answered six questions about the interview and the respondent. Based on this information 40 observations were excluded: 17 observations because the interviewer seriously doubted the reliability of the answers of the respondent, 23 observations because the interviewer

indicated that the respondents had trouble understanding the questions. This leaves us with a sample of in total 697 entrepreneurs.

4.2 Variables and Operationalisations

4.2.1 Innovativeness
To measure innovativeness we used a set of five dichotomous items that measured whether the entrepreneur had introduced or invested in new or improved products or processes (see Table 1). These items were adapted from the first South African Innovation Survey (Oerlemans et al. 2003; Rooks et al. 2005). Innovativeness in the Ugandan context of small enterprises obviously refers to activities new to the firm, rather than to the market or to the world. We used a non-parametric items response model, the Mokken model (a probabilistic version of the Guttman scale), to measure the scalability of the items. This indicated that the items constitute a strong scale (Mokken H = 0.54). [3]

Table 1:
Mean, Range and Scalability Coefficient Mokken H for Items Measuring Innovativeness.

Item	Mean	Range	Mokken H
In the last three years, have you invested resources to improve your (business) premises?	0.49	0-1	0.54
In the last three years, have you invested resources to improve your (business) machineries or tools?	0.46	0-1	0.55
In the last three years, has your business introduced products or services that were new or improved **to the market**?	0.42	0-1	0.60
In the last three years, have you improved your products or services?	0.46	0-1	0.47
Do you plan to change your product-mix or service-mix within the next year?	0.59	0-1	0.58

---

[3] A Mokken H between 0.4 and 0.5 is considered to be a medium strong scale, above 0.5 is considered to be strong (Mokken and & Lewis, 1982; Meijer and Baneke, 2004).

4.2.2 Social Capital: Measurement of Network Characteristics and Network Resources

To obtain network data we followed a standard survey method of collecting ego-centered network data (Marsden, 1990). We used name-generators and interpreters to measure different aspects of the network of entrepreneurs. Multiple name-generators are more reliable than single name-generators when it comes to measuring the size and composition of the network (Marin & Hampton, 2007).

In the first name-generator we asked about personal contacts with the following question "From time to time, most people discuss important personal matters with other people. Looking back over the last six months – who are the people with whom you discussed an important personal matters?". This provides indicators for respondents' personal social capital. The second question was about contacts with whom business matters were discussed: "From time to time, entrepreneurs seek advice on important business matters. Looking back over the last six months – who are the people with whom you discussed an important business matter?". This provides indicators for the informational social capital. The third question was about business contacts that could provide material support: "If you were seeking material support for your business from other entrepreneurs. Looking back over the last six months – who are those entrepreneurs?". This provides information about resource social capital.

For every name-generator question the respondent was asked to list names. The maximum number of names was five. Limiting the number of alters is a standard way to cope with time constraints in a survey, while maintaining measurement precision and decreasing measurement bias (Burt, 1984: 315). There were a number of further questions about each person cited on the name-generator (i.e. alter-generator). Important questions referred to the frequency of contacts with each person and a list of possible resources that could be obtained from the cited contact. We also asked questions about the relationships between each of these alters This gives us an idea of the density or constraint of the network.

Using the information obtained from these name-generators we we able to constructed a network size measure and a constraint measure. Moreover using the information on the three networks we constructed a multiplexity measure.

4.2.3 Size of the Network

The size of the network is simply the number of contacts mentioned by the respondent. Using this information we constructed three size variables: *personal network size*, *informational network size*, and *resource network size*.

Size = n,

where n is the absolute number of contacts

4.2.4 Constraint

Constraint is a summary measure of structural holes and brokerage. A network contact constrains ego's entrepreneurial opportunities when an alter q, in whom ego has heavily invested, itself has invested heavily in alter j. Burt (1992:54) defines constraint as follows:

"Contact j constrains your entrepreneurial opportunities to the extent that: (a) you've made a large investment of time and energy to reach j, and (b) j is surrounded by few structural holes with which you could negotiate to get a favorable return on the investment".

