Iván Arribas Fernández
José E. Vila Gisbert

# Guanxi Management in Chinese Entrepreneurs

## A Network Approach

Fundación **BBVA**

# Guanxi Management in Chinese Entrepreneurs

## a Network Approach

**Iván Arribas Fernández[1,2]**
**José E. Vila Gisbert[1]**

*[1] UNIVERSITY OF VALENCIA*
*[2] THE VALENCIAN INSTITUTE OF ECONOMIC RESEARCH (Ivie)*

## ■ Abstract

This working paper analyzes the role played by two dimensions of entrepreneurs' private social capital in the performance of an entrepreneurial venture: local size and degree of preferential linking. To fulfill this objective, we build a bi-dimensional measure of social capital based on network models and a methodology to estimate this measure for any group of entrepreneurs. Based on a survey of service entrepreneurs who launched their business in the city of Shanghai, we show that social capital or guanxi is relevant for business success. Moreover, we show that roles played by each dimension are quite different. A large local network, i.e. a large set of agents able to advise or support the entrepreneur, increases the chances of survival of the new venture but has no impact to make it go beyond a self-employment business. To reach this level, entrepreneurs need to generate a high degree of preferential attachment; in other words, they need to generate a social network that allows them to get advice and support from those agents placed in critical positions within Shanghai's global socio-economic network. This finding has relevant political and managerial implications and generates new questions to be answered in future research.

## ■ Resumen

Este documento de trabajo analiza el papel que juegan dos dimensiones del capital social de un emprendedor en los resultados de su aventura empresarial: el número de conexiones y su grado de elección preferencial. Para cumplir este objetivo, construimos una medida bidimensional del capital social basada en modelos de redes y la metodología para medir ambas dimensiones en cualquier grupo de emprendedores. A partir de una base de datos obtenida con una encuesta a emprendedores en el sector servicios en la ciudad de Shanghai, contrastamos que el capital social (*guanxi*) es relevante para el éxito empresarial y que ambas dimensiones juegan un papel diferenciado. Así, disponer de un mayor número de conexiones, esto es, de un mayor número de agentes capaces de asesorar y apoyar al emprendedor, incrementa la probabilidad de supervivencia de la nueva aventura empresarial, pero no tiene un impacto significativo a la hora de hacerla crecer. Para alcanzar el crecimiento empresarial, los emprendedores necesitan generar un alto porcentaje de conexiones preferentes, es decir, necesitan generar una red social que les permita obtener asesoramiento y soporte de agentes localizados en puntos críticos dentro de la red socio-económica. Estos resultados tienen relevantes implicaciones políticas y de gestión y generan nuevas cuestiones a ser respondidas en futuras investigaciones.

## ■ Key words

Social capital, network analysis, entrepreneurship in China

## ■ Palabras clave

Capital social, análisis de redes, emprendedurismo en China

# 1.    Introduction

INTEREST in entrepreneurship as a potential engine for economic development and poverty reduction has motivated a wide series of research agendas that examine this phenomenon for developing and transition economies. In the last decade, a growing body of literature has been developed to better understand topics such as: (1) profile and motivation of the entrepreneur (Djankov et al. 2006a, 2006b), (2) impact of entrepreneurship in economic development and living conditions (Mohapatra et al. 2007, Huang 2008, Shane 2009) and (3) characterization of successful entrepreneur ventures in terms of survival and growth (Arribas and Vila 2007, Fornoni et al. 2009) for these developing economies.

On the other hand, academic research on management has shown an increasing interest in analyzing the role played by social capital as a valuable resource for companies' successful performance, specifically SMEs and new ventures. The underlying assumption in this literature is that economic actors are embedded and nurtured in webs of social relationships (Granovetter 1985) and, as social capitalists, they capitalize on resources and assets located in social networks for instrumental actions (Lin 2001a).

This paper could be placed conceptually at the intersection of these two research agendas. Specifically, we analyze how entrepreneurs' social capital promotes the success of a new venture in the rapidly changing and fast-paced competitive environment of the Chinese economy. We know that in economic, political and socio-cultural terms, China is different and perhaps even unique. Thus, any research which examines how entrepreneurship is articulated in this particular context can help our understanding.

Social capital can be analyzed from a macro or micro approach. In a macro analysis, social capital is a public good of a given geographic region, social group or subculture, and permeates all the economic transactions performed in a social environment (Coleman 1988, 1990; Putman 1993, 2002; Fukuyama 1995). Under a micro approach (Burt 1992; Lin 2001b) social capital is considered a private good, generated by the specific social network of each agent. The amount and consequences of social capital are different for each agent and depend on the structure of their network and their position in it. In this framework, agents are able to manage their networks strategically by creating or destroying links, as well as investing efforts and resources to improve their quality. Entrepreneurs can therefore

change the structure of their networks in order to gain competitive advantages. Our paper will consider this last approach.

Generally speaking, under the strategic-micro approach, social capital consists of the whole network of relationships of company managers or entrepreneurs and the resources allocated to all the other agents in this network (Bourdieu 1986; Coleman 1988; Adler and Kwon 2002). This capital has been found to have positive impacts on firms' performance (Batjargal 2003; Fornoni et al. 2009), and product innovation (Tsai and Ghoshal 1998) for instance. Research on personal networks of entrepreneurs reveals that entrepreneurs can obtain information and advice from network members (Fernandez and Underwood, 2009), access to private equity (Batjargal and Liu 2004) or information on market opportunities (Fornoni et al. 2009).

To develop and estimate empirical models supporting such conclusions, a methodology to measure social capital is required. Establishing such a methodology is a complex matter (Fornoni et al. 2009) since, as was already highlighted by Burt (Burt 1992), advantages provided by social capital will depend on the global structure of the network and the relative position of the agents in it. However, collecting information on the whole network of entrepreneurs involved in any empirical research would be too expensive in terms of time and resources, or even impossible to perform. Therefore, empirical models in the literature are mainly based on the measurement of local properties of entrepreneurs' social network; specifically in the number and/or characteristics of the direct one-to-one links that the entrepreneur maintains with other agents. One of the main contributions of this paper is the design of a methodology that partially deals with this limitation. To this end, we consider a parametrical network model that allows us to fit a network to empirical data by estimating their parameters. Estimated parameters are used to calculate a measure of entrepreneurs' social capital. Parameter estimation is based on a sample of 105 service entrepreneurs of the city of Shanghai.

We consider a bi-dimensional measure of social capital. The first dimension, named *local size* or degree, is defined as the number of direct links of the entrepreneur with other agents. The second dimension, the *preferential attachment degree*, is related with the position that such agents occupy in the global structure of the network, specifically their own connection level. In other words, we measure not only the average number of contacts of an

entrepreneur (local size), but also their average ability to establish links with those individuals that are better connected in the global structure of the network (preferential attachment degree). Notice that a high scoring in this second measure suggests that entrepreneurs succeeded on establishing links with agents that are social hubs, while a low scoring should be interpreted as a random linking pattern.

