# The Structure of content in multiplex ties:

# Exploring the advantages for entrepreneurs in rural India

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## Abstract

The results of the studies on the influence of network structure of entrepreneurs on firm performance have been inconclusive. This could be due to the fact that in these studies, networks have been taken to be a conduit for single type of content. That ties are multiplex in nature is known but little work has been done to explore the interaction between network structures and content in an entrepreneurial setting. In this study we explore how the structure of the content of ties plays a role in entrepreneurial performance. By doing so, we extend the literature in two specific ways – firstly by focusing, on the structure of various multiplex ties, an attempt is made to reconcile the conflicting findings on the beneficial or detrimental effects of structural holes on performance. Secondly, we take this opportunity to understand how content of ties influences entrepreneurial outcomes - a gap that scholars have recently appealed future researchers to address (Jack, 2009; O'Donnell et al. 2001; Uzzi and Lancaster, 2003). By focusing the study within a low technology context in an emerging economy, we address how individuals set up and manage their firms in a low technological domain in India and the implications for social entrepreneurship.

## Introduction

One of the most prominent works that stimulated the research on networks and entrepreneurship has been the work of Burt (1992). He argued that the structure of social networks surrounding individuals has an important role to play in their performance within the competitive arena and developed measures to quantify network structure. Drawing inspiration from Burt's work, significant research has been conducted within the entrepreneurial setting to explain the performance of entrepreneurs as a function of the structure of the social networks they are enmeshed in.

The results of the studies on effects of network structure of entrepreneurs on the performance of their firms have been inconclusive. Some scholars have reported positive effects of structural holes on performance (Burt, 1992; McEvily and Zaheer, 1999, Bhagavatula et. al. 2008), some (Ahuja, 2000; Xiao and Tsui, 2007) argue that they have a detrimental effect and some found no evidence (Batjargal, 2003). These conflicting findings could be because in all these studies, networks have been operationalized as conduits of single type of content (Jack, 2010). That ties are multiplex in nature is a fact that is known (Larson and Starr, 1993, Human and Provan 1997). Taking cognizance of the multiple tie content, there are two studies in the literature that have explored the interactions between structure and content. Both of these have been conducted only within the realms of mobility in workplaces (Podonly and Page 1997 and Burt, 1997).

This study explores how the structure of the content of ties plays a role in entrepreneurial performance. We extend the literature in two specific ways – firstly, by focusing on the structure of various multiplex ties, we attempt to reconcile the conflicting findings on the beneficial or detrimental effects of structural holes on performance. Secondly, we take this opportunity to understand how content of ties influences entrepreneurial outcomes - a gap that scholars have recently appealed future researchers to address (Jack, 2009; O'Donnell et al. 2001; Uzzi and Lancaster, 2003).

While entrepreneurship exists all over the world, most of the academic insights have come primarily from developed economies. The focus of such studies has typically been the industrial and high technology domains. Relatively little research has gone into how individuals set up and manage their firms in low technological domains[1.] From an entrepreneurial research perspective, low technology firms or informal firms[2] – those that have no legal status - in developing countries represent nascent market capitalism. The study of such firms allows a closer examination of how individual abilities influence business outcomes (Honig, 1998; Brush and Chaganti, 1998; Mueller and Thomas, 2000). Supporting or extending entrepreneurship theories developed in the western economies into a different cultural and technological context will be the first broad contribution of this study.

The network perspective is a lens which lends itself most appropriately to study entrepreneurs in low technology clusters. This is a new area of inquiry within the field of entrepreneurship (Hoang and Antoncic, 2003); It is a perspective well-suited to study entrepreneurs in low technological domains in emerging economies. In these industries, the competitive advantage one entrepreneur gains over the other is not a result of education – there are no formal educational programs that train people to work in these industries. In addition, technology is so simple that virtually anybody has access to it. Therefore, the competitive advantage of one entrepreneur over the other is only due to the business and social networks that these entrepreneurs nurture. These networks govern their production and provide them with vital information about new opportunities and resources and also help them market their products.

## Theoretical background

### *Social capital and competitive advantage for entrepreneurship*

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[1] By *low technology*, we mean those technologies that were developed before the industrial revolution.
[2] By *informal sector* we mean the range of small and micro scale enterprises which are unregistered and/or do not pay taxes.

The important role played by social networks in the process of new venture creation was first studied by Birley (1985), who found that informal ties (i.e. family and friends) appear to play amore significant role than formal ties (i.e. banks, accountants, etc.) when it comes to making resources available.

Following Birley's study, Aldrich and Zimmer (1986) argue that entrepreneurship is "*embedded in networks of continuing social relations. Within complex networks of relationships, entrepreneurship is facilitated or constrained by linkages between aspiring entrepreneurs, resources and opportunities*" (pg 8).

Gulati (1998) segregated embeddedness into two components - relational and structural. Relational embeddedness categorizes the relationships entrepreneurs have within their social networks. Structural embeddedness indicates the overall structure of the ties within a social network. In this paper we focus only on the structural aspect of the embeddedness.

Generally speaking, studies that have investigated the relationship between the structural dimension of network embeddedness and firm performance have taken two routes, one of which is based on the notion that dense networks are advantageous to firms (Coleman, 1988), while the other holds that it is sparse networks that are beneficial to firms. A network is said to be completely redundant or closed when all its members know each other (Burt, 2000). Within a closed network, a dense group of actors who have known each other for a relatively long time and interact frequently provides a number of benefits to the actors involved. Firstly, information is transmitted quickly to all the group members, which helps save valuable time and energy. Secondly, in a closed network, the values of the group are clearly defined, although often implicitly. This in turn ensures a higher level of trust and reciprocity between the members of the network. This ensures that opportunistic behavior is dealt with quickly and effectively through appropriate sanctions. Coleman (1988) argues that, as a result, closed social networks offer a mechanism by which economic transactions are lubricated, which warrants smooth and fair interactions within a minimal regulatory framework. In addition, closed networks stimulate continuity (Steier and Greenwood, 2000). For instance, in situations where one member of a group stops interacting with other members, a network does not need to become fragmented because someone else is likely to fill the gap. Compared to closed networks, networks where there are few contacts between the various members are said to be less redundant (Burt, 1992). To identify the benefits contained in a non-redundant network, Burt uses the term 'structural hole' to capture the existence of gaps in people's social structures. The existence of a structural hole between two groups does not mean that the people in the groups involved are unaware of each another. It merely means that they focus on their own activities to such an extent that they do not pay much attention to the activities of people in the other group.