Figure 1.

An illustration of an ego-network of an entrepreneur
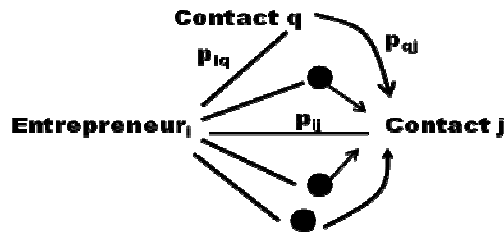
Source: adapted from Burt, 1992.

Burt (1992) proposed the following formula to define the degree to which entrepreneur *i* is constrained by his or her contact with j :

$$c_{ij} = (p_{ij} + \sum_q p_{iq} m_{qj})^2, \text{ for } q \neq i,j. \tag{1}$$

20

p_{ij} is the proportion of entrepreneur i's time and energy invested in contact j as a fraction of time invested in all contacts:

$$p_{ij} = z_{ij} / \sum_j z_{ij} \tag{2}$$

where

z measures time/energy invested in a relationship

p_{iq} is the proportion of i's time and energy invested on contacts other than j

m_{qj} indicates the strength of the relationship between q and j expressed as a ratio relative to the strongest of q's relationships with anyone in ego's network:

$$m_{qj} = z_{qj} / \max(z_{qj}) \tag{3}$$

where

$\max(z_{qj})$ is the strongests of j's relations with anyone in ego's network (which implies that m_{qj} always has a value between 0 and 1).

Equation 1 indicates the extent to which i is wasting his time in cultivating a redundant contact j

In our study, network constraint is the sum of all the constraints in the ego-network:

$$\sum_j (p_{ij} + \sum_q p_{iq} m_{qj})^2 \tag{4}$$

To measure p, the proportion of time spent with a certain alter (equation 2), we make use of a question about the time spent with a certain alter ("How often do you speak with contact? Daily, weekly, or monthly? "). To measure m, relative strength of the relation, we make use of a question about the strength of the relation between two alters ("Please

think about the relationships between the people you just mentioned. For each contact, ask if this contact is a strangers, close, or especially close to the other persons."[4]).[5]

4.2.5 Multiplexity

Multiplexity is the degree to which different kinds of contacts in a network overlap. In our study we are primarily interested in the degree to which business and personal relationships overlap. We constructed a variable multiplexity that indicates the degree of overlap between business relations (i.e. information relationships and resource relationships) are also personal relationships.[6] In the interview, we could check for every business relationship whether or not it was also mentioned as a personal relationship. The variable *multiplexity* is the number of times that a business relation was said to be a personal relation as well, divided by the total number of business relations. Hence multiplexity is 0 if no relations overlap, and 1 if all business relations are personal relationships as well.

4.2.6 Control Variables

To control for possible confounding effects we included a number of control variables.

Age

---

[4] In the pre-test it became apparent that the category friend was confusing for the respondents, if there was a relation between alters they were always friends. We therefore decided to use the close and very close categories.

[5] An alternative formula provide by Burt measures for the degree to which entrepreneur i is constrained by his contact with j as $c_{ij} = (p_{ij} + \sum_q p_{iq}p_{qj})^2$, for $q \neq$ i,j, where p_{qj} is the proportion of alter q's time and energy invested in contact *j*, instead of m$_{qj}$, which represents the relative strength of the relation. We cannot accurately estimate p_{qj} because we have no information about the contacts of the alters external to the entrepreneurs ego-network. Also, the chosen specification is preferable because it correlates very highly with density measures, so that density and constraint form a common dimension (See for this correlation Burt, 1992, pp.).

[6] We focus on the business-personal relation overlap, there are more possible overlaps between networks, for instance between the business advice and the material resource network, however these overlaps are not our main research interest.

Age has been found to be a factor in the probability of establishing a business. As individuals grow older, they are less likely to invest in the activities necessary to start a new enterprise.