Social connections are important to Chinese people in many aspects of their life, specifically when doing business (Gold et al. 2002). Thus, China provides a great opportunity to study the issues related with the impact of social networks and social capital on the performance of new companies. The idea of social capital in the Chinese context captures the indigenous social phenomenon called guanxi (关系/關係), a word in Mandarin that could be translated into English as *connections*. Although guanxi has a long heritage in China, Fan (2002) notes that it was only in the 1980s that western academics began to consider its importance. Guanxi is defined in several ways: a web of extended family relationships (Kipnis 1997), a cluster of patron-client exchange relationships for instrumental purposes (Walder 1986), particularistic relationships -built simultaneously for the sake of the relationship and instrumental purposes- (Lin 2001b) and special relationships due to the existence of particularistic ties (Tsui et al. 2000; Yeung and Tung 1996). The Chinese concept of guanxi stresses that business is always done between people, rather than between companies. Chinese entrepreneurs know the importance of guanxi and become experts in managing their personal networks. Moreover, as China becomes more important in the global economy, many foreign businesses realize that a proper strategy of guanxi management is a key business facilitator in this economy.

This paper is structured as follows. Section 2 defines the two dimensions of social capital, while section 3 establishes the research hypothesis to be tested. In section 4 we describe the methodology followed: empirical data collected, social capital estimation, etc. The results are given in section 5, and their implications are discussed in section 6.

# 2.   Measurement of Social Capital from a Network Approach

LET us precisely define the bi-dimensional measure of an economic entrepreneur's social capital. This definition allows us to present and test the research hypothesis of this study. A network is a finite set of nodes (in our case socio-economic agents in Shanghai Society) connected by a series of attachments or links, corresponding to their relationships and interactions. When a new node (i.e. an entrepreneur) is added to the network, they establish new links with existing agents. More formally, we consider that at date *t-1* there exist a network, say $G_{t-1}$, and at date *t* a new node, say $i_t$, is added. Then, node $i_t$ identifies *m* nodes from $G_{t-1}$, to link with. The inclusion of these new links generates a new network, called $G_t$. In our case we consider that the entrepreneur establishes a link with a pre-existing agent when they ask this agent for advice or support during the process of launching a new venture.

The addition of the *m* links node $i_t$ establishes at time *t* plus the links future new-born nodes establishes with node $i_t$ defines a first measure of the social capital of $i_t$. This measure is named as *degree* or *local size* of $i_t$. Notice that local size is a local measure that does not depend on the global structure of the social network. The higher an agent's degree is, the wider is its number of connections. Thus, the local size can be considered as a first local measure of the guanxi of an entrepreneur.

Beyond local structure, an entrepreneur can follow different rules to choose which agents to ask for advice or support. There are two extreme situations:

- *random attachment*: an entrepreneur $i_t$. links with *m* preexisting nodes that selected uniformly at random. Then, each set of *m* old born nodes has the same probability to be selected by a newborn node. The result of this process is a variation of an Erdös-Rényi random network (Erdös and Rényi 1959, 1960, 1961). In our context, this way of choosing links can be interpreted as an absence or failure of a strategy to manage guanxi in business creation: entrepreneurs contact agents without any consideration of the value of their position in

the global social network (Burt 1992). The network structure generate by random attachment is called a random structure.

- *preferential attachment*: an entrepreneur prefers being linked with those agents that are more valuable as an aid in the process of business creation. We assume that the value of an agent is directly related with the fact of being a hub in the global network (Burt 1992). In the preferential attachment nodes are selected in proportion to the current number of links of the existing nodes. This network model was introduced first by Price (1976) and reintroduced later by Barabási and Albert (1999). This way of choosing links can be interpreted as the success in a strategy focused on developing effective guanxi for the start up: entrepreneurs are in contact with those agents who add more value through their advice or support. The network structure generated by preferential attachment is called a preferential structure.

**FIGURE 1:    Two networks with 100 nodes and a mean degree of 2**
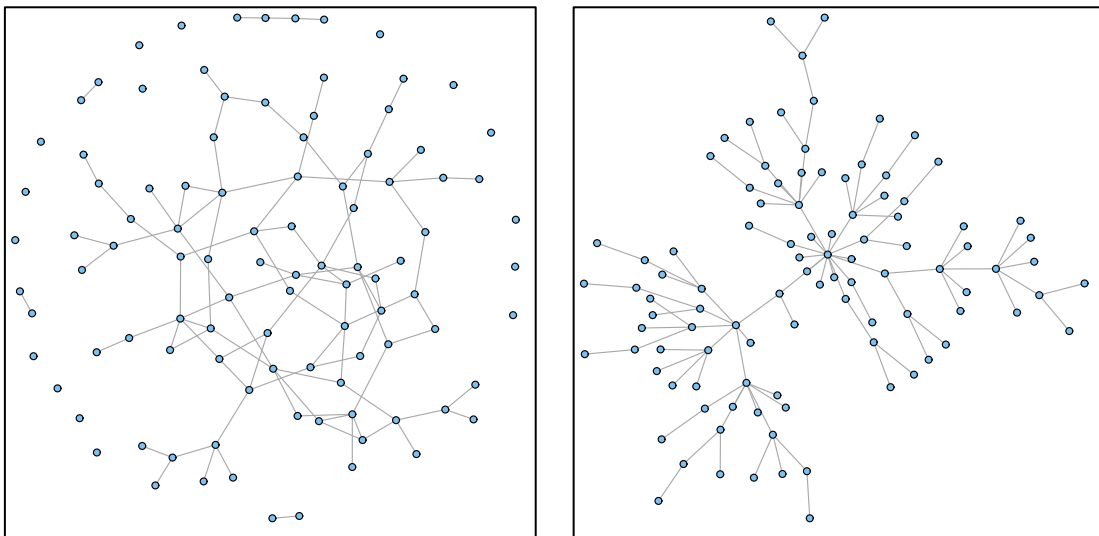


*Note*: The network on the left is a random network: no node is more preferable than any other. On the right hand side is a preferred attachment network: some nodes (in the center of the graph) are more preferred than others (in the periphery).

Figure 1 compares a random structure with a preferential structure network, both networks of 100 nodes and an average degree of 2. Random network (on the left) exhibits a number of features that are common to this model: there are some isolated nodes; degree

distribution concentrates around the mean degree, i.e., the majority of nodes have a degree that ranges between 1 and 3; and there are no hubs. As it can be seen on the figure on the right, the topology of a preferential structure differs from that of the random network: degree distribution has fat tails, i.e., there are nodes with a high degree (see the ones in the center of the graph) that behave as hubs; simultaneously, the number of nodes with a low degree, less than the average, is high.

