2008

The Impact of Social Networks on Inter-Organizational Effectiveness: The Case of IPO Deal Networks

Sven C. Berger
University of Frankfurt, sven.berger@wiwi.uni-frankfurt.de

Oliver Hinz
Goethe-University of Frankfurt, ohinz@wiwi.uni-frankfurt.de

THE IMPACT OF SOCIAL NETWORKS ON INTER-ORGANIZATIONAL EFFECTIVENESS – THE CASE OF IPO DEAL NETWORKS

Berger, Sven C., University of Frankfurt & E-Finance Lab Frankfurt, Mertonstrasse 17–25, 60325 Frankfurt am Main, Germany, sven.berger@wiwi.uni-frankfurt.de

Hinz, Oliver, University of Frankfurt, Mertonstrasse 17–25, 60325 Frankfurt am Main, Germany, ohinz@wiwi.uni-frankfurt.de

Abstract

The question for the effectiveness of inter-organizational collaboration gains much attraction in the light of social network analysis. We analyze this by the case of Initial Public Offering (IPO) deal networks as this is a valuable example for the repeated collaboration of autonomous organizations on a shared goal and data is publicly available.

We use the social networks established through deal activities over time as independent variables explaining the success of the IPO. Although we did not find statistically significant support for the impact of centrality for neither the lead manager nor the consortium banks, we see that the clustering among the consortium banks is a significant driver for IPO success. The higher the clustering amongst the collaborating consortium banks the better the performance of the issued share. We thereby provide initial evidence for the influence of network structure on IPO success and show that the build-up of the consortium has a significant impact on the success of the IPO.

In terms of methodology, we explore a way of constructing networks from previous collaborations which form the basis for proven analysis techniques and might help to shed light on various questions in the domain of inter-organizational collaboration.

Keywords: Collaboration, Social Network Analyses & Economic Implications, Network Positions, Organisational & Inter-Organisational Initiatives.

1 INTRODUCTION

The past decades have seen a constant shift away from traditional monolithic corporate structures. The importance of alliances, multi-organizational collaboration increased dramatically (2005), which is also reflected in increased Information Systems (IS) research on collaborative support systems, organizational implications and impact of IS (Mäkipää, 2006). In such multi-organizational networks, social relations and their details thus become frictional matters (Granovetter, 1985). Research in this field received substantial impetus from the upcoming analysis of social networks since the network structure amongst the collaborating organizations might be one important driver for the effectiveness of inter-organizational collaboration. Effectiveness is seen as the ultimate success measure of such inter-organizational collaborations and is thus subject of manifold research streams (Marco & Umit, 2006; Melville et al., 2004).

A typical showcase for such situational inter-organizational collaboration is the case of deal networks for initial public offerings (IPOs) on stock exchanges. Participating banks known as "syndicate members" or "underwriters" (Corwin & Schultz, 2005) share costs, pool and spread risk as well as provide access to complimentary (sales) resources and face typical sources of conflict lying in relationship interdependencies (Kumar & van Dissel, 1996), possibly resulting in alliance unstability and underperformance (Bignoux, 2006). Although such situational emerging of project-related social structures is an ideal object of investigation, there is no research on the network structure of IPO consortiums, yet. Or, as Gulati & Higgins put it as an opportunity for future research: „Scholars could also examine the effects that different network clusters of intermediaries have on IPO success" (Gulati & Higgins, 2003).

The remainder of our paper is organized as follows: Chapter 2 surveys the relevant literature for both, inter-organizational effectiveness and Social Network Analysis (SNA) in the domain of IPO deal networks, and introduces our hypotheses. Chapter 3 introduces our methodology while chapter 4 constitutes the core of our paper. First we describe the data in detail before we present some descriptive results. Subsequently we test the hypotheses from chapter 2. The findings are then discussed in chapter 5 concluding the paper.

2 PREVIOUS RESEARCH

2.1 Inter-organizational effectiveness in IPO consortiums

The question of organizational effectiveness has been established as a subject of IS research. Although there are important epistemological differences between the fields of IT and organization studies, there is growing research interest in integrating institutional analysis especially in IS research (Orlikowski & Barley, 2001).

Due to the growing importance of networked organizations and alliances, there is a shift from organizational effectiveness to inter-organizational effectiveness. As organizations are more and more regarded from an *open systems input-process-output perspective* (Scott, 2003), they are urged to modify and respond to their environments along with the challenges involved. One opportunity is to establish alliances and partnerships, which is the case with IPOs.

Bakos & Treacy (1986) see the inter-organizational effectiveness of such alliances as decisive for competitive advantage based on comparative effectiveness. Inter-organizational effectiveness relies on the success of multi-organizational collaboration. Success factors for these were studied by Mattessich et al. (2001) or Ackermann et al. (2005), who identify five dominating themes regarding multi-organization collaborative teams in their literature review *(lack of history, conflicting goals, complex*

politics and power, multiple roles, nature of the client), which emphasize the importance of well-established network structure of cooperation.

Network organization concerns those approaches focusing on relationships within and beyond organizations or, as Granovetter (1985) proposed, reflect the social embeddedness of economic actions. An inter-organizational collaboration reflects a higher state of a company which can not be analyzed as an autonomous agent but as being a part of a system embedded in inter-organizational relationships. Especially the "network approach" (Håkansson & Ostberg, 1975; Håkansson, 1987), "social network perspective" approach (Gulati, 1998), "Resource Dependence Theory" (Pfeffer & Salancik, 2003) or "relational view" approach (Gulati et al., 2000; Dyer & Singh, 1998) try to capture the relationships between inter-organizational partners.

