Competitive Paper

Track #4 Corporate Strategies in International Business

Alliance Networks, Network Embeddedness of Foreign Partners and Joint Venture Termination in Emerging Economies

Abstract

Transactional analysis of joint ventures considers that the instability and high rate of termination of joint ventures formed in emerging economies are mainly determined by the inherent uncertainty of this entry mode coupled with the country risk of those economies. To reduce or control this transactional uncertainty, foreign investors must have access to information and knowledge on their potential local partners in emerging economies. Building on social network theory and its inter-organizational developments, this article hypothesizes that foreign firms which are embedded in an alliance network benefit from reliable and relevant information and knowledge on the availability, resources and behavior of potential local partners. This mitigates transactional uncertainty and reduces the likelihood of joint venture termination. This hypothesis is examined using a sample of 276 European firms which formed joint ventures in different emerging economies during 1996. Empirical results are contrasted and only provide partial validation of the network-survival relationship. Simply being part of an alliance network is not sufficient to enable a foreign investor to minimize transactional uncertainty and to significantly enhance the ability to select the right local partner. Only large and sparse networks offer their members the internal market and base of reliable, relevant information on potential local partners that ensure the survival of future joint ventures in emerging economies.

Key words

Joint venture, inter-organizational network, network embeddedness, survival analysis, emerging economies

Alliance Networks, Network Embeddedness of Foreign Partners and Joint Venture Termination in Emerging Economies

Introduction

Defined as a separate organizational entity formed and managed by two or more independent partners, the joint venture (JV) was initially viewed as a mode of internationalization or as a mode of entry into foreign markets (Franko, 1971; Berlew, 1984). However over time, joint ventures (JVs) have progressively widened their scope. They have also been designed for achieving economies of scale (Hennart, 1988), learning and transferring competence and knowledge (Hamel *et al.*, 1989; Hamel, 1991), and restructuring or selling off non-core business activities (Nanda & Williamson, 1995). JVs are now recognized for their strategic flexibility and their multi-purpose nature. They can provide an organizational response that is appropriate either for growth (*e.g.*, diversification, internationalization or specialization) or for refocusing or divestiture. They have such diverse uses that, at some time or another in their history, most firms have formed or envisaged forming JVs. However the multi-purpose nature of JVs must not make us forget that their primary mission is to enter countries that for economic, geopolitical, regulation-related or cultural reasons are considered risky and difficult to get into. The spectacular growth of the BRIC countries (Brazil, Russia, India and China) and emerging economies in general gave new momentum to JVs conceived as a mode of entry. The political and economic uncertainty as well as the cultural specificity of these economies made JVs popular among foreign investors. While many JVs with local and foreign partners are formed every year in emerging economies, many are also dissolved, sold off to the local partner or bought out by a third party. Empirical studies on JV survival in emerging economies show that between 30 and 50% are terminated by the partners during the first five years (Lee & Beamish, 1995; Leung, 1997; Yan, 1998; Nakamura, 2005). Many reasons are put forward to explain such a high termination rate of JVs in emerging economies: divergence of objectives, cultural and organizational differences between partners, opportunistic behavior by one or all of the partners. All these factors trigger conflicts between local and foreign partners and lead to termination of the JV.

Transaction cost theory (Williamson, 1975 and 1991) has found a particularly fertile area of application in the analysis of JVs. A transactional theory of JVs (Hennart, 1988; Kogut, 1988;

Parkhe, 1993; Tsang, 2000) has been developed over time. Transaction cost theory investigated the reasons that led to the formation of JVs. However, transaction cost theory also provided a theoretical framework for analyzing JV termination, especially in the context of emerging economies. Transactional theory of JV termination shows that the inherent uncertainty of the JV governance structure is a major factor in explaining its termination. Thus, the local and foreign firms that get involved in a JV in an emerging economy bear high transaction costs because they are not able to assess and anticipate their future partner's precise contributions, objectives and risks of opportunism. In other words, transaction cost theory considers uncertainty linked to the partner's behavior – namely, transactional uncertainty – as the principal determinant of JV termination. Transactional uncertainty combined with other sources of uncertainty specific to emerging economies makes JVs in such environments particularly unstable: *for international joint ventures formed in developing or transforming economies, the turbulent political and economic environments together with the intercultural and interorganizational dynamics have made managing international joint ventures particularly challenging* (Yan, 1998, p. 773). It is because of this transactional uncertainty – over which the partners have very little, if any, control – that JVs are often destabilized by divergence of objectives, cultural differences or opportunistic behavior.

To reduce or control the transactional uncertainty surrounding JVs in emerging economies, foreign investors must have reliable and relevant information on potential local partners. But how do foreign firms obtain such information? The problem lies in the difficulty of finding information that would enable foreign investors to have better knowledge of their potential local partners and thus avoid making a wrong choice. Foreign firms looking to form a JV in an emerging country are faced with a "market" of potential local partners. Unfortunately for these firms, this market is imperfect, because the information conveyed is incomplete and often superficial. Social network theory (Granovetter, 1973, 1985 and 1992) and its application to interorganizational settings suggest that foreign firms can address this problem by relying on existing interorganizational networks to obtain reliable and relevant information and in turn, reduce uncertainty. According to this theoretical perspective, the interorganizational network is viewed both as an internal market of partners and as a set of embedded interorganizational ties. As an internal market, the network enables its members to form new ties. The network is thus a dynamic entity that evolves through the development of new ties between the same members. As a set of embedded interorganizational ties, the network offers its members direct access to a base of reliable and relevant information and

knowledge. Several empirical studies (Kogut *et al.*, 1992; Gulati, 1995a; Gulati, 1999; Gulati & Gargiulo, 1999; Gulati *et al.*, 2000) have confirmed that the interorganizational network constitutes both an internal market and a base of reliable information on future partners. More precisely, these studies have shown that the likelihood of JV formation between two firms tends to increase significantly if they belong to the same interorganizational network. Building on social network theory and its application to interorganizational settings, this article aims to show that the likelihood of JV termination decreases significantly if foreign partners belong to an interorganizational network. This decrease is all the more significant if both local and foreign partners are embedded in the same network. In other words, the main idea supported in this article is that network embeddedness of foreign firms provides reliable and relevant information and knowledge on the availability, resources and behavior of potential local partners, and therefore reduces uncertainty and the likelihood of JV termination.