We can also consider hybrid models, where the behavior of the entrepreneur varies between these extremes. Then, given a hybrid model, we define the preferential level of the entrepreneur $i_t$, denoted by $r$, as the ratio between the new links that are uniformly and randomly formed and the preferential attachment new links. Notice that $r/(1+r)$ can be interpreted as the fraction of new links selected uniformly randomly by $i_t$ and $1/(1+r)$ as the fraction of new links formed under preferential attachment. We define the *preferential attachment degree* as the fraction of agents that entrepreneur $i_t$ chose under preferential attachment to ask advice or support at any step of the business creation process, given by $1/(1+r)$. Preferential attachment degree provides information on the structure of the entrepreneur's network as a part of the global network, since a high preferential attachment degree suggests that this entrepreneur is connected to a larger proportion of social hubs. However, this measure does not provide any information on the strategy that the entrepreneur followed to make preferential linking possible.

Therefore, the social capital of an entrepreneur is measured bi-dimensionally by its local size and preferential attachment degree. The first measure is local and can be easily obtained by a survey. However, the preferential attachment degree is related with the global properties of the whole network and cannot be directly inferred from the local information available by the entrepreneur. In 4.3 we present a methodology to estimate the average value of the preferential attachment degree for a group on entrepreneurs, taking their degree distribution function as an input.

# 3.    Research Hypothesis

ENTREPRENEURS are autonomous, active and self-directing economic agents that should behave strategically when establishing and maintaining links in their social environment in order to invest in social capital efficiently (Pfeffer and Salancik 1978; Burt 1992). If we consider guanxi from this point of view, it can regarded as a type of behavior where agents use social connections to obtain resources, securing credit or protection as well as market information that is otherwise unavailable (Xin and Pearce 1996). Since social capital depreciates and could become obsolete (Adler y Kwon 2002), it needs to be managed over time. Consequently, guanxi management is a relevant component of the business strategy of any Chinese entrepreneur (Lee and Anderson 2007). According to these results, entrepreneurs are expected to manage their social networks to get advice, information or resources from relevant socio-economic agents, establishing their links not under a random but a preferential pattern, as we propose in our first research hypothesis (H1):

*H1. Social networks of entrepreneurs have not a random but a preferential structure.*

Recall that in a random structure the set of agents who are linked to each entrepreneur are distributed according to the same distribution as all the agents in the global network. In other words, in a random network, entrepreneurs establish links with agents with no specific characteristics. On the other hand, a in a preferential structure the individuals to whom agents are actually connected are hubs of the network in higher proportion than that of the whole network. To test this hypothesis, and to discriminate among a random and preferential social network structure of group of entrepreneurs, we need to consider not only local but some global information on the whole network. It is at this point that our bi-dimensional measurement of social capital plays a key role.

To date, the research literature on social networks and guanxi demonstrated the direct effects of social capital on outcome variables in Chinese economy for both established companies and entrepreneurs (Peng and Luo 2000; Bian 2001; Liao and Sohem 2001; Bruton and Ahlstrom 2003; Batjargal and Liu 2004; Lee and Anderson 2007; Yueh 2009). Difficul-

ties in the political and legal interpretations, combined with difficulties of accessing resources (Sebera and Li 2006), create a need for guanxi as a competitive advantage and a strategy potential for new ventures to survive and grow. It suggests that social networks, relatives, friends, schoolmates, and former employers are necessary and may even be sufficient to explain the process of identifying business opportunities and success. In this paper we introduce a measure of social capital in terms of two parameters, summarizing local and global properties of its social network. According to the results surveyed above, we state the hypothesis that both dimensions of social capital are positively related with the success of an entrepreneurial venture in its survival chance and its growing potential:

> *H2a. The local size of an entrepreneur's social network is positively related to the chances of their entrepreneurial venture surviving.*

> *H2b. The local size of an entrepreneur's social network is positively related to the growth of their entrepreneurial venture.*

> *H3a. Preferential attachment degree is positively related to the chances of their entrepreneurial venture surviving.*

> *H3b. Preferential attachment degree is positively related to the growth of their entrepreneurial venture.*

# 4. Methods

## 4.1. Sample and data collection

All the variables in the study are from a survey conducted between March and July 2009. The authors prepared the questionnaire, the unit of investigation being the private entrepreneur in the service sector who started up their business between 2001 and 2002 in the city of Shanghai, including those whose company closed before 2009. We consider only these entrepreneurial ventures that started up with fewer than eight hired workers and with

no foreign capital[1]. We conducted a pilot test with 10 entrepreneurs using a preliminary version of the questionnaire and these entrepreneurs were excluded from the final database. An English and Chinese version of the final questionnaire was prepared and the entrepreneurs could answer each one of them. The Chinese version was a translation of the English one and to ensure accuracy the Chinese version was subsequently back-translated into English by a different person (Chen et al. 1998). Both English versions do not differ substantially. Data were collected through face-to-face interviews, with the final sample consisting of 105 entrepreneurs. We test the bias of non-respondent by splitting the sample into two groups: the entrepreneurs interviewed before June and the ones interviewed in June or July (Armstrong and Overton 1977). There are no differences in the distribution of the variables of interest between the two groups, thus supporting the assumption that non-respondents are not significantly different from the respondent.

## 4.2. Variables

Questionnaire items were standard and highly validated for the literature. This article only considers part of the variables in the survey.

### 4.2.1. Performance

The questionnaire has different variables related with the performance of the service companies included in the sample, specifically survival, size (sales and employees), growth, profits, internationalization and innovation. Using some of these variables, entrepreneurs' companies were classified into three groups:

- Non surviving ventures: Entrepreneurial firms that did not survive and closed before 2009.

---

[1] The authors are currently developing a complementary research focused on foreign entrepreneurs in China and their strategies to invest in guanxi creation to compete with local companies.

- Self-employment ventures: Entrepreneurial firms that survived and were active in 2009 but remain as a self-employed business under China's legal definition, i.e. companies with fewer than eight hired workers (Huang 2008).

- Dynamic ventures: Entrepreneurial firms that survived and were active in 2009 with more than eight hired workers.

### 4.2.2.   Degree distribution

We consider that the entrepreneur establishes a link with an agent when they ask this agent for advice or support in any step of the process of creating a new venture. In the interview, we asked the names of all the people contacted by the entrepreneur for this purpose. The item of the questionnaire also discriminated between the specific types of help required, but in this analysis we only take into account the number of different contacts maintained irrespective of the purpose. Thus, each entrepreneur is associated with a value corresponding to their local size and the number of contacts they have. This measure allows us to estimate the empirical degree distribution for the entire sample as well as for each of the three groups of firms defined above.

### 4.2.3.   Control variables

An exhaustive review of the literature was undertaken to identify the factors that affect a new venture's performance. All these factors were included in the questionnaire.

*Size*, measured as the number of employees, and the *age of the firm* were entered as control variables (Lopez-Garcia and Puente 2006; Dunne at al. 1988, 1989). After a revision of fifty-five published entrepreneurship studies dealing with influences on performance, Murphy et al. (1996) noted that size was the most widely used control variable. Age of the firm was almost as widely used (McCann 1991; Zahra et al. 2007).