Burt also suggests that firms that are embedded in sparsely connected networks, i.e. firms that have many structural holes, will enjoy advantages with regard to efficiency and brokerage based on their ability to facilitate the exchange of non-redundant information. The benefits of having a network rich in structural holes are access, timing and referrals. A network with many structural holes will have access to more sources of new information, which will increase the likelihood of receiving information that can be put to use. In addition, it is important for the timing of information to be right, in the sense that entrepreneurs have access to new opportunities before others do. Since entrepreneurs cannot possibly be everywhere, their contacts can make sure that they are at the right place at the right time.
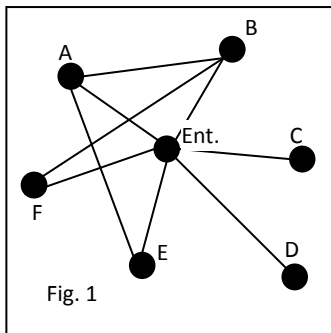


Fig. 1

Fig. 1 depicts a social network of an entrepreneur. It can be seen that he has connections to six alters (contacts A to F). Some of the contacts know one another (A knows B & E and B knows F) while some contacts are independent (no one knows C and D except the entrepreneur). This network structure can also be transformed into various numerical forms – entrepreneur has a network size of 6, a density of 26.7, an effective size of 4.5 and network constraint of 0.37[3]. Studies that have investigated the relationship between the structural dimension of network embeddedness and firm performance have considered ties to be independent of the content that passes through them to test what type of structure helps entrepreneurs - closed or dense networks as agued by Coleman (1988) or sparse networks (containing many structural holes ) as argued by Burt (2000).  Some of the verifiable work relevant to this research is presented in Table 1. This table briefly discusses the findings of the research work pertaining to structural embeddedness and entrepreneurship. The results of the studies on the effects of network structure of entrepreneurs on the performance of their firms have been inconclusive. Some scholars have reported positive effects of structural holes on performance (Burt, 1992; McEvily and Zaheer, 1999, Bhagavatula et. al. 2008), some (Ahuja, 2000; Xiao and Tsui, 2007) argue that they have a detrimental effect and some have found no evidence (Batjargal, 2003, 2010).

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[3] The Operationalization section of this paper contains the explanations and measurements behind  these numbers

**Table 1:  Important empirical work in network entrepreneurship (Collated  by the author)**

| Researcher | Description of study | Findings |
|---|---|---|
| McEvily and Zaheer (1999) | ▪ They propose that a firm's embeddedness in a network of ties is an important source of variation in the acquisition of competitive capabilities based on two differentiating facets: bridging ties and linkages to regional institutions. | ▪ Support for Burt's non-redundancy in a firm's advice network explains  acquisition of capabilities and participation in regional institutions. While infrequency of interaction and geographic dispersion of the advice network did not show significant results. |
| Lee and Tsang (2001) | ▪ Effects of entrepreneurial personality traits, background and networking activities of Chinese entrepreneurs in SME in Singapore.<br>▪ Variables used: need for achievement, internal locus of control, self-reliance and extroversion, education, experience, size and frequency of communication | ▪ Need for achievement, number of partners and experience are positively related to venture growth.<br>▪ Network size assists larger firms more than smaller firms. Frequency of interaction assists smaller firms more than larger firms |
| Batjargal, Bat (2003) | ▪ Impact of entrepreneurs' social capital (based on structural, relational and resource embedddedness) on firms' performance in post-soviet Russia | ▪ Network size indirectly affects economic actions, network heterophily negatively correlates to performance, and weak ties are beneficial whereas strong ties are not.<br>▪ High position alters do not increase performance but the ability to seek more from a network plays a significant role in the performance.<br>▪ No evidence of structural embeddedness (density and structural holes) |
| Jenssen and Greve (2002) | ▪ Exploring if simple measures like number and strength of ties are more important for entrepreneurs than redundancy because many weak and strong ties increase the entrepreneur's access to resources. | ▪ Redundancy does not have positive relation to a business start-up success. Contrary to theory, it was positively related to access to information and support. Higher redundancy together with a higher number of ties affects access to information. For finance the effect of strong ties is slightly higher than that of weak ties |
| Rowley, et al. (2000) | ▪ Explores the contingency approach to investigate the conditions under which sparse/dense networks and strong/weak ties are positively related to firm performance | ▪ Weak ties are positively related to the firm performance. The strong ties argument (building of trust based on governance, reciprocity and mutual gain) is not supported.<br>▪  There is an interaction effect between relational embeddedness, structural embeddedness and environment conditions.<br>▪ No support for either Burt's structural holes or Coleman's closure.<br>▪ Density was found to be beneficial in the exploitation context |
| Bruderl and Preisendorfer (1998) | ▪ Studied the network success hypothesis based on 1700 respondents | ▪ Strong ties seem to be more important than weak ties.<br>▪ The hypothesis that entrepreneurs compensate for shortfalls in human financial capital by resorting to network support did not find confirmation. |

| Researcher | Description of study | Findings |
|---|---|---|
| Ramachandran, Ramanarayan and Sunderajan (1993) | ▪ Social networking in small enterprises in two states of India. The focus was on the subjective experiences of acquiring critical resources required for the firm. | ▪ Family and friends play an important role in networking.<br>▪ They also found that networks are dynamic when people move from a state of active to latent networking and from inner circle to outer circle.<br>▪ Caste and religion seem to be unimportant in networking.<br>▪ Education and prior experience were also important. |
| Rowley, et al. (2000) | ▪ Explored the the conditions under which sparse/dense networks and strong/weak ties are positively related to firm performance | ▪ Weak ties are positively related to the firm performance. Strong tie argument (builds trust based governance, reciprocity and mutual gain) is not supported.<br>▪ There is also interaction effect between relational embeddedness, structural embeddedness and environment conditions.<br>▪ No support for either Burt's structural holes or Coleman's closure.<br>▪ Density was found to be beneficial for exploitation context |

It is clear from the table that there is no congruence in the findings on the process through which networks influence entrepreneurship. These conflicting finding could be due to the fact that in all these studies, networks have been operationalized as conduits of single type of content (Jack, 2010). That ties are multiplex in nature is a fact that is known (Larson and Starr, 1993, Human and Provan 1997). Hence exploring the structure of network effects along the lines of the content of these multiplex ties may provide us with greater insights.