Gender

In most countries gender has been found to be a significant factor in the probability of establishing a business. To control for this we included a dummy variable *gender* (female = 1, male = 0).

Rural versus urban region

To control for possible confounding effects of the sample regions we included a dummy variable *rural* (rural region = 1; urban region = 0) .

Economic Sector

We constructed three dummies for economic sectors: customer services, agriculture and manufacturing, with the trade and services sector as the reference category.

5 Results

Table 2 presents the means, standard deviations and correlations for the variables defined above.

Table 2: Mean, Standard deviation and correlations of the study variables.

	M	SD	1	2	3	4	5	6	7	8	9	10
1.Innovative Performance	2.39	1.89	-									
2.Constraint	1.61	0.89	.16	-								
3.Multiplexity	0.51	0.43	-.15	.31	-							
4.Number of alters	3.95	2.29	.28	.61	-.21	-						
5.Years of education	8.81	3.70	.21	.09	.00	.16	-					
6.Age	31.5	10.8	.01	.02	-.03	.03	-.19	-				
7.gender (female=1)	0.42	0.49	-.11	-.13	.03	.23	-.10	.10	-			
8.region (rural = 1)	0.49	0.50	.19	.25	-.06	.38	.07	.09	-.06	-		
9.customer oriented	0.36	0.48	.14	-.05	-.01	-.09	-.01	-.05	.16	-.31	-	
10.Agricultural	0.14	0.35	.01	.08	.00	.11	-.03	.21	-.08	.39	-.31	-
11.Manufacturing	0.12	0.32	.09	.13	-.06	.15	-.01	-.10	-.07	.33	-.27	-.15

Coefficients > |.07| are significant.

Table 3 presents four different specifications of our regression model. The difference between model 2 and model 1 is that we add a square term for our constraint variable. The difference between model 3 and model 2 is that we add the multiplexity variable. In model 4, we add the size variable. Our preferrred specification is model 4.

Table 3: Network Determinants of Innovative Performance
(standardized regression coefficients; t-value between brackets)

	Model 1	Model 2	Model 3	Model 4
Constraint	0.08*	0.15***	0.22***	0.21***
	(2.13)	(3.84)	(5.44)	
Constraint squared		-0.13***	-0.14***	-0.14***
		(-5.07)	(-5.64)	(-5.27)
Multiplexity			-0.18	-0.18***
			(-5.05)	(-4.09)
Number of alters (network size)				0.01
				(0.20)
Years of education	0.20***	0.19***	0.18***	0.18***
	(5.62)	(5.26)	(5.18)	(5.14)
Age	0.07~	0.06	0.05	0.05
	(1.81)	(.04)	(1.48)	(1.48)
gender (female=1)	-0.10**	-0.09	-0.07*	-0.07*
	(-2.74)	(-2.42)	(-2.03)	(-1.97)
region (rural = 1)	0.21***	0.17***	0.13**	0.13
	(4.75)	(3.86)	(3.15)	(3.06)
customer oriented	0.24***	0.22***	0.20***	0.20***
	(5.91)	(5.58)	(5.24)	(5.24)
Agricultural	-0.01	-0.01	-0.01	-0.01
	(-0.32)	(-0.27)	(-0.22)	(-0.21)
Manufacturing	0.07~	0.08*	0.07~	0.07~
	(1.83)	(2.02)	(1.68)	(1.69)
Constant	-0.00	0.12**	0.14**	0.14**
	(-0.10)	(2.91)	(3.30)	(3.18)
Number of observations	703	703	703	703
F	14.69***	16.38***	17.82***	16,18***
	(8, 694)	(9, 693)	(10, 692)	(11, 691)
R^2	0.14	0.18	0.20	.20

~ = $p < .01$; * = $p < .05$; ** = $p < .01$; *** = $p < .001$

Regression diagnostics

The ordinary least squares regression model assumes that independent variables and the error term in the regression model are statistically independent. If this assumption is not

met, parameter estimates may not be consistent. Since social networks are, at least partly, the results of choices of entrepreneurs, constraint may be conceived as an endogenous variable. We tested for endogeneity using an augmented regression test (Davidson & MacKinnon, 1993), and a Hausman test (Hausman, 1978). As our instrumental variables we used two variables, i.e. married or not and the proportion of kin in the network, that do not correlate with innovativeness, while they did correlate with constraint. The result of the Hausman test as well as the augmented regression test showed that in our case constraint can be treated as an exogenous variable, so that endogeneity poses no problems.