This article is organized as follows: in the first part, we define the different forms of transactional uncertainty. Building on transaction cost theory and on the theoretical perspective of Crozier & Friedberg (1977), we link the different forms of transactional uncertainty to the concept of power and to JV termination. In the second part, we formulate research hypotheses. In keeping with social network theory, these hypotheses will state the impact of network embeddedness, of network density and of the foreign partner's position in the network, on the likelihood of JV termination. In the third part, we detail the data collection, the variables, and the sample of 276 European firms which formed JVs in emerging economies during 1996. In this article, the unit of analysis is not the JV, but the European partner's stake in the JV. Using event history analysis, the change in each European stake (*i.e.*, JV dissolution, sell-off to the local partner, internalization of the local partner's stake, and no change) was followed-up within a period at risk ranging from 1996 to 2007. The European firm's network embeddedness was measured by analyzing the history of JVs formed by each European partner in the sample over the previous ten years (1986-1995). A statistical network analysis of interorganizational ties was applied to all of these previous JVs. This analysis aimed to discover whether the European partners are embedded within an alliance network, to formalize alliance networks, and to identify the density of the network and the European partner's position within it. In the fourth part, we test the research hypotheses and report the results. In the discussion and conclusion, we sum up the main findings and present the limitations and the future directions of this research.

1. Transaction Cost Theory and Uncertainty in Joint Ventures

Transactional uncertainty involves two forms of uncertainty: strategic uncertainty and behavioral uncertainty. The first, strategic uncertainty, is due to the information asymmetry that exists between the future partners before the JV is implemented. This information asymmetry concerns the contributions and objectives of each partner in the JV. When the JV contract is signed, the contracting parties only have imperfect and supposed knowledge of their respective partner's resources. Similarly, they only know their partner's declared objectives, and not their tacit or true objectives. However, as long as the contracting parties do not know precisely their respective partner's contributions and objectives, they cannot know whether they fit strategically and whether they will gain any benefit from the JV. This information asymmetry, which is the source of strategic uncertainty, is the consequence of the lack of transparency and the tacitness that naturally exist as regards an organization's resources and objectives. This lack of transparency and the tacitness stem from the nature of the organization's resources and objectives which are idiosyncratic and are therefore difficult to perceive by any external player, whether this be an individual or a firm. The same applies to the potential partners in a JV. As we have just seen, the information asymmetry between partners is "natural", but it is also deliberate and actively sought. Many partners deliberately conceal their true goals. The contracting parties in the JV consider that it is not in their interest to reveal their true goals, because this would enable their partner to exert pressure which might result in weakening their position. The second form of uncertainty, behavioral uncertainty, is due to the unpredictability of the partner's behavior within the JV. By definition, the behavior of any player, whether an individual or a firm is unpredictable to a certain extent. However, in the case of a JV where firms must work together on a joint project, this unpredictability may be detrimental if one or all of the partners behave opportunistically. Williamson (1975) distinguished two types of opportunistic behavior: cheating and free riding. Within a JV, this may consist of a firm seeking to obtain information or resources in a manner unfair or detrimental to its partner. On this subject, Hart (1995) referred to a risk of a *hold-up* in the case that one of the partners captures all the value created by the JV. This type of behavior may also be found in partners which are reluctant or fail to fulfill their contractual commitments. In all cases, opportunistic and unpredictable behavior raises the issue of the partner reliability. Moreover, this reliability cannot be assessed at the outset, for the reasons mentioned above. It is only in practice, in working daily together within a JV that the partners prove or disprove their reliability.

It is important to note that both the above sources of uncertainty, information asymmetry and unpredictability of behavior, are often deliberately maintained by the partners, because they confer power in their relations and transactions with others. This observation is based on Crozier & Friedberg's work (1977) on power and its sources within organizations. Like the individuals in Crozier & Friedberg's work (1977), the JV partners strive to obtain power and to protect themselves against the opportunistic behavior of their counterparts by creating an *area of uncertainty*. The greater this area, the greater the partners' margin of freedom in relation to each other. Moreover, as shown by Crozier & Friedberg (1977), the source of power lies in this margin of freedom which varies from one player to another. Paradoxically, it is in trying to develop their power and protect themselves from their partners that firms increase the uncertainty within JVs, and therefore put the latter in danger.

2. Social Network Theory, Alliance Networks and Joint Venture Termination: Definition of Research Hypotheses

Any foreign firm aiming to enter into an emerging economy through JV is confronted with the task of selecting the right local partner. The literature on JVs in emerging economies has often considered the selection of local partner as a critical stage for ensuring the future success of the JV (Lu & Ma, 2008). The contributions of the local partner to the JV are of strategic importance for foreign firms. The local partner is expected to provide access to local markets, distribution channels, personnel, knowledge of local regulations and preferential access to the government (Inkpen & Beamish, 1997; Lu & Ma, 2008). Thanks to its local partner, the foreign firm does not need to deal directly with unfamiliar clients, employees, distribution channels, regulations and State authorities. However and as noted previously, a foreign investor negotiating a JV contract with local players in an emerging economy cannot know with any certainty the true contributions, behavior and objectives of its potential local partners before the JV is implemented. In this specific setting, the foreign investor faces both forms of uncertainty, strategic and behavioral, linked to its potential local partners. This is why the transaction costs to be borne by the foreign partners are often high. The search for potential local partners, for reliable information on these partners, followed by the negotiation and drafting of a JV contract involve high costs. Many foreign investors attempt to solve this issue by relying on a formal contract that is often coercive, codifying the slightest details of how the JV is to function. However, no contract, even the most codified possible contract, can overcome the lack of transparency that surrounds the true nature of the local partners' contributions and objectives; and no contract can prevent the latter from behaving

opportunistically. On the contrary, the implementation of such codified and formalized contracts often produces the opposite effect. First, because of the high transaction costs involved in devising highly-formalized contracts, the foreign partners have greater expectations of profit; they are therefore more demanding and exert more pressure on their local partners. Highly-formalized contracts may have another side-effect: they may affect the very keystone of the alliance, namely, the willingness of partners to work together. The desire to write and apply a highly-formalized JV contract is not without important consequences for the contracting parties. This desire is due to caution or even to distrust in the other party. In such conditions, it is difficult to create the necessary minimum of mutual confidence required in order to make an alliance last and prosper. In this contractual setting, the JV's risk of dissolution is high, because the essential factor for reducing the high uncertainty that surrounds any projected alliance is lacking, namely, reliable information on the potential local partners.

Social network theory (Granovetter, 1973, 1985 and 1992) and its inter-organizational developments (Kogut *et al.*, 1992; Gulati, 1995a; Gulati, 1999; Gulati & Gargiulo, 1999; Gulati *et al.*, 2000) consider that this reliable information exists within interorganizational networks and that it is actually one of the core elements that hold such networks together. Besides being a structure grouping firms through direct and indirect ties, a network is a base of reliable information about the resources, objectives and behavior of firms located within and outside the network. This information is reliable because its content has been compiled gradually; it has been confirmed and re-confirmed through the formation and repetition of ties and common experiences between the network members. On this subject, Burt (1992a and 1992b) refers to redundant information to define the network's capacity to produce reliable information and circulate this to its members. Second, this redundant information is reliable because it is obtained not from one, but from several sources called *trusted informants* and *referrals* (Granovetter, 1985; Gulati, 1999). These trusted informants are network members who centralize and circulate information internally. The other members trust them because they benefit from a solid reputation and/or wide experience of interorganizational ties both within and outside the network. More specifically, a network provides easy access to a large stock of reliable experience and knowledge that has been accumulated over time by the different network members. Network members may rely on this cumulative experience and knowledge to facilitate their entry into emerging economies. As argued by Chen & Chen (2005), network resources (experience, advice, knowledge …) are particularly valuable in

entering an emerging or a *primitive* market in which local institutions to support foreign direct investment in the country are lacking or not well developed.