### *Content, network structure and performance*

Podolny (2001) in his paper explores networks as pipes and prisms of the market information. He suggests that as a pipe, networks deliver novel information and as a prism, they provide 'informational cues' to the markets about the quality of the service or product that is being offered. Also as a pipe, networks deliver multiple resources to the entrepreneur. Hence taking information redundancy to be a function of presence or absence of ties may indicate partial reality.

Another reason why segregating networks along the lines of content is likely to offer greater insights into the networking phenomenon is that each of us have a *knowledge corridor* (Rohnstadt, 1988; Shane, 1999) which is unique to each of us. This cognitive corridor develops continuously and is distinctly based on the individuals prior knowledge, lifestyle, family status, education, experience, etc. It is this knowledge corridor that help entrepreneurs in filtering the information that they receive to comprehend and reinterpret information in way that those who do not have similar corridor would not be able to do so. It is argued that this knowledge corridor that enables opportunities to be visible only to a select few. Most entrepreneurs are likely to be aware

of this knowledge corridor of their alters and hence may discuss matter which the alters have some knowledge of. Based on this awareness, entrepreneurs may discuss multiple matters leading to a multiplex relationship. Taking this argument further, while keeping in line with Burt (1992), it is to identify whether or not those who provide similar content are connected to one another. Only when such individuals form a triad with the entrepreneur, can one argue that one of the ties is redundant.

Now that we are aware that analyzing social capital along various types of content can provide greater insights into our understanding of social capital as an independent variable, we extend this idea into entrepreneurship.



Fig. 2
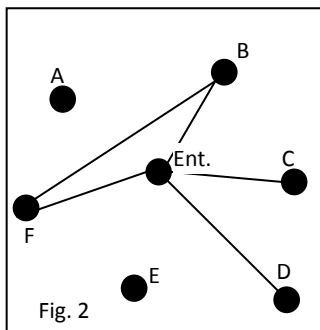
Continuing from Fig 1. although the entrepreneur knows six contacts, he knows who knows what and is likely to discuss topics on which he gets some expert advice. For instance, if we assume that he discusses topic Alpha with B, C, D and F and topic Beta with A, B, E and F. Then the network of the content Alpha and Beta



Fig. 3
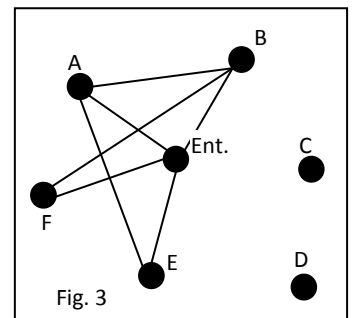
looks like in Figs. 2 and 3 respectively. Certainly from the figures, one can infer that the network configuration of the content varies with the topic discussed. The differences in the network configurations are given in Table 2.

**Table 2. Network configuration and network content**

| Topic | Network Size | Effective Size | Network Constraint | Network Density (%) |
|---|---|---|---|---|
| Original | 6 | 4.5 | .37 | 26.7 |
| Alpha | 4 | 3.5 | .41 | 16.7 |
| Beta | 4 | 2 | .70 | 66.7 |

It is not that researchers are unaware of this phenomenon, they are and hence use multiple name generators to identify multiple relationships that individuals have with their alters (Van der Poel, 1993). However, in a manner similar to Burt (1992), all of them aggregate the networks around the respondents to calculate the social capital. Podolny and Baron (1997) argue that we loose the possibilities of generating deeper insights into how networks function if we aggregate ego networks. Instead they suggest we calculate different social capital that arises by analyzing multiple relations. To prove their point, in their study, they took the very name generator questions Burt (1992) has used in his work – task advice network, strategic information network, buy-in network, social support network and mentorship network –and instead of aggregating the data, they

analysed them as separate networks. They found that social capital in the form of structural holes benefited only in inter-personal networks, in the case of formal position to position network (or authority network), structural holes do not increase the chance of promotion. Taking into account, that content matters, Burt (1997) reanalyzed the data from his earlier study but this time around, he did not aggregate the network around alters and found results that are similar to Podolny and Baron (1997). This discussion is continued in the hypothesis section after a brief description of the context in which the study has been conducted.

## Context

The textile industry in India is very complex. At one technological end of this industry are looms in areas like Tiruppur, Erode, etc. that produce fabric for the world markets using sophisticated machinery. At the other technological end are looms producing fabric using ancient hand operated looms mostly for the domestic markets. In between these two extremes a number of intermediate technologies exist making it difficult to present a complete picture of Indian textile industry. The handloom industry has survived for a thousand years and the sector has been examined from various perspectives for over hundred and fifty years[4].

The handloom industry is suitable to study networks and entrepreneurship. Firstly, it provides employment to millions in rural India. Secondly, it has survived thus far by developing marketing networks across India and supplying these network with high quality products in small numbers rapidly and therefore exist in the open market, along with the mill industry[5]. Unlike many other rural industries, entrepreneurs in handloom industry have not been examined extensively. As mentioned earlier, one of the main reasons was the exploitation of weavers by master weavers. The government tried to address the issue by encouraging and supporting weavers' cooperatives by spending huge sums of money; consequently most of the studies on handloom focused either on the evaluation of the handloom policies of the government (Srinivasulu, 1997; Niranjana and Vinayan, 2001; Dev et al. 2008) or on the working of the weavers' cooperatives (Mukund and Sundari, 1998). It is only in the recent past that the focus has shifted to the work of master weavers (Bharatan, 1988; Mukund and Sundari, 2001). It has thus come to light that the advantages entrepreneurs have over other market channels in this sector are a result of the social networks these master weavers develop to govern production and receive information about market demands (Mukund and Sundari, 2001; Cable et al. 1986).