To check the robustness of our results we performed a number of regression diagnostics. We identified four influential data points. Removing them did not substantially alter the results, most of the coefficients became slightly more significant. We found no signs of heteroskedasticy of the residuals. However a normal probability plot revealed that the distribution of the residuals slightly deviates from a normal distribution. We checked for multicollinearity: no problems were detected.

We used 10 interviewers to collect the data. We checked whether interviewer bias could have affected the results. We did this by including 9 interviewer dummies in the analysis. The results were not affected. All the coefficients that were significant in table 3 remained significant and the signs remained unchanged, though some of the standard errors of coefficients did show some increase.

Interpretation

The most important findings are as follows:

Network size has a significant positive effect on innovative performance. Larger networks are beneficial for entrepreneurial innovation. This is consistent with our hypothesis 1.

Constraint has a positive and significant coefficient, while the coefficient of constraint squared is significant and negative. This is a very important result. It indicates that at first increasing constraint has a positive effect on innovative performance. This is in line with the Coleman hypothesis that social capital is positively related to entrepreneurial innovation. However beyond an optimum level of constraint, negative effects set in. The

25

more constraint there is, the less innovative the entrepreneur will be. This is in line with the Burt hypothesis that constrained networks have negative effects on entrepreneurial performance and innovation. Thus, specification 4 provides a synthesis between two approaches which so far have been contrasted in the literature. This finding confirms our third and most important hypothesis. The curvilinear relation between constraint and innovative performance is illustrated in figure 2, which derives directly from our empirical data and represents the relationship between constraint (horizontal axis) and innovative performance for the three different types of networks: personal, information and material.

Figure 2:
The Curvilinear Relationship between Network Constraints and Innovative Performance.
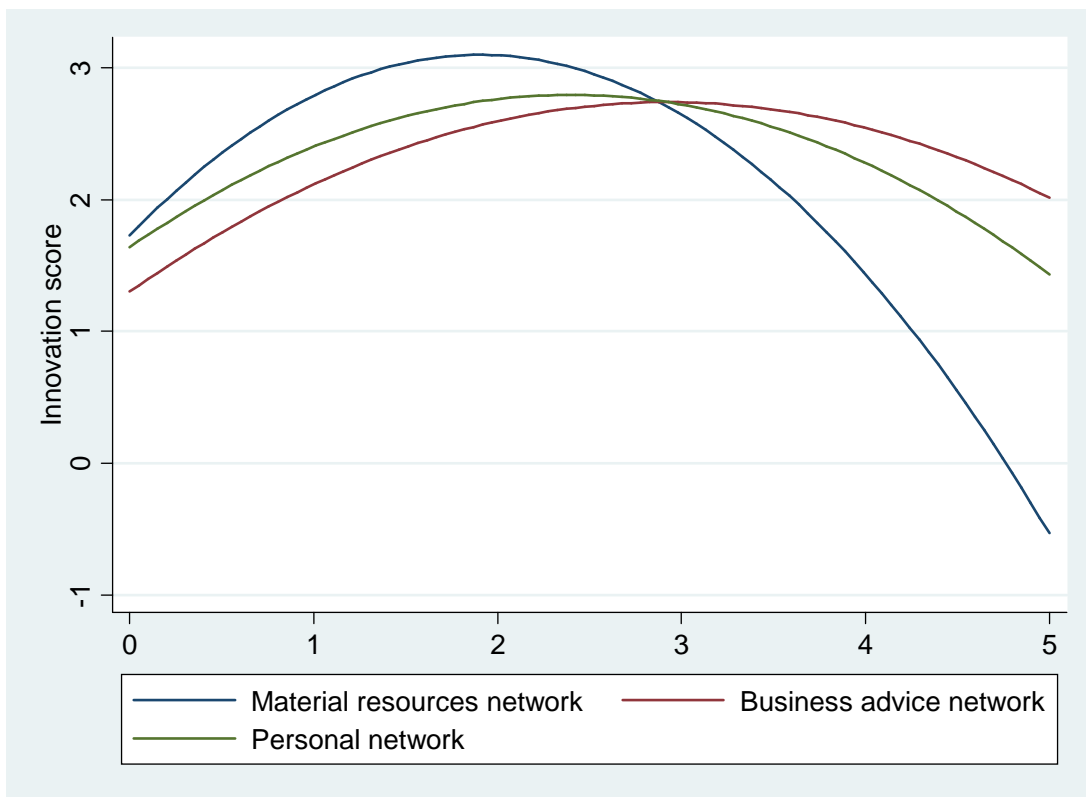
The results with regard to multiplexity form a further support for this line of reasoning. Multiplex networks do not favour innovation. Entrepreneurs who are too strongly tied up in networks where personal and business relationships are intertwined, have less scope