The personal characteristics of the entrepreneur, such as *gender*, *age* or education, have been analyzed by several authors as determinants of performance (Bates 1990, 1995; Boden and Nucci 1990; Bruderl et al. 1992). Empirical findings on ventures started by female entrepreneurs suggest that these companies have a lower probability of success than

those with male founders (see for instance Boden 1996; Boden and Nucci 1990; Cooper et al. 1994). The latter paper justifies this fact by referring to the disadvantages of female entrepreneurs in accumulating both financial and human capital through wage employment.

The influence of *education* on performance lies in the fact that knowledge gained enhances the managerial capacity to develop a superior business in general or a specific strategy (Honig 1998; Kim et al. 2006; West III and Noel 2009). Consequently, resources can be acquired more efficiently, costs are reduced, and revenues are increased. In short, performance improves. According to human capital theory, education may foster either specific or general skills (Reuber and Fischer 1999; Szilagyi and Schweiger 1984). We divide education into two types: industry-specific knowledge and general business knowledge. Industry-specific knowledge is associated with the particular skills, insights, and proficiency applicable to a sector, industry, or product market such as technical knowledge regarding the service managed. General business knowledge is aimed at preparing individuals to manage a firm or undertake a business project, such as the education level of the entrepreneur and specific courses on starting up firms.

In addition to knowledge and skills obtained from formal education, it is important to consider the influence of prior *experiences* (Kim et al. 2006). We define experience as knowledge and skills gained by observing and dealing with a variety of situations encountered at firms similar to the one managed by the entrepreneur. These entrepreneurial skills influence the performance by helping the entrepreneur to evaluate opportunities and use resources more effectively (Castrogiovanni 1996). Thus, experienced owners are able to make better choices. In contrast to education, this experience cannot be acquired at a centre of learning, but can only be learned by engaging in business activity. We considered three variables to measure the experience of the entrepreneur: the number of years they had previously worked in companies regardless of their sector of activity, previous experience as a worker in companies within the same service activity before starting up their own businesses, and previous experience as a business owner.

## 4.3. Estimation of social capital measures

A key characteristic of any network is its degree distribution, which is defined as the relative frequency of nodes that each possible degree has. Degree distribution (which is an aggregation of local information of the nodes) constitutes a worthy tool to infer global properties of a network. Degree distribution for hybrid models between random and preferential attachment can be derived (see Kleinberg et al. 1999; Kumar et al. 2000; Dorogovtsev and Mendes 2002; Pennock et al. 2002; Levene et al. 2002; Cooper and Frieze 2003; and more recently Jackson and Rogers 2007). Specifically, Jackson (2008), and Jackson and Rogers (2007) establish that the degree distribution has a cumulative distribution function given by:

$$F(d) = 1 - \left(\frac{m+2rm}{d+2rm}\right)^{2(1+r)}$$

(1)

where $d$ denotes any value of the degree, $m$ is the average number of direct links established by entrepreneurs and $r$ is the average ratio between the new links that are uniformly and randomly formed, and the preferential attachment new links[2].

The cumulative distribution described in (1) is useful for estimating an average measure of both dimensions of social capital (local size and preferential attachment degree) for a group of entrepreneurs when data on their degree distribution is available. Consider an observed network or its degree distribution. The parameter $m$ can be directly calculated from the degree distribution as half of the average degree, and $r$ can be estimated with a least square regression approach. From (1) we have:

$$\log\big(1 - F(d)\big) = 2(1+r)\log(m+2rm) - 2(1+r)\log(d+2rm).$$

(2)

---

[2] When $r \to 0$ the degree distribution becomes the power-law distribution that describes the case of pure preferential attachment, $F(d) = 1 - (m/d)^2$; when $r \to \infty$, the process approaches to the uniformly random link formation.

Fixed *m*, we can estimate *r* as follows. We start with an initial value of the parameter, say $r_0$ and regress *log(1 – F(d))* on *log(d+2r₀m)* to estimate *2(1 + r)* and obtain a new value $r_1$. We iterate this process until a fixed value of *r* is estimated.

Given an observed degree distribution we can interpret *m* as the average intensity of the linking process of a node in the network. The parameter *r* gives the ratio between the uniformly random links and the preferential links. The estimation of parameters *m* and *r* for the random network in Figure 1 gives *m = 0.98* and *r = 0.45*; and *m = 0.99* and *r = 0.00* for the preferential attachment network. As expected, nodes of both networks exhibit an intensity in the link formation equal to one half of the average degree of the network. However, the expected proportion of links formed under preferential considerations, *1/(1 + r)*, is 0.55 in the random network and 1.00 in the pure preferential attachment network.

In our context, nodes are entrepreneurs and links are relationships between individuals to help entrepreneurs in the starting up process. Thus, *2m* is the average number of relationships that an entrepreneur uses to support the entrepreneurial activity (i.e. the average degree of the social network) and *1/(1 + r )* is the fraction of relationships that were selected by an average entrepreneur in a preferential way because the expected outcome should be more valuable than under a random selection.

## 4.4. Strategy to test the research hypotheses

To test our five research hypotheses, our strategy is the following. Firstly, we partition the sample of entrepreneurs into the three separate groups defined in 4.2: non-surviving business, self-employment business and dynamic business. A series of control variables, summarizing the most relevant characteristics of the entrepreneur and the company at the moment of its start-up (excepting those related with social capital) are analyzed for each group. The sample design establishes approximated quotas on gender, age and previous experience of the entrepreneur. We then confirm the homogeneity of the distribution of these control variables among the three groups. If such homogeneity is not rejected, we can conclude that the differences in the performance of the companies in the sample cannot be induced by those control variables. In the next step of the analysis, we follow the technique described in 4.3 to obtain an estimation of the average bi-dimensional measure of social

capital (local size and preferential attachment degree) in the three groups of entrepreneurs. The comparison among these estimated measures allows us to test the hypothesis.

Notice that the application of this methodology does not require the whole sample to be representative of the universe of Shanghai's service entrepreneurs. However, the homogeneity of the distribution of all the control variables among the three subsamples is essential.

# 5.    Analysis and Results

WE test the homogeneity of control variables among non-surviving, self-employment and dynamic ventures in point 5.1. Since we cannot reject this null statistic hypothesis, the use of the strategy is justified to test the research hypotheses that were described in 4.4. The estimation of the social capital measures for each group is presented in 5.2 and results of hypotheses tests are presented in 5.3.

## 5.1.  Homogeneity of the control variables among groups of service entrepreneurs

The descriptive statistics in table 1 show relevant information of each factor for the three groups of entrepreneurs according to their performance*: non surviving, self-employment and dynamic business.* We have tested if factors differ significantly among groups and the resulting p-values of the tests are shown in the last column.