A foreign firm willing to invest into an emerging country through JV cannot hope to collect relevant and reliable information on potential local partners by relying solely on its own experience and knowledge of the target country. Instead, relevant and reliable information on potential local partners is more efficiently and surely obtained by direct, easy access to the country's experience and knowledge of the other network's members. On the basis of their past alliances, deals and JVs with various partners in different geographical locations, the other network members may recommend foreign investors a pool of local players with a good reputation. They may also help identify and select the local partner whose resources and objectives provide the best match for a JV project. By exploiting the network's cumulative experience and knowledge on a specific country and its local players, a foreign investor will be able to select the appropriate local partner relatively quickly and easily and this in turn, will decrease the likelihood of future inter-partner conflicts and JV termination. In this informational configuration of the network, members are also strongly motivated to form new alliances within the network itself, because the transaction costs incurred are reduced to a minimum, and hence the risks of termination of these embedded JVs is also reduced. Therefore the likelihood of a JV being formed in an emerging country as well as its longevity are significantly increased if the foreign partners are embedded in an alliance network. As a consequence, we can formulate the first two research hypotheses as follows:

> Hypothesis 1a: *the likelihood of JV termination in emerging economies decreases if the foreign partners belong to an alliance network.*
> Hypothesis 1b: *the likelihood of JV termination in emerging economies decreases if foreign and local partners are embedded in the same alliance network.*

Besides belonging to an alliance network, the literature on interorganizational networks stresses the importance of analyzing the network density as well as each partner's position in the network. Networks have different densities and embedded partners have different positions in the network. These structural and positional differences have an impact on the likelihood of JV termination, because they have a direct effect on the reliability and quantity of information available to embedded foreign partners.

Several measurements may be used to describe the internal structure of a network. Among these, some determine the propensity of an alliance network's members to form new JVs and are closely correlated to the survival of these JVs. This is notably the case for the density of

ties between members of a network. Network density is defined as the number of existing ties divided by the maximum number of possible ties between network members. A dense network is one in which the members are all (or almost all) tied together. A network with members densely tied to each other is defined as a *closed group* (Coleman, 1988 and 1990). The literature on interorganizational networks converges in considering that exchanges of information and knowledge within dense networks are achieved more easily and quickly than within sparse networks (Coleman, 1988 and 1990; Uzzi, 1996; Ahuja, 2000). Dense ties facilitate and accelerate exchanges of information and knowledge between network members whatever the position (central or peripheral) of the latter within the network. Several explanations may be put forward to explain why dense ties have a positive impact on the availability of information and knowledge to network members. First, dense ties reflect a large number of common experiences among all network members. These common experiences inform network members about the past behavior and loyalty of potential partners. In other words, they forge the (good or bad) reputation of network members and reduce the strategic and behavioral uncertainty associated with potential partners within and outside the network. The denser the network, the broader and more widely accessible is this base of common experiences. Second, the denser the network, the greater the members' mutual trust. A closed network emerges from the development of *repeated ties* between network members (Gulati, 1995b). By repeating ties amongst each other, network members get to know each other better and better. Finally, the development of repeated ties in an alliance network strengthens mutual trust and creates strong cohesiveness between its members through the development of similar behavior, language and routines. Dense ties lead to the formation of shared values, codes and norms within the network. They also mitigate the risk of free riding and opportunistic behavior among network members by exerting strong group pressure on each member to fulfill commitments and obligations (Coleman, 1988 and 1990; Bae & Gargiulo, 2004). As a consequence, strong organizational and cultural cohesiveness between network members help those members to circulate, access and absorb non-distorted, non-costly information and knowledge.

As noted previously, the literature on interorganizational networks is conclusive about the positive relationship between network density, and the availability and reliability of information within the network. However, it remains controversial about whether dense ties enhance the quality, relevance and content of information and knowledge diffused in the network: some studies stress the benefits of dense ties, also referred to as *network closure*

(Coleman, 1988 and 1990; Reagans & Zuckerman, 2003), while others put forward negative aspects. Studies (Burt, 1992; Gargiulo & Benassi, 2000; Bae & Gargiulo, 2004) exposing the dangers and pitfalls of dense ties argue that the resulting shared norms and values among network members act as organizational filters that ignore or reject all innovative ideas and information. These filters only accept and process redundant, conformist and common information and knowledge which have a little impact on network members' innovation and performance. On the basis of these two opposite streams of research, we defend the notion that the relationship between network density and the quality, relevance and content of information and knowledge is neither positive, nor negative. Actually, it follows an inverted U-shaped relationship. In the context of network members willing to enter into an emerging country, this inverted U-shaped relationship may be interpreted as follows: moderate levels of network density help embedded foreign firms collect and distribute reliable but also innovative and relevant information and knowledge about potential local partners within or outside the network. On the contrary, high or low levels of density do not allow network members to benefit fully from the informational configuration of the alliance network. Therefore it is possible to formulate the following hypotheses:

> Hypothesis 2a: *there is an inverted U-shaped relationship between the likelihood of JV termination in emerging economies and the density of the alliance network in which foreign partners are embedded.*
> Hypothesis 2b: *there is an inverted U-shaped relationship between the likelihood of JV termination in emerging economies and the density of the alliance network in which foreign and local partners are embedded together.*

Each partner's position in a network may be viewed as a determinant of JV survival. Whether they are individuals or firms, each network member occupies a well-identified position in the global structure of the network. This position corresponds to a precise role and status (Freeman, 1979; Burt, 1982 and 1992; Brass & Burkhardt, 1992; Gulati, 1999). Since the role and status of a network member varies according to its more or less central position, the concept of position is often associated with that of centrality. *Centrality refers to how critical an organization is to the network's global structure* (Barley *et al.*, 1992, p. 328). Centrality may be gauged from several measurements which have distinct interpretations. Freeman (1979) proposed two centrality measures that are frequently used in the literature on networks: degree centrality and betweenness centrality.

Degree centrality is the simplest form of centrality. It corresponds to the number of ties linking one member to the other members in a network. Freeman (1979) has presented it as a

measure of a member's involvement in a network. In an alliance network, a firm with a high degree centrality benefits from a large base of common experience with different embedded partners. The central firm is tied to many network members, and these in turn are tied to several other members. A high degree centrality provides the firm with fine-grained information about a large number of potential partners and therefore widens the firm's range of possible alliances within and outside the network. Betweenness centrality refers to the presence of a firm on the shortest paths (called *geodesics*) linking together the different network members. A firm with high betweenness centrality is in a position to be a broker who can access and control many information flows in the network. Therefore the network members are highly dependent on the firm which has high betweenness centrality. As a consequence, betweenness centrality has often been interpreted as a measure of the power in the network.