for innovation. This is an important finding in the context of developing countries, where such multistranded relationships are more prevalent than in advanced economies.

With regard to the control variables, it is worth mentioning that education is highly significant in all specifications. As is well known, human capital is one of the determinants of innovative performance. Higher schooling of entrepreneurs creates more scope for innovation. Female entrepreneurs tend to be less innovative than male entrepreneurs. Somewhat unexpected is the finding that rural entrepreneurs are more innovative than urban entrepreneurs.

6   Conclusion

In this study we examined the influence of network characteristics on entrepreneurial innovativeness amongst small scale entrepreneurs in Uganda. The analysis is based on a tailored survey held in May 2008. The survey included detailed questions about networks which allow us to chart the network characteristics of the entrepreneurs and operationalise complex theoretical concepts.

Our results provide a synthesis between two opposing strands of literature: the social capital tradition and the structural holes tradition. The social capital tradition, associated with the name of Coleman, hypothesizes positive relationships between network density and the performance of entrepreneurs. The structural holes tradition associated with Burt hypothesizes negative effects of network constraints on entrepreneurial behaviour. We examine these hypotheses in relation to the innovative performance of entrepreneurs. We find a curvilinear relation between constraint and innovation. In this curvilinear relationship, social capital effects dominate at lower levels of constraint and structural constraint effects at higher levels. This is a plausible finding. Entrepreneurs need to be embedded in networks in order to be able to innovate. But, as networks become denser, more multiplex and more constrained, they will start function as barriers to innovation.

References

Adler, P.S. and S-W Kwon 2002. Social capital: prospect for a new concept. The Academy of Management Review, 27: 17-40.

Ahuja, Gautam (2000). Collaboration networks, structural holes and innovation: a longitudinal study. Administrative Science Quarterly, 45: 425-455.

Akcomak, S. and B. ter Weel, Social Capital, Innovation and Growth, Evidence from Europe, UNU-MERIT, Working Paper 2006-40, Maastricht, November 2006.

Akçomak, Semih & Bas ter Weel, 2009, Social capital, innovation and growth: Evidence from Europe. European Economic Review, 53 (5), 544-567,

Anderson and Miller, 2003. "Class matters": human and social capital in the entrepreneurial process. Journal of Socio-Economics, 32: 17–36

Bosma, N., M. van Praag, R. Thurik, G. de Wit, 2004. The value of human and social capital investments for the business performance of startups. Small Business Economics, 23: 227-236.

Bourdieu P. 1985. The forms of capital. In: Richardson J.G. (Ed.), Handbook of theory and research for the sociology of education, pp. 241-258, New York: Greenwood.

Brüderl, J. and P. Preisendörfer, 1998. Network support and the success of newly founded businesses. Small Business Economics, 10: 213-225.