The average age (S.D.) the entrepreneur is 39.5 (10.1) years old, with most of them being males (78.1%). Surviving firms are 83% of the sample[3], having an average size (measured as the number of employees) of 15 (83.6) and an average survival time of 5.2 (1.9) years. More than two thirds of the entrepreneurs have technical knowledge regarding the

---

[3] Surviving companies are over-represented in the sample, this bias being induced by the difficulties to contact ventures that were inactive in 2009. However, this bias does not affect the conclusions of this research, since survival is only considered to define the subsamples of entrepreneurs whose company closed.

activity of their business (71.4%), but only 37% has received specific training on starting up. Concerning experience, entrepreneurs had been working for 3.6 (3.2) years before starting up their own business and two-thirds of them have experience as workers in companies engaging in the same activity. Up to 40% of the entrepreneurs have previous experience as a business owner.

TABLE 1:   **Descriptive statistics by performance and p-values for the test of differences among groups**

| Factors | Non-surviving business | Self employment business | Dynamic business | All business | p-value |
|---|---|---|---|---|---|
| Sample size (entrepreneurs) | 18 | 58 | 29 | 105 | |
| Entrepreneur's age (years) | 40.1 (9.8) | 39.4 (10.9) | 39.5 (9.0) | 39.5 (10.1) | 0.908 |
| Females | 22.2% | 25.9% | 13.8% | 21.9% | 0.442 |
| Size of the firm (employees)[1] | — | 4.6 (2.4) | 23.0 (10.8) | 15.0 (3.6) | 0.000 |
| Age of the firm (years) | 5.8 (1.6) | 4.9 (1.9) | 5.5 (2.1) | 5.2 (1.9) | 0.162 |
| Technical knowledge about the activity of the firm | 66.7% | 74.1% | 69.0% | 71.4% | 0.783 |
| Courses on starting up | 44.4% | 36.2% | 34.5% | 37.1% | 0.773 |
| Previous experience as a business owner | 44.4% | 32.8% | 51.7% | 40.0.% | 0.218 |
| Working experience (years) | 3.0 (1.7) | 3.6 (2.8) | 4.2 (4.6) | 3.6 (3.2) | 0.562 |
| Previous experience as a worker in companies with the same activity | 55.6% | 65.5% | 72.4% | 65.7% | 0.499 |

[1] There is no data on the number of employees for the closed business.

*Note*: For continuous variables we show the average (standard deviation); for the dichotomy variables we show the proportion of entrepreneurs in the case described by the variable; and for the categorical variables we show the percentage for each level.

The overall figures do not differ significantly among the three groups considered (all p-values in the last column of table 1 are higher than 0.05). We can conclude that the factors analyzed have the same distribution in the three groups of entrepreneurs and that the difference in performance is caused by other factors. *The entrepreneurs in the subsamples characterized by the performance are homogeneous with respect to their personal characteristics, prior experience and education.*

Why is there a different performance among groups when the entrepreneurs exhibit similar characteristics? We illustrate that the key point is the difference in the average local size and average preferential attachment among groups.

## 5.2. Estimation of the average degree and preferential linking level

The degree distribution for each group of entrepreneurs provides the input information to estimate the average of the bi-dimensional measure of their social capital. Figure 2 shows the three degree distributions and Table 2 the average degree for the three categories of entrepreneurs according to their performance. Entrepreneurs with non-surviving ventures have the lowest average local size. They asked 2.6 relationships for any kind of advice and support and more than 50% of them contacted only 2 or 3 agents (see Figure 2a); Entrepreneurs with surviving ventures maintained, on average, around 6 contacts during the starting up phase: 6.0 contacts in the group of self-employment ventures and 6.4 for the ones in the dynamic group.

**FIGURE 2:** **Degree distribution of the entrepreneurs' relationships for three categories of performance**

a)  Non-surviving business          b)  Self-employment business          c)  Dynamics business
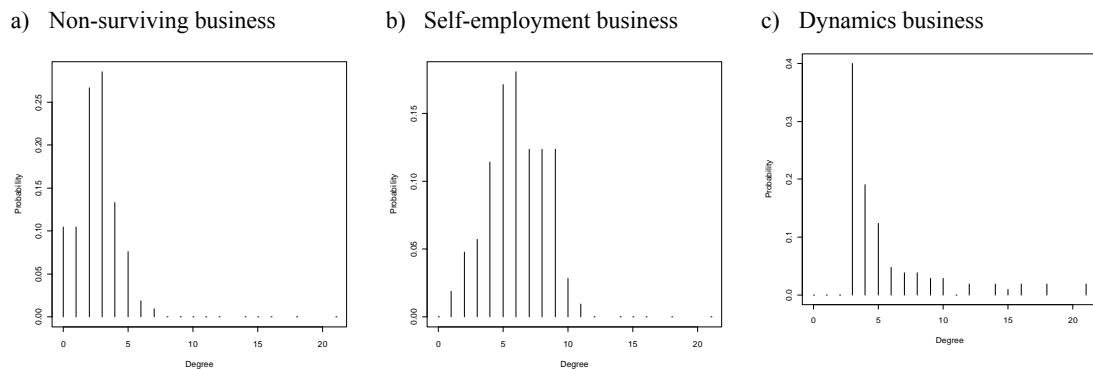


Figures 2b-2c illustrate that, although both averages are similar, the degree distribution is quite different in both subgroups of surviving firms. The degree distribution for self-employment ventures is symmetric around the mean degree, as expected in a random structure. In the case of dynamic entrepreneurs, degree distribution exhibits skewness on the right

and the majority of entrepreneurs have three contacts, less than average, as expected in a preferential structure.

TABLE 2:   **Average degree, percentage of strategic links and odds of preferential relationships by performance**

| Social capital | Non-surviving business | Self employment business | Dynamic business |
|---|---|---|---|
| Average degree | 2.6 | 6.0 | 6.4 |
| % preferential relationships | 26% | 31% | 98% |
| Odds of strategic relationships | 0.35 | 3.76 | 49.00 |

An estimation of the average preferential degree in the three groups of entrepreneurs, according to 4.3, confirms the conclusions of the visual analysis. As table 2 shows, in addition to having the lowest average degree, the group of entrepreneurs with non-surviving business has the lowest preferential attachment degree of 26%: only one in four contacts are established with hubs of the global network. Hence, in this group both measures of social capital are, on average, extremely poor and entrepreneurship failed after the starting of the activity.

Surviving firms were launched by entrepreneurs who maintained, on average, more than double the number of relationships during the starting up process than those of non-surviving firms. In the two groups of surviving firms local size coincides, but the preferential attachment degree is quite different, as can be seen in table 2. We estimate that 31% of entrepreneurs' contacts in the self-employment venture group were preferential. This result contrasts with the 98% of preferential relationships maintained by dynamic entrepreneurs. Entrepreneurs with a large local size and almost completely preferential attachments launched dynamic ventures.

Average degree and percentage of preferential relationships are the two parameters that characterize the degree probability distributions, assuming that those distribute according to the cumulative function given in (1). Therefore, to test whether these parameters differ among the three categories of performance is equivalent to testing whether there are differences in their degree distribution function. We use a refined version of the Li test (Li 1999) to test whether the degree distribution function of a group of entrepreneurs differs signifi-

cantly from other group. Therefore, if *f* and *g* were the degree distributions corresponding to, let us say, the group of non-surviving business and the group of self employment business, the null would be $H_0$: *f(x)=g(x)* against the alternative, $H_1$: f(x) ≠ g(x). The *p*-values were obtained using 399 bootstrap repetitions.