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[4] One of the oft cited references is that of Marx (1853). An article in the New York Daily Tribune explains how the British systematically destroyed Indian industries in the early part of the 19th century and of these, handloom was the largest.

[5] One of the main reasons for the survival of this industry in India is that there has not been a significant change in women's primary clothing option – the sari, since centuries. The production of sari and dress material is more suited for hand-operated looms than large mills because of the ease with which new designs can be produced. Technically, each sari can have unique colours and patterns, whereas mills would need to produce hundreds of saris to recover design costs.

Entrepreneurs who operate in this industry use hand-operated looms to produce traditional textiles. Production takes place entirely in rural areas and, unlike many other village based industries, the handloom markets are distributed across the country, with some products being exported as well. The prime movers in the industry are entrepreneurs called 'master weavers', who raise money in the informal banking systems and organize their production based on what the markets demand. Each master weaver provides the raw material and designs to a set of weavers, who produce the textiles and are paid accordingly.

Once the master weaver receives the woven cloth from the weavers, he has to market the cloth. He usually has a set of clients (i.e. owners of retail stores who sell the products to the end-customers) in various parts of the country. Clients who purchase regularly obtain products on credit, while others, who purchase occasionally, have to pay in cash. It is through these clients that the products finally reach the end customers. These clients also provide vital market information to the master weavers. It is this feedback channel that helps this sector to be competitive in the markets.

## Prior work in entrepreneurship in the non-western context

Economic anthropology is a field of study that has primarily looked at non-market exchanges in traditional and primitive societies, and on the transformation of societies from non-market to market economies. The interest in understanding economic transactions within the realm of anthropology was particularly high between 1950 and the late 1970s (Stewart, 1991). Thus there were studies on the role of the entrepreneur in social change (Barth, 1963), understanding the exchange spheres in Darfur (Barth, 1967), the way rural communities in India organised their production and system of rewards (Epstein, 1967), religious belief and its influence in economic change in Java (Geertz, 1956), the change in economics as societies developed (Geertz, 1963), analysing entrepreneurship as a differential response to change (Long, 1977), entrepreneurship in Indian towns (Nafziger, 1977) and, the process of setting up an enterprise (de Montoya, 2000).

Barth (1963, 1967) wrote about how a Fur language speaking society in Darfur, Sudan, organised their exchange processes. To understand how the local economy worked, he conceptualised an 'economic sphere'. An economic sphere is one in which all transactions follow the same rules. Transaction between spheres may or may not be possible. To illustrate this idea, Barth found two main economic spheres in the area: one where all transactions are done with cash and the other, where all transactions are carried out with labour and beer. This society does not permit an exchange between beer and cash or labour and cash; the sphere containing

labour and beer is ranked higher. While this works for an ethnic community, what happens when outsiders come in? They circumvent the barriers and seek profit by exploiting the discrepancies in the system. Barth concluded that there might be a re-evaluation in the group as a result of exploitation, thereby curtailing the scope for profit.

Long (1977) argued that Barth's model did not 'focus upon an analysis of decision-making of specific individuals or categories of individuals'. The model is able to present opportunities or constraints faced by individuals as a result of 'the structure of interpersonal relationships in which the entrepreneur or the potential entrepreneur is embedded in'. It does not take into account information concerning alternatives and outcomes. Long proposed instead, an 'actor-oriented' perspective, where social relationships are the outcome of face-to-face interactions, and evolve over time. To lend credence to his argument, Long used his research work in the mountain regions of Peru (1972, 1973). He showed that merchants and traders use their social networks to seek information as well as resources for their ventures. He also demonstrated that these entrepreneurs use their current networks to reach out to networks that are beyond their local areas.

In many ways, the analysis and the findings of Long are consistent with recent developments in entrepreneurship, predominantly in the western hemisphere, where social relations are found to significantly influence entrepreneurial performance (Aldrich, 1987; Elfring and Hulsink, 2003). There is enough evidence to support the argument that social networks are important to entrepreneurs irrespective of technology and location. This study benefits from the research work that has been done in the last few decades. It proposes to extend Long's theory on how entrepreneurs in low technological domains within developing countries use their social networks.

**Hypothesis**

To develop the argument to recast networks as pipes and prisms, Podolny (2001) develops a two-by-two matrix (shown in Fig. 4) that offers insights into the uncertainties surrounding the ego (entrepreneur) and uncertainties surrounding the alters (markets).

High

|                          | Low (Altercentric) | High (Altercentric) |
|--------------------------|--------------------|---------------------|
| *Egocentric Uncertainty* High | Vaccine          | High-yield debt     |
| Low                      | Wheat              | Roofing             |

Low                                              High
*Altercentric uncertainty*

**Fig. 4: An illustrative matrix to highlight uncertainty (Podolny 2001, pg. 38)**

Podolny explains that in the upper left corner, development of a Vaccine is uncertain around the development by the innovating company (ego) but once it is developed, the market is likely to accept it. Whereas Roofing on the other hand is likely to have uncertainty around the market or customers (alters) than around the entrepreneur - he is sure of building a roof if he gets a customer. Production of wheat has no uncertainly around the entrepreneur or the market whereas high-yielding debt through junk bonds especially during the time of emergence has both high levels in both kinds of uncertainty.