Although they each have a specific interpretation, these two centrality measures, taken together or separately, have an impact on the formation and survival of new alliances, whether the latter are embedded in the network or not. In their own way, each contributes to reducing transactional uncertainty, thereby increasing a new JV's chances of success. High (degree and betweenness) centrality enables a firm to have a clear understanding of the global structure of the network and its different members. For a central member, an alliance network is viewed as a market of potential partners where there is a large amount of reliable information that is easily accessible. Indeed, this is not the only advantage of high centrality. A firm with a central position stands out in a network: such a firm is recognized by all network members, who will approach it to form an alliance. High visibility is another advantage resulting from high centrality. High visibility makes the central members more attractive to potential partners within and outside the network. Less central members of a network and outside firms see alliances with a central firm as an opportunity to increase their reputation, their visibility and especially their own centrality. When peripheral members or outside firms are involved in JVs with central firms, they aim above all to ensure the survival and success of such alliances. Therefore it is possible to define a third series of research hypotheses as follows:

> Hypothesis 3a: *the likelihood of JV termination in emerging economies decreases with the degree centrality and betweenness centrality of embedded foreign partners.*
> Hypothesis 3b: *the likelihood of JV termination in emerging economies decreases with the degree centrality and betweenness centrality of foreign partners who are embedded in the same alliance network as their local partner.*

3. Research Method: Sample, Variables and Survival Models

Sample

This article is based on a sample of 276 European firms which formed JVs in different emerging economies during 1996. We collected this sample from databases (*LexisNexis*, *Factiva*, *Mergerstat* and *Thomson One Banker*) and annual reports of European firms involved in these JVs. The JVs selected in the sample are made up of alliances located in various countries and industries (see Table 1), entailing the formation of an independent legal entity in which two or more European and local partners bring given assets. Table 1 presents a breakdown of European firms and JVs by country and industry.

Insert Table 1 here

In this article, the unit of analysis is not the JV, but the European partner's stake in the JV. Using an event history analysis, we performed a longitudinal follow-up of the change in each European stake during a period at risk ranging from 1996 to January 2008. Over this 12-year period at risk we identified the European partners whose stake did not change with time and those whose stake changed because they had dissolved, sold off or bought out the JV. Accordingly, changes in European stakes were likened to JV termination, considering that the decision by the (European and/or local) partner(s) to dissolve, sell off or internalize the JV resulted in the end of the alliance. Different sources of information were used and cross-checked to follow-up the evolution of each European stake over the period at risk. In addition to *LexisNexis*, *Factiva*, *Mergerstat* and *Thomson One Banker* databases, information on changes in European stakes was obtained by phone and e-mail inquiries to each European partner. A total of 140 European partners terminated their JV (50.7% of the sample) before the end of the period at risk: 24 partners dissolved the JV, 69 sold off their stake to the local partner, and 47 bought out or internalized the local partner's stake. Figure 1 presents, , the rate of survival of the European stakes in the sample year by year for the entire period at risk.

Insert Figure 1 here

In order to determine whether each of the 276 European firms was embedded in an alliance network, we analyzed the history of the JVs formed by each European partner over a 10-year period preceding 1996. A statistical network analysis of interorganizational ties between European and non-European firms was performed to identify alliance networks. The *Grimmersoft WordMapper DataMining* software was used to compute all the ties resulting from these previous JVs. This analysis aimed to formalize alliance networks, to discover

whether the (foreign and local) partners were embedded in an alliance network, and to identify the network density and the European partner's position in the network. This software built up alliance networks by successive iterations. Initially, these alliance networks were made up only of partners who had a cumulative alliance activity of at least ten previous JVs. The networks were then formalized by fixing a minimum threshold of three repeated ties between partners (a minimum threshold of three co-occurrences). In the end, we identified six alliance networks. 26 European partners and 7 of their local partners were embedded in one of these networks (details of each network can be provided by the authors upon request). Table 2 presents the size (measured by the number of members) and density of these alliance networks. A complete description of these alliance networks is proposed in Appendix 1.

Insert Table 2 here

Variables and Survival Models

A measurement of JV termination was used as a dependent variable. We measured the JV termination variable by binary coding (0, 1). We gave the value 0 to European partners whose stake in the JV remained unchanged until the end of the period at risk (on January 1, 2008). This corresponds to surviving JVs that were treated as censored cases. We attributed the value 1 to European partners that terminated the JV, either by dissolving it, selling off their stake to the local partner, or buying out the local partner's stake before the end of the period at risk. For the 140 terminated cases, we recorded three types of JV termination: dissolution, sell-off and internalization. Dissolution means that the JV was dissolved by both European and local partners, sell-off that the European stake was sold off to the local partner, and internalization that the European partner bought out the local stake and transformed the JV into a wholly-owned subsidiary.

We introduced three independent variables into the regression model: the network embeddedness of European partners, the density of the alliance network and each partner's position in the network. As regards the network embeddedness of European partners, we used binary coding (0, 1) and split this variable into "network embeddedness (1)", which measures whether European partners belong to an alliance network (coded 1) or not (coded 0), and "network embeddedness (2)", which measures whether both European and local partners are embedded in the same alliance network (coded 1) or not (coded 0). In this latter case, European and local partners embedded in the same network may be linked together either through direct repeated ties or indirect ties. On the basis of these two variables, we performed two different levels of statistical analysis, one restricted to a sub-sample (labeled sub-sample

1) of embedded European partners, whether they have prior direct ties with their local partner or not, and another focused only on European partners embedded in the same network as their local partner (sub-sample 2). Sub-sample 1 is made up of 105 European partners and sub-sample 2 of 17 European partners.

We measured the "network density" variable by dividing the number of existing ties in the network by the maximum number of possible ties between network members (see Table 2). We computed the positions of European partners within the six alliance networks with *Ucinet 6* software. First of all, we constructed an adjacency matrix for each network. These matrices (0, 1) represent the ties that exist between all (European and non-European) partners within a network. These matrices are then used to determine the position of the embedded European partners (based on calculation of the degree centrality and betweenness centrality scores). The "degree centrality" score corresponds to the European partner's number of ties within the network. This score is normalized and ranges between 0 (very few ties) and 1 (a large number of ties). The "betweenness centrality" score measures the probability of a partner being present on the geodesic (the shortest path between two network members) of the different members of an alliance network. This score is normalized and ranges between 0 (low probability) and 1 (high probability). Tables 3b and 3c show the statistical distribution of these variables within the two sub-samples of embedded European partners.