The results, showed in table 3, are conclusive. For all pairs of groups we reject the null hypothesis of equality of distributions. Thus, we can conclude that the observed differences are significant and they are the result of different formation models in the subjacent networks.

TABLE 3:   **Differences between the degree distribution functions**

| Groups of entrepreneurs | | Self employment business | Dynamic business |
| --- | --- | --- | --- |
| Non-surviving business | *T-statistic* | 17.248 | 7.839 |
| | *p-value* | 0.000 | 0.000 |
| Self employment business | *T-statistic* | — | 16.507 |
| | *p-value* | — | 0.000 |

*Source*: Li (1999).

## 5.3.  Test of the research hypothesis

### 5.3.1.    Test of hypothesis H1: structure of the social network

Hypothesis 1 claims that entrepreneurs do not manage their guanxi randomly; that is, they ask for advice and support from those agents with greater abilities to help them. In this case, the structure of their social network needs to be very close to that of a preferential linking model or, at least, to the structure of a hybrid linking model with a high preferential attachment degree. Our findings, summarized in table 2, do not support this hypothesis. Each group of entrepreneurs exhibits different social network structures and the preferential linking model only appears in the group of dynamic entrepreneurs. Thus, some of them (group of non surviving ventures) connect with few agents at the start up of their business. On the other hand, entrepreneurs in the group of surviving self-employment business have a larger number of links but, even in this case, most of these links have been established according to

a random attachment model. There is no evidence therefore to support that entrepreneurs generally create social networks with preferential structure.

### 5.3.2. Test of hypotheses H2a and H2b: the role of the local size

Entrepreneurs of surviving firms distinguish from those who started up a non-surviving one in their average local size: surviving firms were managed by entrepreneurs with more than double contacts (around 6 on average) than the other. Thus, the chance of a firm to survive is positively related with the local size of the entrepreneur and we accept hypothesis H2a.

On the other hand, and in contradiction with hypothesis 2b, local size is quite similar for self-employment and dynamic ventures, as expected if local size were related with the growth of the company. Then, we should reject H2b.

### 5.3.3. Test of hypotheses H3a and H3b: the role of preferential attachment

The success when choosing relationships under preferential consideration was related with the growth of the entrepreneurial venture. It should be highlighted that almost all (98%) the contacts made by entrepreneurs with dynamic businesses are preferential, while among those made in the group of self-employment businesses only 31% is preferential. This finding supports H3b.

However, there is not a large difference between the proportion of preferential attachment links in the group of non-surviving and self-employment ventures (26% and 31%). On the contrary, the local size in the second group is more than double the first one. We have to reject H3a.

We can summarize our finding as follows: local size is relevant to guarantee the survival of a new firm, and high preferential attachment degree is needed for a dynamic business.

# 6. Discussion

THIS paper analyzes the role played by two dimensions of entrepreneurs' private social capital in the performance of the entrepreneurial venture: the local size and the preferential linking degree. To fulfill such an objective, we build a bi-dimensional measure of social capital based on network models and a methodology to estimate this measure for groups of entrepreneurs. Based on a survey of service entrepreneurs who launched their business in the city of Shanghai, we show (as established in the literature) that social capital or guanxi is relevant for business success. However, each of both proposed dimensions plays a very different role. A large local size of the network, i.e. a large set of agents able to advice or support the entrepreneur, increases the chances of survival of the new venture but has no impact on making it to go beyond a self-employment business. In order to reach this last level, entrepreneurs need to obtain a high preferential attachment degree. Or in other words, they need to manage guanxi to get advice and support from those agents placed in key positions of the global socio-economic network of Shanghai. This finding has relevant political and managerial implications and generates new questions to be answered in future research.

## 6.1. Contributions

This article presents some significant contributions to the studies of social capital and entrepreneurship and, specifically, to the analysis of entrepreneurship in China and other developing and transition economies. The first contribution is methodological. Under a network approach we propose a measure of two dimensions of social capital and develop a methodology to estimate them for any group of entrepreneurs. A relevant contribution when establishing this methodology is the fact that one of these dimensions, the preferential attachment degree, does not depend on the global structure of the whole network but on the local information of the entrepreneur. This fact is not common in empirical social capital literature, since dealing with global information implies using information of the whole structure of the network. This information is not only difficult to get, most of the times it is impossible. A contribution of this paper is the application of some results of networks theory

to develop an estimation technique of this global measure in terms of the local information of the interviewed entrepreneurs.

A second contribution is a stress of the role of social capital on the performance of Chinese new ventures. We show that, when control variables regarding entrepreneurs' personal characteristics and initial conditions of the start up are similar, social capital can be related with the performance of the company. Given that this result is already well established in the literature, we go beyond to show that both dimensions of social capital play a very different role. Specifically, the local size of the entrepreneur's social network (size of their guanxi) is key in the survival chances of the company. Launching a new business without a minimum number of agents in the Shanghai socio-economic network makes its survival difficult. On the other hand, an extensive guanxi does not seem to be enough to promote dynamic ventures to grow beyond self-employment business (companies with fewer than eight hired workers). We also show that social capital helps to break the self-employment barrier and is a key input for high growth ventures when the global structure of the network is considered. In other words, when the measure of social capital considers not only the number but also the position occupied by the agent connected to an entrepreneur, it is possible to establish a direct relation between this dimension of social capital and the growth chances of the entrepreneur's venture. This conclusion suggests that the role of social capital in the entrepreneurial process could be underestimated systematically, since most of the literature measures it just locally and some implications of social capital only arise when the global structure of the socio-economic network is taken into account. This underestimation seems to have a deeper impact when analyzing the chances of a new venture to grow beyond a self-employment business.

Finally, this study is an empirical contribution to the study of social capital and entrepreneurship in developing and transition economies, and specifically in the Chinese economy. These kinds of contributions are relevant given that entrepreneurship acts as a potential engine for economic development and poverty reduction in these economies.

## 6.2. Managerial implications

The conclusions of this article have several managerial implications regarding the role of social capital and how to manage guanxi in order to launch a venture with high survival and growth chances in China. First of all, we conclude that any entrepreneurial strategy should include an investment plan to generate a minimum level of social capital or guanxi. Moreover, our research establishes some practical implications to manage this guanxi: since the average percentage of preferential linking in the group of entrepreneurs who launched dynamic ventures is 98%, we conclude that these entrepreneurs ask for advice and support only to agents that were already hubs in the socio-economic network of Shanghai. In other words, and as was highlighted for other developing and transition economies (Fornoni et al. 2009), an efficient strategy to generate social capital for dynamic entrepreneurship should focus on the creation of quality social capital. The creation of large and densely connected social networks that links the entrepreneur indiscriminately with many agents does not increase the chances of the venture to grow beyond a self-employment business.