We argue that when the uncertainty surrounding either the alter or the ego is low then, dense network structure will provide advantages to an entrepreneur and when the uncertainty is high then sparse network structure will provide the advantage. In the handloom industry the egocentric uncertainty will be on what products to make which will involve decision on identifying the right colours or selecting the right patterns amongst thousands that are known between all of the stakeholders. From the point of view of the markets, customers are uncertain about the quality of the yarn used (pure silk or artificial silk), zari (is the metal thread made of pure silver or copper that is silver coated) and the dyes (will it run colour or are these azo-free dyes, etc.). More often than not, entrepreneurs can overcome the altercentric uncertainty by ensuring that they use the right raw material combination for the price of the product. There is no issue when the product price is low but when the price of the product is high then customers expects that high quality raw material have been used. The market forces ensure that altercentric uncertainties are minimized and therefore dense networks play a role.

**Hypothesis 1**: Dense networks surrounding production-related discussions will positively influence performance of master weaver firms

*Hypothesis 2*: Dense networks surrounding finance-related in will positively influence performance of master weaver firms

*Hypothesis 3*: More Structural holes within marketing-related discussions will positively influence performance of master weaver firms

*Hypothesis 4*: More Structural holes within design related-discussions will positively influence performance of master weaver firms

## Research Methods

To understand issues related to the rural areas of developing countries, more often than not, researchers depend on primary data collection since few secondary sources exist. In India, government records form the most important sources of data on rural industry. Although researchers have had issues in the past, with the accuracy of data obtained from the Government India (Streefkerk, 1993; Harris 1991), such data, whenever it is available, does provide a basic picture of the industry. In the case of handloom, since the government has always focused on the co-operative sector, all data that is available is related to handloom co-operatives. This data does not have relevance to this study.

Handloom is an industry with low entry barriers. This results in competition from new players all the time. Master weavers do not have access to institutional finance and they raise the funds required for their operation from private sources at high interest rates. Often, the competitive advantage one master weaver has over the other results in his withholding market information from others. Secrecy is one of the key strategies used by master weavers because anyone with a rudimentary knowledge of sales and production, and some capital can establish a firm.

The unwillingness of small entrepreneurs to discuss matters related to their business has not gone unnoticed by previous researchers. According to Harris (1991) many researchers have found that merchants are extremely secretive and it is difficult to elicit answers from them, especially about the financial and marketing details of their firms. In order to make the merchant comfortable enough to talk about their firms, she advises researchers to make multiple trips to the field and participate in discussions that are of least importance to the researcher. Streefkerk (1993) suggests that the researcher might often have to adopt creative techniques that are not prescribed in text books.

The data we used in this study was collected in Andhra Pradesh, a state located in the south of India that is among the top four states in the country in terms of handloom production.

In exploratory research, especially when the member of the research population is difficult to locate or when the population itself is not known (as with drug addicts, etc.) the technique of snowball sampling can be useful (Des Raj, 1972; Babbie, 2004). Babbie explains snowballing as a method of collecting data that involves meeting few members of the population who can be located easily. These individuals in turn are asked to provide information about where to locate a similar set of people. Thus the researcher is able to obtain a rough sketch of the population with little iteration. If the research population is large and dispersed, Knorringa (1999) advices the use of 'multiple snowballs' technique in instances where the research population is large and dispersed; in this method, instead of developing one list from one source, multiple sources are used simultaneously. In this way, each list can potentially take the researcher to a distinct set of respondents. Therefore, a list of master weavers was prepared with assistance from our first respondent. The second respondent was shown this list and asked to add names that he thought the first respondent may have missed. Since handloom clusters have only a limited number of master weavers, after passing on the list to the first set of respondents, only a few new names came up. The list was also shown to the person who was being interviewed. The advantage of using this method was that  a master weaver could have an idea of who all had been interviewed and also of who else was on the list so that he felt less suspicious about the motive behind the interview.

This technique of meeting master weavers was further fine-tuned in subsequent clusters, by starting with the influential master weavers. The smaller master weavers then opened up more easily. This was strategy number two to ensure near 100% response rate. It also meant that extra trips were required to finish the initial set of interviews since the business operations of these master weavers were larger and interruptions proportionally so.

## Data Collection
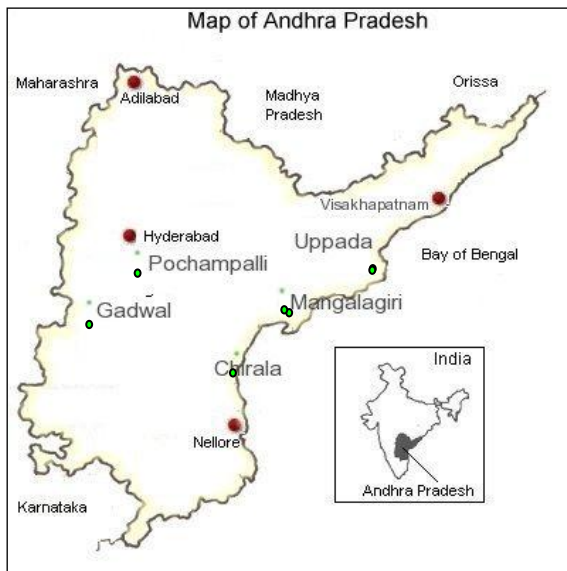


**Figure 5: Map of the research area**

Initially 25 master weavers from five different clusters were interviewed to understand how the handloom industry works – shown as smaller dots in Figure 5. Four master weavers each from Mangalagiri, Chirala, Gadwal, and Pochampalli; and 9 from Uppada. Considering that Uppada cluster was logistically the easiest to access, many of the initial interviews were conducted here.

Since Uppada is very close to the town of Kakinada, many master weavers were accessible on telephones and it was possible to fix up appointments before making the trip. This helped in completing the interviews quickly because of two reasons. Firstly, the master weaver knew the reason for the visit and secondly he made himself free at the scheduled time.

The interviews were conducted in a semi-structured format lasting many hours and multiple sessions. Babbie (2004, pg. 300) explains that a semi-structured or qualitative interview is '*an interaction between an interviewer and a respondent in which the interviewer has a general plan of enquiry but not a specific set of questions that may be asked with particular words and in a particular order... an interview is essentially a conversation in which the interviewer establishes a general direction for the conversation and pursues specific topics raised by the respondent.*' In order to ensure that similar questions were asked of each master weaver, a broad set of questions were prepared. Wherever possible and permitted, notes-taking was substituted with tape-recording. This enabled the interview to be conducted in a smooth fashion, without interruptions. Also, the tape recorder made all the respondents take the event very seriously.