As controls we included certain variables considered in the literature on JV as potential determinants of JV survival. These comprise the "contract amount" of the JV (measured in $US million and logarithmically transformed), the "JV stake" held by European partners (measured in %), and the "country experience" of European partners (measured by the cumulative number of JVs formed by each European partner in a specific emerging country over a 10-year window prior to 1996 and logarithmically transformed). We also controlled for industry and country differences among JVs by coding as dummy variable the most prevalent two-digit SIC code, chemicals and allied products (24.6% of the sample), and country, China (38.4% of the sample). Tables 3a, 3b and 3c present descriptive statistics of the control variables.

A simple survival model (without specifying its parametric form) was used to successively estimate a hazard rate of the different European stakes in the sample (Allison, 1984).

$$h(t) \text{ or hazard function} = \lambda_t \quad \text{where } t = 1, 2, , \ldots, T \text{ and } 0 < \lambda_t < 1$$

Where λ_t is the hazard rate for the time interval t within the period at risk. The hazard rate of European stakes in JVs may be defined as the probability that a European partner would dissolve its JV, sell off its stake to the local partner, or internalize the local partner's stake in an interval from time t=1 to t=T. Therefore the sequence from λ_1 to λ_t corresponds to the yearly variation in the probability of termination for any given JV in the sample. The impact of the independent and control variables on hazard rate was tested with a Cox proportional hazards model (1972).

$$h(t) \text{ or hazard function} = \exp(\beta X_t)\lambda_t$$

Where X_t is the vector of covariates (namely, independent and control variables) at the time interval t within the period at risk and β is the associated vector of regression coefficients.

4. Test of Hypotheses and Results

Tables 3a and 3b present correlation matrices, one for the total sample (see Table 3a) and another for the sub-sample 1 (see Table 3b). We did not compute a correlation matrix for the sub-sample 2. As its small size (N = 17) could bias the results of the Cox proportional hazard models, we decided to remove all control variables and to examine only the impact of network measures on the hazard rate of European partners. We observed high correlations in the total sample between country experience and the two variables of network embeddedness (see Table 3a) and in the sub-sample (1) between network density and the two other network measures (see Table 3b). In order to check for potential collinearity, we examined variance inflation factors (VIF) for all independent and control variables. The VIF statistics were well within the limit of 3, indicating that collinearity did not bias the coefficient estimates in Table 4.

Insert Tables 3a and 3b here

Table 4 reports the results of Cox proportional hazard models for network embeddeness, network measures of European partners and JV termination. Models 1, 2 and 3 are tests of hypotheses using respectively the total sample (see model 1), sub-sample 1 (see model 2) and sub-sample 2 (see model 3). The different models in Table 4 show good fit. However, only a few variables have a significant impact on the hazard rates of European stakes.

Insert Table 4 here

Hypothesis 1a predicted a negative relationship between the likelihood of JV termination and the network embeddedness of European partners, and Hypothesis 1b a negative

relationship between the likelihood of JV termination and the network embeddedness of both local and European partners. As shown in Table 4, the network embeddedness of European partners (see "network embeddedness (1)") has a negative and significant impact on the hazard rate of European stakes ($p < 0.05$), supporting Hypothesis 1a. In contrast, the embeddedness of local and European partners in the same alliance network (see "network embeddedness (2)") has no significant impact on the likelihood of JV termination, thus failing to support Hypothesis 1b.

The second series of hypotheses concerned the inverted U-shaped curvilinear impact of the network density on the likelihood of JV termination. The coefficient estimates for network density and its squared term are not significant for both networks in which only European partners are embedded and networks in which local and European partners are embedded together. Thus neither Hypothesis 2a nor Hypothesis 2b is supported by these results. Interestingly, when entered separately from its squared term, the density of networks with only embedded European partners has a positive and significant impact on the hazard rate of European stakes in JVs ($p < 0.05$), indicating that the relationship between network density and JV termination is linear in this sample (see Figure 2 for a graphical description of this linear and negative relationship). In other words, densely tied networks seem to have a destabilizing effect on JVs with embedded European partners. Conversely, if the alliance network is weakly tied and sparse, then this lack of network closure tends to decrease the hazard rate of European stakes in JVs in emerging economies.

Insert Figure 2 here

It is also important to note that this result holds true but to a lesser degree ($p < 0.1$) if we restrict the focus only to alliance networks in which both local and foreign partners of JVs are embedded. Accordingly, whether JVs are formed by foreign partners and local partners belonging to the same alliance network or by embedded foreign partners and "independent" local partners, their survival is adversely affected by network density.

Hypothesis 3a and Hypothesis 3b respectively predicted that the likelihood of JV termination was negatively related to the degree centrality and betweenness centrality of only embedded European partners and of European partners who are embedded in the same alliance network as their local partner. The coefficient estimates for degree centrality and betweenness centrality of only embedded European partners are not significant, indicating that Hypothesis 3a is not supported. By contrast and as predicted in Hypothesis 3b, degree centrality and betweenness centrality of European partners embedded in the same alliance

network as their local partner have a negative and significant effect on the likelihood of JV termination. In the specific setting of alliance networks where both local and European partners are embedded, European partners with a high (degree and betweenness) centrality are less likely to terminate their stake in JVs than non-central or peripheral network members; the converse is also true. As regards control variables, we observed that only the country dummy (namely JVs located in China) has a negative and significant impact on the hazard rate of European stakes ($p < 0.001$), indicating that European partners are less likely to terminate their JVs in China than in other emerging economies.

Discussion and Conclusion

Transaction cost theory has argued that the high rate of (early) termination of JVs in emerging economies is mainly due to inherent high transactional uncertainty coupled with *the turbulent political and economic environments* (Yan, 1998, p. 773) of those economies. This article explored the factors that might reduce the high transactional uncertainty of JVs in emerging economies, and in turn decrease the likelihood of their termination. Building on social network theory and its interorganizational developments, this article aimed to explain that network embeddedness of foreign partners mitigates this uncertainty and the risks of termination of future JVs. The main idea put forward and defended in this article is that JV survival and performance are embedded in interorganizational networks. This article also sought to show that the likelihood of JV termination is positively affected by the network density and the foreign partner's position in the network.

Table 4 presented contrasting results that only provide partial support of the network-survival relationship. Simply being part of an alliance network is not sufficient to enable a foreign firm wishing to enter into an emerging economy through a JV to minimize transactional uncertainty; nor is it enough to significantly enhance such a firm's ability to select the right local partner. In fact, the network-survival relationship is only supported for alliance networks with a specific internal structure. Only sparse alliance networks, , seem to offer their members the internal market and the base of reliable and relevant information and knowledge on potential local partners that ensure the longevity of future JVs. However the benefits of sparse alliance networks have to be qualified and further discussed with regard to the specific nature of the six networks identified and studied in this article. Indeed as shown in Table 2, the alliance networks studied here display a strong negative correlation between size and density: the bigger the alliance networks, the less densely connected they are, and conversely. The most densely connected networks (see networks #4 to #6 in Table 2) are

made up of only two members. In this specific case, alliance networks may be likened to *repeated ties* between the same two partners (Gulati, 1995b). Therefore our results distinguish between large networks and repeated ties rather between dense networks and sparse networks. In the context of our study, it is the network size, and not directly the network density, that has to do with JV termination or survival. Thus, the embeddedness mechanisms reducing transactional uncertainty and the unforeseeable factors of a JV operate at full scale in large alliance networks: foreign partners embedded in large alliance networks are less likely to terminate their JVs in emerging economies than those embedded in repeated ties with the same partner.