Bruton, G.D., D. Ahlstrom and K. Obloj, 2008. Entrepreneurship in emerging economies: where are we today and where should the research go in the future. Entrepreneurship: Theory and Practice, 32: 1-14.

Burt, R.S. 1984. Network items and the general social survey. Social Networks, 6: 293-339.

Burt, R.S. (1987). Social contagion and innovation: cohesion versus structural equivalence. American Journal of Sociology, 92: 1287-1335.

Burt, R.S. (1992). Structural holes. Cambridge, Mass: Harvard University Press.

Burt, R.S. (2000). The network structure of social capital. In: Research in organizational behaviour. R.I. Sutton and B.M. Staw (eds) pp 345-423. Greenwich, Conn.: JAI Press.

Burt, R.S. (2009). Structural holes and good ideas. American Journal of Sociology, 110: 349-399.

Coleman J.S, (1988). Social capital in the creation of human capital. American Journal of Sociology, 94: 95-120

Coleman J.S, (1991). Constructed organization: first principles. Journal of Law, Economics, and Organization, 7: 7-23.

Coleman, J.S., E. Katz, and H. Menzel, (1966). Medical innovation. New York: Bobbs-Merrill.

Dakhli, M. and D. de Clercq (2004). Human capital, social capital, and innovation: a multi-country study. Entrepreneurship & Regional Development, 16: 107-128.

Davidsson, P. and B. Honig. 2003. The role of social and human capital among nascent entrepreneurs. Journal of Business Venturing, 18: 301-331.

Davidson, R. and J. G. MacKinnon. 1993. Estimation and Inference in Econometrics. New York: Oxford University Press.

Dorjahn, V. R. 1962. 'African Traders in Central sierra Leone'in G. Dalton and P. Bohannan, (eds.), Markets in Africa, Evanston, Northwestern University Press

Dyer, J.H. and K. Nobeoka, (2000). Creating and managing a high performance knowledge-sharing network: The Toyota case. Strategic Management Journal, 21: 345-367.

Fagerberg, J. (2005), ' Innovation: A Guide to the Literature', in: J. Fagerberg, D.C. Mowery and R.R. Nelson (eds), *The Oxford Handbook of Innovation*, Oxford, Oxford University Press.

Leenders, R. Th A.J. and S.M. Gabbay 1999. Corporate social capital and liability. Dordrecht: Kluwer Academic Publishers.

Granovetter, M. (1973). The strength of weak ties. American Journal of Sociology, 78: 1360-1380.

Gulati, R. 1995. Social structure and alliance formation patterns: A longitudinal analysis. Administrative science quarterly, 40: 619-652.

Gulati, R, and M. Gargiulo 1999. Where do interorganizational networks come from? American Journal of Sociology, 104: 1439-1493.

Hausman, 1978. Specification tests in econometrics. Econometrica, 46: 1251-1271.

Hunter, G.. 1962. The New Societies of Tropical Africa, London: Oxford University Press

Ibarra, H. 1993. Network centrality, power, and innovativeness: Determinants of technical and adminstrative roles. Academy of Management Journal, 36: 471-501.

Ibarra, H. 1995. Race, opportunity, and diversity of social circles in managerial networks. Academy of Management Journal, 38: 637-703.

Kesidou, Effie & Adam Szirmai, (2008), Local Knowledge Spillovers, Innovation and Export Performance in Developing Countries. Empirical Evidence from the Uruguay Software Cluster, European Journal of Development Research, 20(2), pp. 281-98

Khalaf, S., and E. Shwayri. 1966. Family Firms and Industrial Development: The Lebanese Case', Economic Development and Cultural Change, 15, no. 1, Oct. 1966: pp. 59-96.

Knack, S. and P. Keefer, (1997). Does social capital have an economic payoff? A cross-country investigation. The Quarterly Journal of Economics, 112: 1251-1288.

Macaulay, S. (1963). Non-contractual relations in business: a preliminary study. American Sociological Review 28: 55-67.