Quantitative data was collected using a set of questions regarding various aspects of a master weaver's operation and details of his social network. A two-fold process was used to develop the questionnaire. In the first part, the pre-testing phase, the questionnaire had queries on the entrepreneur's background (human capital), on their current business activity and on their networking activities (social capital). Depending on the comfort levels of the respondents, the wording and sequencing were modified for further encounters. The

second phase was the actual data collection. The subsequent paragraphs explain in greater detail how these two phases were implemented.

The first version of the questionnaire was developed from a list of themes that are relevant to the master weavers, and based on available literature. It was framed subsequent to the completion of the first few interviews. Qualitative interviews were also used to test the questionnaire. The specific task in the testing phase was to find out if the master weaver understood the questions and could answer without any difficulty.

The trial period established that the master weavers were reluctant to part with information about their business networks. This problem was brought up with a local research team that had conducted a number of quantitative market studies for the Indian corporate sector. They suggested that the assistance of a local MBA student be sought. They explained that the reluctance to share information on trade and networks might stem from uncertainty about the intentions of the survey. It was also felt that master weavers might be concerned that pertinent information could be leaked to government officials. However, weavers often speak to MBA students who work on academic projects, and might feel a greater degree of comfort and trust if one of them was involved. A student was thus selected in the early stages of questionnaire development, which right away enabled him to get a grasp of focus of the research.

The final questionnaire was a significantly modified version of the first one. For one thing, English had been abandoned in favour of Telugu, the local language It was tested in four clusters—Mangalagiri, Chirala, Gadwal and Pochampalli. The Uppada cluster was left out as it had too few master weavers. Then questions that did not show any variance in the responses and those that the respondents were reluctant to answer were dropped.

The questionnaire was filled in by the research assistant in the course of a personal interview. The master weavers were given the questionnaire at the start of the interview, so that they could have an idea of the kind of information we expected to collect. This procedure also prevented them from getting impatient. The respondents who were part of the trial leg were revisited to obtain answers to some questions that were added later. These multiple visits gave us an ideal opportunity to cross check previous responses, especially in matters regarding financial dealings.

According to Babbie (2004, pg. 263), the advantages of adopting an interview survey are many. In our case multiple trips had assured us of a high response rate—in fact, close to 100%. More importantly, this method

reduces the number of 'don't know' answers because difficult questions could be clarified in a subsequent visit. For us, the most important part of the questionnaire was about the master weaver's networks and the relationship between the various *alters* of the master weaver. It was in this section that the advantage of having an interviewer fill the questions was most evident.

We collected data from 107 master weavers[6]. Of these thirty-seven from Pochampalli from a universe of about one hundred and twenty master weaver firms, thirty-three from about one hundred and fifty firms in Chirala, twenty-two from about eighty firms in Mangalagiri and fifteen from about fifty firms in Gadwal.

## Network data

There are two forms of network data – one where the focus of the data is on the individual, which is known as ego-networks and another where the focus on the whole network. In this study, we focused on the individual. The best known and most widely used instrument to collect ego-oriented network data in social surveys is called "name generator". It was first administered in the 1985 General Social Survey ( Bailey and Marsden, 1999). This was a nationwide survey aimed at understanding the personal networks of American citizens. Central to his name generator instrument is the question:

> *From time to time, most people discuss important matters with other people. Looking*
> *back over the last six months — who are the people with whom you discussed an*
> *important personal matter?*

This question is followed by 'name interpreter' items, which help the researcher gain a deeper understanding of the characteristics of the respondent's alters (contacts) and the type of relationships they have. Furthermore, questions are asked about the respondent's perception of the relationships between the various pairs of alters (Bailey and Marsden, 1999) to identify the over structure surrounding the ego.

In light of the ease with which the name generator could be used in the area we investigated, we adopted it to generate the network data. To generate network data surrounding the content that flows through the network, we worked within the lies suggested by Campbell and Marsden, to identify the most important business related issues for a master weaver. This was done through the qualitative study. After interacting with 25 master weavers, the issues that are important for a master weaver are: creating new designs, servicing the

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[6] The broad idea was to get around 90-100 questionnaires filled. Since the data collection was done in parts and in different parts of the state, we had 107 in the end. The number of respondents we had from each cluster does correspond to the number of master weavers in each cluster.

current set of clients, acquiring new clients, procurement of raw material, managing labour and raising and rotating finance[7].

We used a name generator for each of these issues to identify the structure of the content. In line with Marsden (1993, p. 400), we used three types of name interpreter items: 1) the attributes of alters, like age and caste 2) dyadic features of the relationship between ego and alter, for instance the intensity, duration and importance 3) characteristics of the relationships between various alters (friend, business acquaintance or relative).

## Operationalization

### Network variables

The network variables used in this study are network size, network density and network constraint. Network size is taken as the total number of alters the master weaver is connected to. It is measured by simply counting the unique relationships or alters of the master weaver. Network density is the total number of relationships that exist between the master weaver and his unique alters, divided by the total number of ties that are theoretically possible (Burt, 1983).

Network constraint indicates the extent to which the master weaver is constrained by the structure of the network involving his alters (Burt, 1992). This measure, when low, indicates the advantage the master weaver acquires by developing connections with people that are not connected to each other. When the network constraint has a high value it indicates the lack of structural holes, as all or most of the master weaver's alters are engaged in relationships with one another. Both network density and network constraint were calculated by using the network analysis software UCINET 5.0 (Borgatti, et al. 2002). The variables used in this study are described below and are also explained in the form of formulae in Table 3.

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[7] While analyzing, however, we have found out that there was a great overlap in the network related to the topics servicing existing clients and identifying new client. We clubbed both of these and termed it as marketing network. Likewise there was an overlap between raw material network and labour. These two networks were combined and we termed it as production network. The other two are design, and finance networks.