A distinct reasoning applies to the foreign partner's position in the network. Generally speaking, we did not observe statistically significant differences in the likelihood of JV termination between embedded partners occupying either a central or a peripheral position in the alliance network. More specifically, we found such differences but only if we restricted the focus to alliance networks in which both local and foreign partners of JVs are embedded. In fact, occupying a central position in an alliance network does not translate automatically into lower rate of JV termination and more generally into a cooperative advantage for such embedded foreign firms. A central position may provide the embedded foreign firms with associated informational and reputational benefits only if these central firms team up with local partners who are affiliated to the same alliance network.

The issue of network ties is central for understanding and explaining the network-survival relationship regarding JVs in emerging economies. In social network theory, ties are really at the core of the network, because they constitute the usual means for embedding the network's different members. The findings of this article underline this pivotal role, as opposed to other network variables such as the degree centrality or betweenness centrality of foreign partners. However, our findings point out that ties also play an ambivalent role: they both facilitate and destabilize new ties between firms who are inside and outside the network. Ties inside a network facilitate closeness and exchanges of information, experience and knowledge between different members. They contribute to transforming an alliance network into a web of resources in which large flows of reliable and transparent information and knowledge circulate. Indeed, the larger the firms connected by network ties, the better the flow, the quality and the variety of information and knowledge in the network. However, ties can have a destabilizing effect: if they are repeated frequently between the same partners, they create closed and small networks which in turn, have a negative effect on the survival of future JVs.

Repeated ties may be likened to *strong ties* (Granovetter, 1973, 1985 and 1992; Burt, 1992) in that they enclose the embedded foreign partners in a path dependency process that will restrict their choice of alliances and local partners. By repeating ties with a same partner, whether foreign or local, firms develop a cohesion-exclusion mechanism for their alliances. Thus, repetition of ties produces what Gulati & Gargiulo (1999) have called *overembeddedness* of partners who develop a unique, strong and symbiotic relationship together. In this setting, fewer and fewer alliances are formed with new partners. Even when JVs are formed with local firms outside the network, their selection process has been often constrained and biased by the cohesion-exclusion filters which result from repeated ties between the same two partners.

This article has some limitations which make us cautious regarding interpretation and generalization of our findings. Considering these limitations, we can envisage future directions for this research. Firstly, the two sub-samples of embedded partners, sub-sample 1, restricted to embedded European partners, whether or not they have prior direct ties with their local partner, and sub-sample 2, focused only on European partners embedded in the same network as their local partner, are quite small in relation to the total sample of 276 European partners who formed a JV in an emerging economy during 1996. This may lead to certain statistical bias that can be eliminated if the total sample and sub-samples are lengthened by one or two extra years. Furthermore, the dependent variable used in this article, namely the hazard rate of European stakes in JVs, cannot be viewed as a proxy of JV performance as JV terminations have different determinants and implications: some may be related to failures, whereas others are not. An interesting direction for new research would be to distinguish between the different reasons for JV termination and to relate them to partners' network embeddedness. This would offer a more complete view of the cooperative advantage of alliance networks for embedded firms wishing to enter emerging economies through JVs with local firms.

References

Ahuja, G. (2000). Collaboration Networks, Structural Holes, and Innovation: A Longitudinal Study, *Administrative Science Quarterly*, 45/3, 425-445.

Allison, P.D. (1984) *Event History Analysis*. London: Sage University Paper.

Bae, J. and Gargiulo, M. (2004). Partner Substitutability, Alliance Network Structure, and Firm Profitability in the Telecommunications Industry, *Academy of Management Journal*, 47/6, 843-859.

Barney, J.B. (1991). Firm Resources and Sustained Competitive Advantage, *Journal of Management*, 17/1, 99-120.

Barney, J.B. (2001). Is the Resource-Based "View" a Useful Perspective for Strategic Management Research? Yes', *Academy of Management Review*, 26/1, 41-55.

Berlew, E.K. (1984). The Joint Venture – A Way into Foreign Markets, *Harvard Business Review*, 62/4, 48-54.

Bleeke, J. and Ernst, D. (1991). The Way to Win in Cross-Border Alliances, *Harvard Business Review*, 69/6, 127-135.

Brass, D.J. and Burkhardt, M.E. (1992) Centrality and power in organizations, In N. Nohria and R.G. Eccles (eds), *Networks and Organizations*, Boston: Harvard Business School Press, 191-215.

Burt, R.S. (1992) *Toward a Structural Theory of Action*. New York: Academic Press.

Burt, R.S. (1992) The social structure of competition, In N. Nohria and R.G. Eccles (eds), *Networks and Organizations*, Boston: Harvard Business School Press, 57-91.

Coleman, J. (1988). Social Capital in the Creation of Human Capital, *American Journal of Sociology*, 90, Supplement S95-S120.

Coleman, J. (1990) *Foundations of Social Theory*. Cambridge MA: Belknap.

Crozier, M. and Friedberg, E. (1977) *L'Acteur et le Système*. Paris : Editions du Seuil.

Delios, A. and Beamish, P.W. (2001). Survival and Profitability: The Roles of Experience and Intangible Assets in Foreign Subsidiary Performance, *Academy of Management Journal*, 44/5, 1028-1038.

Franko, L.G. (1971) *Joint Venture Survival in Multinational Corporations*. New York: Praeger Publishers.

Freeman, L. (1979). Centrality in Social Networks: Conceptual Clarification, *Social Networks*, 1, 215-239.

Gargiulo, M. and Benassi, M. (2000). Trapped in your Own Net? Network Cohesion, Structural Holes, and the Adaptation of Social Capital, *Organization Science*, 11/2, 183-196.

Garrette, B. and Dussauge, P. (1995) *Les Stratégies d'Alliance*, Paris : Les Editions d'Organisation.

Gomes-Casseres, B. (1987). Joint Venture Instability: Is it a Problem?, *Columbia Journal of World Business*, 22/2, 97-102.

Granovetter, M.S. (1973). The Strength of Weak Ties, *American Journal of Sociology*, 78/6, 1360-1380.

Granovetter, M.S. (1985). Economic Action and Social Structure: The Problem of Embeddedness, *American Journal of Sociology*, 91/3, 481-510.

Granovetter, M.S. (1992) Problems of explanation in economic sociology, In N. Nohria and R.G. Eccles (eds), *Networks and Organizations*, Boston: Harvard Business School Press, 25-56.

Gulati, R. (1995a). Social Structure and Alliance Formation Pattern: A Longitudinal Analysis, *Administrative Science Quarterly*, 40/4, 619-652.