Marin, A. and K.N. Hampton, (2007). Simplifying the personal name generator. Field Methods, 19: 163-193.

Marsden, P.V., 1990. Network data and measurement. Annual Review of Sociology, 16: 435-463.

Marwell, G., P.E. Oliver, and R. Prahl. (1998). Social networks and collective action: A theory of critical mass. III. American Journal of Sociology, 94: 502-534.

Meijer, R.R. and J.J. Baneke, (2004). A case for nonparametric item response theory modelling. Psychological Methods, 9: 354-368.

Merry, S.E. (1984). Rethinking gossip and scandal. In: D. Black (ed) Toward a general theory of social control, 1: 271-302. New York: Academic.

Mizruchi, M. S. (1989). Similarity of political behavior among large American corporations. American Journal of Sociology, 95: 401-424.

Mokken, R.J. and C. Lewis, (1982). A nonparametric approach to the analysis of dichotomous item responses. Applied Psychological Measurement, 6: 417-430.

Nahapiet, J. and S. Ghoshal (1998). Social capital, intellectual capital, and the organizational advantage. The Academy of Management Review, 23: 242-266.

Naudé, W, Entrepreneurship in Economic Development, UNU-WIDER, Helsinki, 2007

Pennings, J.M., K. Lee and A. Witteloostuijn (1998). Human capital, social capital, and firm dissolution. Academy of Management Journal, 41: 425-440.

Perkins, D, 'Law, Family Ties and the East Asian Way of Business', in: L.E. Harrison and S. P. Huntington (eds), Culture Matters. How Values Shape Human Progress, New York, Basic Books, 2000, pp.232-243.

Portes, A. (1998). Social capital: its origins and applications in modern sociology. Annual Review of Sociology, 24: 1-24.

Portes, A., and J. Sensenbrenner (1993). Embeddedness and immigration: A note on the social determinants of economic action. American Journal of Sociology, 98: 1320-1350.

Powell, (1990). Neither market nor hierarchy: Network forms of organization. In L.L. Cummings and B.M. Staw (eds.), Research in Organizational Behavior, 12: 295-336. Greenwich, CT: JAI Press.

Powell, Walter W., Kenneth W. Koput, and Laurel Smith-Doerr (1996). Interorganizational collaboration and the locus of innovation: networks of learning in biotechnology. Administrative Science Quarterly, 41: 116-145.

Rogers, E. M. (2003). Diffusion of innovations (5th ed.). New York: Free Press.

Rooks, G., Oerlemans, L. A. G., Buys, A. J. & Pretorius, M. W. (2005) Industrial innovation in South Africa: A comparative study, South African Journal of Science, 101, pp. 149–150.

Rooks G., F. Tazelaar & C. Snijders. Gossip and Reputation in Business Networks. Submitted for publication.

Raub, W. Rooks G., and F. Tazelaar (2007). Erträge des Sozialkapitals in Zwischenbetrieblichen Beziehungen: Eine Empirisch-Theoretische Studie. Kölner Zeitschrift für Soziologie und SozialPsychologie, 47: 241-271.

Rooks, G, A. Szirmai and A. Sserwanga, The Interplay of Human and Social Capital in Entrepreneurship in Developing Countries.The Case of Uganda, WIDER Research Paper No.2009/09, Helsinki, 2009.

Shan, W. G. Walker, and B. Kogut (1994). Interfirm cooperation and startup innovation in the biotechnology industry. Strategic Management Journal, 15: 387-394.

Szirmai, A, W. Naudé and M. Goedhuys, 'Entrepreneurship, Innovation and Development. An Introduction' in A. Szirmai, W. Naudé and M. Goedhuys (eds), Entrepreneurship, Innovation and Development, forthcoming.

Uzzi, B. (1996). The sources and consequences of embeddedness for the economic performance of organizations: The network effect. American Sociological Review, 61: 674-698.

Walker, G. B. Kogut and W. Shan, (1997). Structural holes and the formation of an industry network. *Organization Science*, 8: 109-125.