**Table 3: Definition and measurement of network variables**

| Embeddedness Type | Variable | Measure | Remark |
|---|---|---|---|
| **Structural** | Network size | Number of alters that an ego is directly connected to. | |
| | Network Density | $$\frac{N*(N-1)}{2T}$$ Where T is the total number of ties and N is the number of contacts in the ego's network. | Measure popularised by Burt (1983) to indicate how dense the network is. Naturally, the higher this value, the higher is the density of the network. |
| | Network Constraint | $$\left( p_{ij} + \sum_q p_{iq} p_{qj} \right)^2, \quad q \neq i, j$$ Where i indicates the ego, j and q are two of the ego's contacts, pij is the proportional time investment of i in contact j, piq is the time investment of i in contact q and pqj is the time investment of contact q in contact j. | Measure developed by Burt (1992) to indicate the extent to which an individual is constrained by the structure of the network involving his alters. The higher this value, the more redundant or constrained is the network. |

## Control variables

In addition to the independent variables, we believe there are two more variables that may influence performance, which we would like to control. These are Firm age and Number of unpaid workers. Firms that have been in existence for longer would be in a better position to levy their experience in spotting opportunities and mobilising resources and hence perform better. So we expect older firms to be doing better than younger firms. Also, many master weavers use their close family members in their operations without providing any payments. Hence we expect master weavers with more number of unpaid workers to be having higher performance.

## Dependent variable

Three performance measures that Shane (2003) lists out are survival, growth and Initial Public Offering (IPO). Since many enterprises perish in the first year itself, survival is the first performance measure. The fact that

these master weaver firms are in existence supports the first performance measure. These firms never go IPO so this performance measure cannot be applied. Getting growth figures is a difficult proposition in the case of the handloom industry considering that these firms get split along the family members once in a while. The dependent variable for this study is performance and it is operationalized as the number of weavers working under each master weaver. For small rural enterprises it is not mandated by the law to keep accounts, hence using any form of financial data as a performance measure may not be an accurate measure.

## Results

Table 4 shows the distribution of alters with whom master weavers discuss each of the above issues. The table shows that when the network size is small, master weavers discuss almost all issues with everyone in their network. When the network size is less than 5, master weavers discuss marketing related issue with 83 per cent of the alters, finance with 75 per cent, design related issue with 67 per cent and production with 83 per cent. The numbers do not add up to 100 as master weavers discuss multiple issues with the same alter. Hence it can be said that greater levels of multiplexity – discussing multiple issues with the same contact – exist in smaller networks. As the network grows, the master weavers have an option of talking to specific individuals on specific topics which decreases multiplexity.

**Table 4: Descriptive statistic of network content (in per cent)**

| Network Size | Marketing | Finance | Design | Production |
|:---:|:---:|:---:|:---:|:---:|
| 1-4 | 83 | 75 | 67 | 83 |
| 5-8 | 86 | 23 | 54 | 42 |
| 9-12 | 79 | 20 | 59 | 34 |
| 13-16 | 72 | 23 | 57 | 37 |
| 17-20 | 77 | 29 | 49 | 41 |

The greatest drop in content as the network size grows seems to be in issues related to finance. This could be because the entrepreneur may choose to talk about finances only with a core group, usually family or close friends. On the other hand, marketing seems to be the most common network content as several master weavers bring it up with a significant number of alters. Perhaps it is exactly such persistent efforts at keeping their ear to the ground that makes them more successful compared to entrepreneurs in other traditional industries

Table 5 shows the correlation matrix for all the variables used. It can be seen that there is a correlation between the numbers of non salaried workers. This can be expected because to manage more production (weavers, suppliers, etc.) master weavers require more helping hands. In all possibilities, he would search for family members whom he does not have to pay salary first before seeking to hire external candidates. As it would be expected, the network size correlates negatively to all the constraint measures and density. As Burt has mentioned while defining the measure that constraint decreases as size or density increases. One of the highest levels of correlation can be found between constraint of the overall network and the constraint of the marketing network. While these two variables are not taken into the same regression model, this relationship needs a little explanation. In most cases, handloom production happens around clusters of villages that are close to one another. Hence, there will be very few people who do not know one another. Master weavers know each other and also know each other's weavers. Similarly the raw material suppliers are also known all the stakeholders. The only source of structural holes for master weavers are the network they maintain outside the cluster, which are mostly their clients and with whom they discuss most of their marketing related issues. Hence there is a great overlap between these two variables. Most constraint measure are correlating positively to each other, which is expected because all of them are measuring the same entity – structural holes but in different networks.

**Table 5: Descriptive Statistics and Person's correlations**

|  |  | Mean | SD | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Firm Age | 18.34 | 6.86 | | | | | | | | | |
| 2 | No. of non salaried workers | 2.84 | 1.65 | -.022 | | | | | | | | |
| 3 | Network size | 11.05 | 3.88 | .071 | .076 | | | | | | | |
| 4 | Network density | 0.45 | 0.17 | -.057 | .065 | -.242$^*$ | | | | | | |
| 5 | Network constraint | 0.33 | 0.12 | .020 | .010 | -.396$^{**}$ | .368$^{**}$ | | | | | |
| 6 | Constraint of marketing network | 0.41 | 0.15 | .036 | -.099 | -.283$^{**}$ | .224$^*$ | .814$^{**}$ | | | | |
| 7 | Constraint of design network | 0.47 | 0.24 | -.066 | -.066 | -.191 | .117 | .508$^{**}$ | .388$^{**}$ | | | |
| 8 | Constraint of finance network | 0.69 | 0.37 | -.038 | -.083 | .072 | .120 | .097 | .226$^{**}$ | .124 | | |
| 9 | Constraint of production network | 0.63 | 0.30 | .024 | -.111 | -.271$^{**}$ | .135 | .420$^{**}$ | .330$^{**}$ | .310$^{**}$ | .114 | |
| 10 | Number of weavers | 22.91 | 18.35 | .115 | .151 | .083 | -.310$^{**}$ | -.133 | -.250$^*$ | .000 | -.042 | .052 |