Gulati, R. (1995b). Does Familiarity Breeds Trust? The Implications of Repeated Ties for Contractual Choice in Alliances, *Academy of Management Journal*, 38/1, 85-112.

Gulati, R. (1999). Network Location and Learning: The Influence of Network Resources and Firm Capabilities on Alliance Formation, *Strategic Management Journal*, 20/5, 397-420.

Gulati, R. and Gargiulo, M. (1999). Where do Interorganizational Networks Come from, *American Journal of Sociology*, 104/5, 1439-1493.

Gulati, R., Nohria, N. and Zaheer, A. (2000). Strategic Networks, *Strategic Management Journal*, 21/3, 203-215.

Hamel, G., Doz, Y.L. and Prahalad, C.K. (1989). Collaborate with your Competitors and Win, *Harvard Business Review*, 67/1, 133-139.

Hamel, G. (1991). Competition for Competence and Inter-Partner Learning within International Strategic Alliances, *Strategic Management Journal*, 12(Special Issue), 83-103.

Harrigan, K.R. (1988) Strategic alliances and partner asymmetries, In F. Contractor and P. Lorange (eds), *Cooperative Strategies in International Business*, Lexington MA: Lexington Books, 205-226.

Hart, O. (1995) *Firms, Contracts and Financial Structure*. Oxford: Oxford University Press.

Hennart, J.-F. (1988). A Transaction Costs Theory of Equity Joint Ventures, *Strategic Management Journal*, 9/4, 361-374.

Hennart, J.-F., Kim, D.-J. and Zeng, M. (1998). The Impact of Joint Venture Status on the Longevity of Japanese Stakes in U.S. Manufacturing Affiliates, *Organization Science*, 9/3, 382-395.

Inkpen, A.C. and Beamish, P.W. (1997). Knowledge, Bargaining Power, and the Instability of International Joint Ventures, *Academy of Management Review*, 22/1, 177-202.

Kogut, B. (1988). Joint ventures: Theoretical and Empirical Perspectives, *Strategic Management Journal*, 9/4, 319-332.

Kogut, B. (1989). The Stability of Joint Ventures: Reciprocity and Competitive Rivalry, *Journal of Industrial Economics*, XXXVIII/2, 183-198.

Kogut, B. (1991). Joint Ventures and the Option to Expand and Acquire, *Management Science*, 37/1, 19-33.

Lee, C. and Beamish, P.W. (1995). The Characteristics and Performance of Korean Joint Ventures in LDCs, *Journal of International Business Studies*, 26/3, 637-654.

Kogut, B., Shan, W. and Walker, G. (1992) The make-or-cooperate decision in the context of an industry network, In N. Nohria and R.G. Eccles (eds), *Networks and Organizations*, Boston: Harvard Business School Press, 348-365.

Leung, W.-F. (1997). The Duration of International Joint Ventures and Foreign Wholly-Owned Subsidiaries, *Applied Economics*, 29, 1255-1269.

Lu, J.W. and Ma, X. (2008). The Contingent Value of Local Partners' Business Group Affiliations, *Academy of Management Journal*, 51/2, 295-314.

Luo, Y., Shenkar, O. and Nyaw, M.-K. (2001). A Dual Parent Perspective on Control and Performance in International Joint Ventures: Lessons from a Developing Economy, *Journal of International Business Studies*, 32/1, 41-58.

Meschi, P.-X. (2005). Environmental Uncertainty and Survival of International Joint Ventures: The Case of Political and Economic Risk in Emerging Countries, *European Management Review*, 2/2, 143-152.

Nakamura, M. (2005). Joint Venture Instability, Learning and the Relative Bargaining Power of the Parent Firms, *International Business Review*, 14/4, 465-493

Nanda, A. and Williamson, P.J. (1995). Use the Joint Ventures to Ease the Pain of Restructuring, *Harvard Business Review*, 73/6, 119-129.

Pangarkar, N. (2003). Determinant of Alliance Duration in Uncertain Environments: The Case of the Biotechnology Sector, *Long Range Planning*, 36/3, 69-84.

Park, S.H. and Russo, M.V. (1996). When Competition Eclipses Cooperation: An Event History Analysis of Joint Venture Failure, *Management Science*, 42/6, 875-890.

Parkhe, A. (1993). Strategic Alliance Structuring: A Game Theoretic and Transaction Cost Examination of Inter-Firm Cooperation, *Academy of Management Journal*, 36/4, 794-829.

Reagans, R. and Zuckerman, E.W. (2001). Networks, Diversity, and Productivity: The Social Capital of Corporate R&D Teams, *Organization Science*, 12/4, 502-517.

Tsang, E.W. (2000). Transaction Cost and Resource-Based Explanations of Joint Ventures: A Comparison and Synthesis, *Organization Studies*, 21/1, 215-242.

Uzzi, B. (1996). The Sources and Consequences of Embeddedness for the Economic Performance of Organizations. American Sociological Review, 61/4, 674-698.

Williamson, O.E. (1975) *Markets and Hierarchies*. New York: The Free Press.

Williamson, O.E. (1991). Comparative Economic Organization: The Analysis of Discrete Structural Alternatives, *Administrative Science Quarterly*, 36/2, 269-296.

Yan, A. (1998). Structural Stability and Reconfiguration of International Joint Ventures, *Journal of International Business Studies*, 29/4, 773-796.

Table 1: Breakdown of European partners and JVs by emerging country and industry

Emerging country	*JVs*	*%*	*2-digit SIC code*	*JVs*	*%*
China	106	38.4	*Chemicals & allied products*	68	24.6
India	32	11.6	*Transportation equipment*	36	13.0
Thailand	13	4.7	*Electronic equipment & components*	23	8.3
Malaysia	10	3.6	*Computer Equipment*	15	5.4
Russia	9	3.3	*Oil & gas exploration*	15	5.4
Other countries	106	38.4	*Other industries*	119	43.1
Total	276	100.0	*Total*	276	100.0

Table 2: Size and density of the alliance networks

Network	*Size* [a]	*Density* [b]
#1	13	0.19
#2	8	0.29
#3	10	0.24
#4	2	1.00
#5	2	1.00
#6	2	1.00

[a] Network size is measured by the number of embedded partners.

[b] Network density is defined as the number of existing ties divided by the maximum number of possible ties between the network members. This score is ranging from 0 (low density) to 1 (high density).