Walter, T., W. Balunywa, P. Rosa, P., A. Sserwanga, S. Barabas, and R. Namatovu, (2003). *Global Entrepreneurship Monitor, Uganda Executive Report 2003*, Kampala:Makerere University Business School.

Walter, T., W. Balunywa, P. Rosa, P., A. Sserwanga, S. Barabas, and R. Namatovu, (2004). *Global Entrepreneurship Monitor, Uganda Executive Report 2004*, Kampala:Makerere University Business School.

Westlund, H. and R. Bolton (2003). Local social capital and entrepreneurship. Small Business Economics, 21: 77-113.

Woolcock, M. (1998). Social capital and economic development: Toward a theoretical synthesis and policy framework. *Theory & Society*, 27: 151-208.

Woolcock, M. and D. Narayan. (2000). Social capital: Implications for development theory, research and policy. *The World Bank Research Observer*, 15: 225-249.

Annex: Gestation Activities

This annex presents the results of regressions with gestation activities as the dependent variable. Gestation activities provide an indicator of the successful exploitation of a start up and are as such associated with innovativeness. We use a set of five dichotomous items that measure gestation behaviors to create a scale for gestation activities (see Table 4). The Mokken model, a non-parametric items respons model indicated that the items constitute a strong scale (Mokken H = 0.62).

Annex Table 1:
Mean, Range and Scalability Coefficient Mokken H for Items Measuring Gestation Activity.

Item	Mean	Range	Mokken H
Have you prepared a business plan?	0.44	0-1	0.69
Is your plan written informally for internal use?	0.43	0-1	0.65
Is your plan written formally for external use?	0.06	0-1	0.71
Have you purchased any major items like equipment, facilities or property?	0.55	0-1	0.57
Have you developed projected financial statements (such as income and cash flow statements)?	0.37	0-1	0.54

The regressions with gestation activities as dependet variable are reproduced in Annex Table 2. It is encouraging that the regressions with this alternative dependent variable perfectly confirm the results in the main text. Constraint has a positive coefficient, constraint squared a negative coefficient, multiplexity a negative coefficient, size a positive coefficient and human capital a positive coefficient.

Annex Table 2

Network Characteristics and Gestation activities

(standardized regression coefficients; t-value between brackets)

	Model 1	Model 2	Model 3	Model 4
Constraint	0.17***	0.21***	0.25***	0.12*
	(4.77)	(5.58)	(6.41)	(2.10)
Constraint squared		-0.07**	-0.08**	-0.06*
		(-3.07)	(-3.41)	(2.20)
Multiplexity			-0.12**	-0.04
			(-3.26)	(-1.00)
Number of alters				0.17**
				(3.14)
Years of education	0.15***	0.14***	0.14***	0.13***
	(4.42)	(4.18)	(4.09)	(3.81)
Age	0.03	0.02	0.02	0.02
	(0.76)	(0.68)	(0.51)	(0.45)
gender (female=1)	-0.12**	-0.11**	-0.10**	-0.08*
	(-3.39)	(-3.20)	(-2.94)	(-2.40)
region (rural = 1)	0.33***	0.31***	0.29***	0.26***
	(8.09)	(7.46)	(6.94)	(6.30)
customer oriented	0.26***	0.25***	0.24***	0.24***
	(6.83)	(6.60)	(6.34)	(6.37)
Agricultural	0.05	0.05	0.05	0.05
	(1.16)	(1.20)	(1.24)	(1.38)
Manufacturing	0.05	0.06	0.05	0.05
	(1.39)	(1.49)	(1.26)	(1.38)
Constant	-0.00	0.08~	0.08*	0.05
	(-0.09)	(1.74)	(1.98)	(1.29)
Number of observations	703	703	703	703
F	26,96***	25.31***	24.14***	23.14***
	(8, 694)	(9, 693)	(10. 692)	(11, 681)
R^2	0.24	0.25	.26	.27

~ = $p < .01$; * = $p < .05$; ** = $p < .01$; *** = $p < .001$