Finally, our results have some implications on Chinese policy making, as regards the promotion of entrepreneurship as an engine of the development of some regions, mainly rural, in this country (Mohapatra et al. 2007). Since real development is not created by indiscriminate but dynamic entrepreneurship (Shane 2009), an efficient regional development policy should include the tools to facilitate local entrepreneurs to link with well connected agents of the global Chinese socio-economic network.

## 6.3. Limitations

This study is not without limitations. First of all, our results are based on a small sample of local service entrepreneurs who launched their business in the city of Shanghai. In addition, the generalization of our conclusion to all China or even other developing and transition economies should be made cautiously, even when they are coherent with other results stated in the literature. Second, we asked the interviewees to provide information of the start up process, which took place some years ago. This fact may introduce some memory biases that are difficult to control. Third, the network methodology we used to test the research hypothesis does

not allow us to quantify the impact of each dimension of social capital (local size and preferential link degree) on the chances of a new venture to survive and become dynamic. Finally, our study shows that the preferential linking degree is higher in dynamic entrepreneurs, but does not provide information on the strategy that the entrepreneur followed to make this preferential linking possible. In other words, we cannot discriminate if dynamic entrepreneurs' guanxi existed before the start up process or whether it was created strategically as part of the launching process. Further research will deal with these limitations.

# 7.    References

ADLER, P. Y KWON, S. (2002): "Social Capital: prospects for a new concept". *Academy of Management Review* 27, 17-40.

ARMSTRONG, J.S. and T. OVERTON (1977): "Estimating non-response bias in mail surveys". *Journal of Marketing Research* 14, 396-402.

ARRIBAS, I. and J.E. VILA (2007): "Human capital determinats of the survival of entrepreneurial service firms in Spain", *International Entrepreneurship and Management Journal* 3, 309-322.

BATJARGAL, B. (2003): "Social capital and entrepreneurial performance in Russia: a longitudinal study", *Organization Studies* 24, 535-556.

BATJARGAL, B. and M. LIU (2004): "Entrepreneur's access to private equity in China: The role of Social Capital", *Organization Science* 15, 159-172.

BARABÁSI, A.L. and R. ALBERT (1999): "Emergence of scaling in random networks", *Science* 286, 509-512.

BATES, T. (1990): "Entrepreneur human capital inputs and small business longevity", *The Review of Economics and Statistics* 72, 451-559.

____ (1995): "Analysis of survival rates among franchise and independent small business start-ups". *Journal of Small Business Management* 33, 26-36.

BIAN, Y. (2001): "Guanxi capital and social eating in Chinese cities", in N. Lin, K. Cook and R. Burt, eds. *Social Capital: Theory and research*. New York: Aldine de Gruyter, 275-295.

BODEN, R. (1996): "Gender and self-employment selection: an empirical assessment", *Journal of Socio-Economics* 25, 671-682.

BODEN, R. and A. NUCCI (1990): "The 1982 characteristics of business owners dataset", *Journal of Small Business Management* 2, 301-305.

BOURDIEU, P. (1986): "The Forms of Capital", en J. Richardson, ed. *Handbook of Theory and Research for the Sociology of Education,* New York: Greenwood Press.

BRUDERL, J., P. PREISENDORFER and R. ZIEGLER (1992): "Survival chances of newly founded organizations", *American Sociological Review* 57, 227-242.

BRUTON, G. and D. AHLSTROM (2003): "An institutional vision of China's venture capital industry", *Journal of Business Venture* 18 (2), 233-259.

BURT, R. (1992): "Structural holes: The social structure of competition", Cambridge (MA): Harvard University Press.

CASTROGIOVANNI, G.J. (1996): "Pre-startup planning and the survival of new small businesses: Theoretical linkages", *Journal of Management* 22, 801-822.

CHEN, X.P., H. CHUN and D.J. SEGO (1998): "The role of organizational citizenship behavior in turnover: conceptualization and preliminary test of key hypotheses", *Journal of Applied Psychology* 83, 922-931.

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

____ (1990): *Foundations of social theory,* New York: Cambridge University Press.

COOPER, A.C., F.J. GIMENO-GASCON and C.Y. WOO (1994): "Initial human and financial capital as predictors of new venture performance", *Journal of Business Venturing* 9, 371-395.

COOPER, A.C. and FRIEZE, A. (2003): "A general model on web graphs", *Random Structures and Algorithms* 22 (3), 311-335.

DJANKOV, S., Y. QIAN, G. ROLAND and E. ZHURAVSKAYA (2006a): "Who are China entrepreneurs?", *AEA Papers and Proceedings* 92 (2), 348-352.

____ (2006b): "Entrepreneurship in China and Russia Compared". *Journal of the European Economic Association*, 4 (2-3), 352-365.

DOROGOVTSEV, S.N. and S.F.F. MENDES (2002): "Scaling properties of scale-free evolving networks: continuous approach", *Physic Review Letters* 63, 056125.

DUNNE, T., M. ROBERTS and L. SAMUELSON (1988): "Patterns of firm entry and exist in U.S. manufacturing industries". *Rand Journal of Economics* 19, 495-515.

____ (1989): "The growth and failure of U.S. manufacturing plants", *Quaterly Journal of Economics* 104, 671-698.

ERDÖS, P. and A. RÉNYI (1959): "On random graphs", *Publicationes Mathematicae Debrecem* 6, 290-297.

____ (1960): "On the evolution of random graphs", Institute of Mathematics, Hungarian Academy of Sciences, 5, 17-61.

____ (1961): "On the strength of connectedness of a random graph", *Acta Mathamatica* Hungarian Academy of Sciences, 12, 261-267.

FAN, Y. (2002): "Questioning guanxi, definitional, classification and implications", *International Business Review* 11, 543-561.

FERNÁNDEZ, R. and L. UNDERWOOD (2009): *China entrepreneur: Voices of experience from 40 business pioneers*. New York: John Wiley & Sons Inc.

FORNONI, M., D. RIBEIRO and J.E. VILA (2009): "Impact of entrepreneurs' social capital on the performance of their ventures: an analysis of the Argentinean case", Documento de Trabajo ERI-CES.

FUKUYAMA, F. (1995): *Trust: the social values and the creation of prosperity*. New York: The Free Press.

GOLD, T., D. GUTHRIE and D. WANK, eds. (2002): *Social connections in China: Institutions, culture and the changing nature of guanxi*. New York: Cambridge University Press.

GRANOVETTER, M. (1985): "Economic action and social structure: the problem of embeddedness". *American Journal of Sociology* 91 (3), 481-510.

HONIG, B. (1998): "What determines success? Examining the human, financial, and social capital of Jamaican microentrepreneurs". *Journal of Business Venturing* 13, 371-394.

HUANG, Y. (2008): *Capitalism with Chinese Characteristics: Entrepreneurship and the State*. New York: Cambridge University Press.

JACKSON, M.O. (2008): *Social and economics networks*. New Jersey: Princeton University Press, 1.ª edición.