Table 3a: Means, standard deviations and correlations (total sample)

Variables	*Mean*	*Std dev.*	*1*	*2*	*3*	*4*	*5*	*6*	*7*
1. Termination	0.51	0.50	–						
2. Network embeddedness (1)	0.38	0.48	–.14*	–					
3. Network embeddedness (2)	0.06	0.24	–.08	.32***	–				
4. Contract amount	146.88	355.90	–.04	.24**	.05	–			
5. JV stake	50.43	14.45	–.04	–.11†	–.09	–.18*	–		
6. Country experience	1.48	3.59	–.14*	.31***	.16*	.03	.18*	–	
7. Industry dummy	0.24	0.43	–.06	.09	.06	.06	.11*	.16*	–
8. Country dummy	0.38	0.48	–.22**	.05	.08	–.01	.15*	.56***	.13*

N = 276 European partners †p < 0.1 * p < 0.05 ** p < 0.01 *** p < 0.001 (two-tailed tests)

Table 3b: Means, standard deviations and correlations (sub-sample 1)

Variables	*Mean*	*Std dev.*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*
1. Termination	0.42	0.49	–							
2. Network density	0.29	0.22	.23*	–						
3. Degree centrality	0.35	0.23	.14	.86***	–					
4. Betweenness centrality	0.26	0.23	–.16†	–.34***	.15	–				
5. Contract amount	268.04	525.39	.03	.13	.16†	.02	–			
6. JV stake	48.40	15.76	–.13	–.20*	–.16†	.03	–.14	–		
7. Country experience	2.85	5.23	–.10	–.21*	.02	.46***	.01	.11	–	
8. Industry dummy	0.29	0.46	.13	.03	.07	.08	.15	.10	–.07	–
9. Country dummy	0.42	0.49	–.21*	–.15	–.01	.26**	.01	.18†	.56***	.08

N = 105 European partners †p < 0.1 * p < 0.05 ** p < 0.01 *** p < 0.001 (two-tailed tests)

Table 4: Cox models, network embeddedness, network measures and JV termination [a, b]

Variables	*Model 1(total sample)*		*Model 2 (subsample 1)*			*Model 3 (subsample 2)*		
Network embeddedness (1)	– 0.41 (0.20)*							
Network embeddedness (2)		– 0.37 (0.42)						
Network density			1.06 (0.60)*	– 0.03 (9.05)		22.98 (13.35)†	37.92 (38.08)	
Network density squared				1.45 (7.29)			4.67 (18.85)	
Degree centrality					0.75 (0.59)			– 11.03 (4.88)*
Betweenness centrality					– 0.81 (0.78)			– 3.90 (1.97)*
Contract amount	– 0.11 (0.14)	– 0.16 (0.13)	– 0.03 (0.21)	– 0.02 (0.22)	– 0.02 (0.21)			
JV stake	– 0.01 (0.01)	– 0.01 (0.01)	– 0.01 (0.01)	– 0.01 (0.01)	– 0.01 (0.01)			
Country experience	0.19 (0.37)	– 0.03 (0.34)	0.19 (0.63)	0.17 (0.64)	0.22 (0.65)			
Industry dummy	– 0.07 (0.21)	– 0.07 (0.21)	0.43 (0.32)	0.47 (0.37)	0.45 (0.32)			
Country dummy	– 0.68 (0.23)***	– 0.62 (0.23)***	– 0.79 (0.49)	– 0.78 (0.49)	– 0.75 (0.49)			
Log-likelihood	– 733.26	– 735.03	– 187.65	– 188.63	– 188.79	– 14.45	– 14.45	– 12.38
Model chi-square	19.69**	16.15**	12.09*	11.34	11.02	3.22†	3.23	7.36*
N	276 (140)	276 (140)	105 (44)	105 (44)	105 (44)	17 (6)	17 (6)	17 (6)

[a] Positive coefficients indicate that increase in independent or control variable values increase the likelihood of JV termination by European partners, and conversely.

[b] Cell entries are coefficient estimates. Numbers in parentheses are standard errors.

† $p < 0.1$ * $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$ (two-tailed tests)

Figure 1: Survival function of European stakes in JVs formed in emerging economies

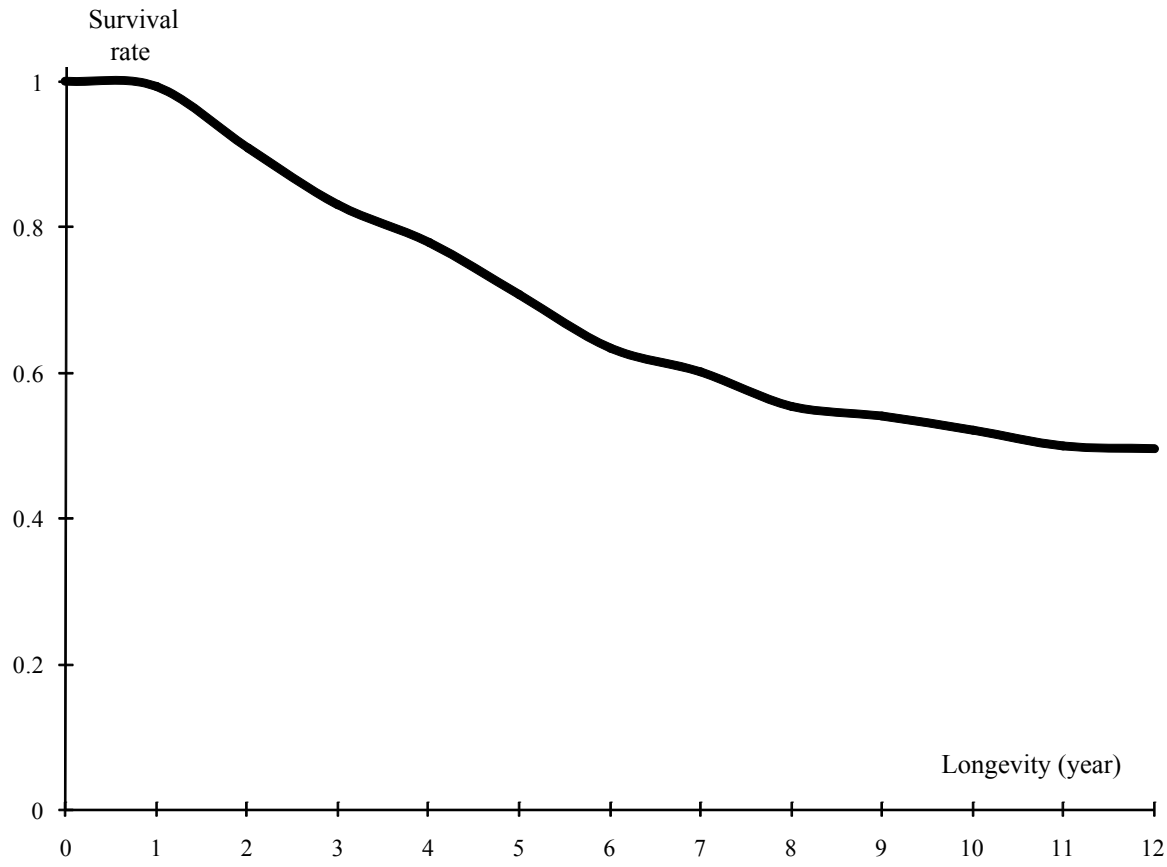

Figure 2: Breakdown of survival functions by network density