**. $p < 0.01$, *.$p < 0.05$

Two regression models are presented in Table 6. The first model includes the control variables and network structure variables in the form of density and network constraint aggregated around alters. Network density surrounding the entrepreneurs is significant and is found to be negatively influencing the performance ($\beta$ = -.298 and $p < .01$). On the other hand, aggregated network constraint is not significant. This indicates that sparse networks with fewer ties between the contacts influence the dependent variable. In the second model, we introduce the individual network constraint of the each of the content topics instead of the aggregated

network constraint. In this model the network density surrounding the entrepreneur is once again significant and there is a slight increase in the significance value ($\beta$ = -.315 and $p < .01$). The network constraint of marketing network is strongly significant ($\beta$ = -.288 and $p < .01$) and the network constraint of production network is mildly significant ($\beta$ = .178 and $p < .10$). Constraint of design network and constraint of finance network are not significant. This implies that Hypotheses 1 and 3 found support while Hypotheses 2 and 4 did not find any support. Implications and possible explanations of these finding are taken up in the next section.

**Table 6: Results of the regression analysis on Performance**

| Independent Variables | Model 1 | Model 2 |
|---|---|---|
| Firm Age | .120 | .164 |
| No. of unpaid workers | .210[*] | .186[+] |
| | | |
| Network size | -.039 | -.004 |
| Network density | -.298[**] | -.315[**] |
| Network Constraint | -.068 | |
| | | |
| Constraint of Marketing network | | -.288[**] |
| Constraint of Design network | | .117 |
| Constraint of Production network | | .178[+] |
| Constraint of Finance network | | .056 |
| | | |
| $R^2$ | .149 | .219 |
| Adj $R^2$ | .100 | .139 |
| F | 3.055 | 2.762 |
| Sig | .014 | .014 |

+ $p < .10$, * $p < .05$, ** $p < .01$

## Discussion

This study has had two objectives. The first has been to extend the entrepreneurship studies that are primarily conducted in the western world to explain the functioning of entrepreneurs in completely different cultural and technological settings. The second objective was to explore the possibilities of deriving greater insights into

the understanding of how networks influence performance by separating the networks according to the content. This study has significantly addressed both these objectives.

Micro enterprises in rural areas, especially those that are non-agricultural in nature, have had an important role to play in the economic development of that area. That networks are important to entrepreneurs in developing countries has been pointed out by Long (1977). He argues that the opportunities and the constraints faced by an entrepreneur are contingent on the network of interpersonal relationships he is embedded in. This study has made it possible to conduct a quantitative analysis to understand the influence of networks on the workings of small entrepreneurs. We have shown that the social network they seek and interact with has a significant influence on the performance of their ventures.

By disentangling the network constraint according to the content, we have shown that low constraint (more structural holes) around the marketing networks and high constraint around production networks help entrepreneurs to perform better. Handloom industry, over the last few years has been servicing the urban markets more than the rural markets. Hence, as cities are becoming large and the requirement of new markets to sustain and grow seem to be crucial. It is in reaching out to new markets where novel information is required. On the other hand, production requires lot of tacit knowledge. There are no formal education systems for training weavers. The craft of weaving is learnt within families and the tacit weaving knowledge is transferred within family for which closed network structure is optimal. The findings for the handloom industry may also be used to understand craft-based industries, since they both need to satisfy highly differentiated demand conditions while using local resources (McAuley and Fillis, 2005; Paige and Littrell, 2002). This means that those engaging themselves in supporting craft based enterprises should not market the products (as many NGOs and cooperatives do) but should help the craftsmen themselves market the product. This enables the craftsmen understand the likes and dislikes of the customers and are likely to come up with products that are more easily marketable.

The results of the previous studies on structural holes and performance have remained inconclusive. Different researchers have found different results. While some scholars have found support (Burt 1992, McEvily and Zaheer, 1998, Bhagavatula, et al. 2010) some others have not found any support (Batjargal, 2003) while some have found detrimental support (Ahuja, 2000, Xiao and Tsui, 2003 and Batjargal, 2010). By focusing on the content of ties we have been able to reconcile the conflicting finding of beneficial or detrimental effects of structural holes. Hence, firms that have high uncertainty around alters or egos on what to produce, will benefit from having more structural holes. In the case of handloom, master weavers are not sure what the market

demands and hence having more structural holes in the marketing related discussion were found to be beneficial.

On the other hand, when there is lesser uncertainty around either alters or egos the entrepreneurs are certain of what to produce. The only constrain in such situations is whether or not they will be able to produce them in the quantities and the qualities that the markets require. In such situation, governance or trust plays an important role. In the case of master weavers, he should be able to get his weavers to produce the right kind of products.

What our study also shows is that entrepreneurs require both types of network structure. One can assume that sparse networks in marketing related discussions provide new information and it is this new information that is the source of new opportunities. In order to translate these new opportunities in new products, dense networks come into play.

Unlike this study of ours, two other studies that have been conducted in non western settings have not found any support for structural holes (Xiao and Tsui, 2007 and Batjargal, 2010). The different between the studies is that our study focuses on entrepreneurs in India while the other two are on mobility in work places in China. Perhaps in entrepreneurial setting culture plays a lesser role in mediating behavior than in managerial setting. When survival of the firm is at stake entrepreneurs who transcend the cultural barriers are more likely to survive than those who do not. Also, the cultural system in China (Guanxi) is different in India (caste) and caste is basically vocation led segregation between people. For a long period of time weavers and master weavers were from the same caste. However, as markets started to grow, weavers from another caste can be found but in all our research areas, master weavers seem to be from the same caste. Perhaps there is lot of tacit knowledge that is required to be a master weaver (identifying opportunities in the markets and converting them into marketable products) which prevents outsiders from coming into this profession. Our study has shown that both dense and sparse networks are important for master weavers. This mean that master weavers will have to balancing the collectivist attitude with the weavers and individualistic attitude with the clients and developing this tact may not be as easy. Hence those individuals and institutes working for the upliftment of the weavers, may have to take this ability into cognizance and train the weavers suitably.

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