JACKSON, M.O. and B.W. ROGERS (2007): "Meetings strangers and friends of friends: how random are social networks", *American Economic Review* 97 (3), 890-915.

KIM, P.H., H.E. ALDRICH and L.A. KEISTER (2006): "Access (not) denied: The impact of financial, human, and cultural capital on entrepreneurial entry in the United States", *Small Business Economics* 27, 5-22.

KIPNIS, A. (1997): *Producing guanxi, sentiment, self and subculture in a north China village*, Durham: Duke University Press.

KLEINBERG, J. M., R. KUMAR, P. RAGHAVAN, S. RAJAGOPALAN and A.S. TOMKINS, (1999): "The Web as a graph: measurements, models, and methods", *Proceedings of the International conference on Combinatorics and Computing, Lecture Notes in the computer Science* 1627, Berlin: Springer-Verlag.

KUMAR, R., P. RAGHAVAN, S. RAJAGOPALAN, D. SIVAKUMAR, A.S. TOMKINS and E. UPFAL (2000): "Stochastic models for the web graph", *Foundations of Computer Science*, disponible en: http//:www.csa.com.

LEE, E.Y. and A.R. ANDERSON (2007): "The role of guanxi in Chinese entrepreneurship", *Journal of Asia Entrepreneurship and Sustainability* 3 (3).

LEVENE, M., T. FENNER, G. LOIZOU and R. WHEELDON (2002): "A stochastic model for the evolution of the web", *Computer Networks* 39, 277-287.

LI, Q. (1999): "Nonparametric testing the similarity of two unknown density functions: local power and bootstrap analysis", *Journal of Nonparametric Statistics* 11 (1), 189-213.

LIAO, D. and P. SOHMEN (2001): "The development of modern guanxi in Asia". *Stanford Journal of East Asia* 1, 27-33.

LIN, N. (2001a): *Social capital: a theory of social structure and action*. Cambridge: Cambridge University Press.

\_\_\_\_ (2001b): "Guanxi: a conceptual analysis", in A. So, N. Lin and D. Poston eds. *The Chinese triangle of mainland China, Taiwan and Hong Kong. Comparative institutional analysis*. London: Greenwood Press, 153-166.

LÓPEZ-GARCÍA, P. and S. PUENTE (2006): "Business demography in Spain. Determinants of firms survival", Documento de Trabajo n.º 0608, Madrid: Banco de España.

MCCANN, J.E. (1991): "Pattterns of growth, competitive technology, and financial strategies in young ventures", *Journal of Business Venturing* 6, 189-208.

MOHAPATRA, S., S. ROZELLE and R. GOODHUE (2007): "The rise of self-employment in rural China: Development or Distress?", *World Development* 35 (1), 163-181.

MURPHY, G.B., J.W. TRAILER and R.C. HILL (1996): "Measuring performance in entrepreneurship research", *Journal of Business Research* 36, 15-23.

PENG, M. and Y. LUO (2000): "Managerial ties and firm performance in a transition economy: The nature of a micro-macro link", *Academy of Management Journal* 43 (3), 486-501.

PENNOCK, D.M., G.W. FLAKE, S. LAWRENCE, E.J. GLOVER and C.L. GILES (2002): "Winners don't take all: characterizing the competition for links on the web", *Proceedings of the National Academy of Sciences* 99 (8), 5207-5211.

PFEFFER, S.H. and G.R. SALANCIK (1978): *The external control of organizations: a resource dependence perspectiv*e. New York: Harper and Row.

PRICE, D.S. (1976): "A general theory of bibliometric and other cumulative advantage processes", *Journal of the American Society for Information Science* 27 (5), 292-306.

PUTMAN, R. (1993): "The prosperous community. Social capital and public life", *The American Prospect* 4, 35-42.

____ (2002): "Bowling together". *The American Prospect* 13, 27-34.

REUBER, A.R. and E. FISCHER (1999): "Understanding the consequences of founders' experience". *Journal of Small Business Management* 37 (2), 30-45.

SEVERA, T. and W. LI (2006): "The effects of economic transitions on Chinese entrepreneurship", *Journal of Asia, Entrepreneurship and Sustainability* 2 (3).

SHANE, S. (2009): "Why encouraging more people to become entrepreneurs is bad public policy", *Small Business Economics* 33, 141-149.

SZILAGYI, A.D. and D.M. SCHWEIGER, (1984): "Matching managers to strategies: A review and suggested framework", *Academy of Management Review* 9, 626-637.

TSAI, W. and S. GHOSHAL (1998): "Social Capital and Value Creation: The Role of Intrafirm Networks", *Academy of Management Journal* 41, 464-476.

TSUI, A., J.L. FARH and K. XIN (2000): "Guanxi in the Chinese context" in J.T. Li, A. Tsui and E. Weldon eds. *Management and organization in the Chinese context,* London: Macmillan, 225-244.

WALDER, A. (1986): "Communist neo traditionalism: work and authority in Chinese industry", Berkeley: University of California Press.

WEST III, G.P. and T.W. NOEL (2009): "The impact of knowledge resources on new venture performance", *Journal of Small Business Management* 47, 1-22.

XIN, K.R. and J. L. PEARCE (1996): "Guanxi: connections as substitutes for formal institutional support", *Academy of Management Journal* 39 (6), 16-41.

YEUNG, I. and R. TUNG (1996): "Achieving business success in Confucian societies: the importance of guanxi (connections)", *Organization Dynamics* 25 (2), 54-65.

Yueh, L. (2009): "Self-employment in urban China: Networking in a transition economy", *China Economic Review* 20, 471-484.

Zahra, S.A., D.O. Neubaum and L. Naldi (2007): "The effects of ownership and governance on SMEs' international knowledge-based resources", *Small Business Economics* 29, 309-327.

# NOTA SOBRE LOS AUTORES - *ABOUT THE AUTHORS\**

**IVÁN ARRIBAS FERNÁNDEZ** graduated in mathematics (statistics and operation research) and holds a PhD in economics from the University of Valencia, and is a professor in the Department of Economic Analysis of the said university. He has also taught on the MBA of the National University of Mar del Plata (Argentina) and has lectured in the Central Bank of the Dominican Republic (analysis and modelling of time series to forecast main economic outcomes, training in mathematical models focused on macroeconomics, etc.). His specialist fields are game theory and network games. He has published various articles in international journals and has participated in many Spanish and international congresses.
E-mail: ivan.arribas@uv.es

**JOSÉ E. VILA GISBERT** graduated in mathematics and holds a PhD in economics from the University of Valencia. He is a professor at the University of Valencia (Department of Economic Analysis) and research fellow at the ERI-CES. His research agenda takes in game theory, social networks and entrepreneurship in developing and transition economies (Argentina, China, Mexico and Romania).
E-mail: jose.e.vila@uv.es

---

## ÚLTIMOS NÚMEROS PUBLICADOS – *RECENT PAPERS*

**Documentos
de Trabajo**

**8**