As we introduced, the collaboration of several investment banks in the context of an IPO is a typical representation of such inter-organizational relationships. The question for the impact of organizations' social context on IPO performance has attracted much attention in recent years (Gulati & Higgins, 2003) and networks relationships are regarded as critical (Corwin & Schultz, 2005), but as a lot of research focused on inter-personal networks, inter-organizational aspects were neglected (Gulati & Westphal, 1999). Nevertheless, the importance of inter-organizational networks for IPO was acclaimed, based on surveys of firms going public (Brau & Fawcett, 2006) as well as on market observations, where Stuart et al. (1999) show, that relations to prominent organizations are valued as a signal for the quality of an IPO and thereby positively affect the performance. In addition, Gulati & Higgins (2003) show, that there is a significant relationship between the broker's reputation and the IPO success.

Still, there is no substantial analysis of the network structure of IPO consortiums and the potential impact of specific network structure characteristics on the performance of the managed IPO has not been examined yet.

2.2 Social Network Analysis of Deal Networks

As one major research stream in the New Economic Sociology, organizational science, and recently in IS, the analysis of social networks provides explanatory insights into the performance effects of organizations and inter-organizational collaborations (Provan & Milward, 1995). As derived above, deal networks are typical for inter-organizational collaborations as they fully meet typical definitions in existing literature. While a range of different definitions of inter-organizational collaboration exists, we follow the definition of Hardy et al. defining it as a "cooperative, inter-organizational relationship that is negotiated in an ongoing communicative process, and which relies on neither market nor hierarchical mechanisms of control" (Hardy et al., 2003). This definition encompasses a wide range of collaborative arrangements although it distinguishes collaboration from other forms of inter-organizational activities which have a more cooperative character but where cooperation is either purchased or driven by governmental regulations.

The performance of collaborations is assumed to significantly depend on the coordinator of the network, who should possess the competence for managing complex networks. The role of the "Broker" (Miles & Snow, 1986), "network organizer" (Windeler & Sydow, 2001) or "network integrator" (Galbraith, 1998) depicts this coordinating function. Pollock et al. (2004) introduce the similar concept of the *network architect* as a function to manage structural holes in mediated financial markets (developed in the context of US IPOs). This central participant fulfils four core tasks (Sydow, 2004): (1) selection of network partners, (2) allocation of tasks and resources, (3) regulation of collaboration and (4) evaluation of organizations, relations and the network. Especially the selection of network partners is regarded as "crucial in any networked organization" (Galbraith, 1998 p 86). Basis for such a central role would be an advance in market or technology knowledge or reputation as well as the competence for managing complex networks (Ritter & Gemünden, 2003).In an IPO context, the leading manager as such a network architect basically performs Galbraith's integration function.

In social network analysis, the centrality, as a dominant concept reflects the position of the actor within the network (Poulin et al., 2000). Actors are "more central to the extent they have more relations with more members of the network (relational), play a role that is more connected to other roles (positional), are higher in the hierarchy (prominence), have a greater range of ties (range), and are more tied to non-connected others (brokerage)" (Zack, 2000).

Considering the importance of the lead manager as network architect and its centrality, we thus hypothesize:

> *H1: The higher the centrality of the lead manager, the better the performance of the issued shares.*

One effect of collaboration, often cited in strategy literature, lies in its potential to increase organizational resources and capacities. This has positive effects due to the availability of key equipment, intellectual property, personnel or organizational knowledge (Dyer & Singh, 1998). On the background of deal networks, a considerable amount of sales resources are necessary to place the issue among the market participants. Due to the underlying business models, specific knowledge on the broker side might come in handy to facilitate an adequate placement. Although communication and coordination among the collaborators may be more complex as in a monolith structure (Kumar & van Dissel, 1996), the client base, potentially increased by a network structure, is regarded as highly decisive for the IPO success (Brau & Fawcett, 2006) and the performance could benefit from increasing the number of underwriting IPO banks especially by raising media and market attention (Corwin & Schultz, 2005). In our case, the involvement of a higher quantity of brokers might reflect this, when assuming a ceteris paribus condition, i. e. when broker's transaction experience is controlled for. Therefore we hypothesize:

> *H2: The more banks in the consortium, the better the performance of the issued shares.*

Not only the lead manager benefits from a position well-connected to all other market participants, but also the other consortium banks contribute significantly to the success of an IPO (Carter et al., 1998). Their relational sales power is reflected by their centrality in the inter-organizational network and could positively affect the share performance. Hence,

> *H3: The higher the average centrality of the consortium banks, the better the performance of the issued shares.*

Network coordinators can increase the stability of the network by including partners with "embedded" relationships in the deal network (Pollock et al., 2004). According to Granovetter (1985) market relationships differ in their degree of embeddedness, from loose ones to dense networks of social ties promoting trust and cooperation, depending on frequency (e.g. Baker, 1984; Granovetter, 1985) and the concentration (e.g. Baker, 1990; Larson, 1992; Uzzi, 1996) of transactions.

As Fischer et al. (2004) argue for the case of US IPO investor networks, embedded relationships based on prior transaction histories (1) decrease opportunistic behaviour (Uzzi, 1996), (2) facilitate information transfer (Larson, 1992; Uzzi, 1996), (3) influence the acquisition and use of power (Baker, 1990), (4) build trust between the transaction partners (Uzzi, 1996), and (5) reduce market volatility (Baker, 1984) and therefore help to create stable networks.

Homans (1974) introduced the "cohesion-compliance" hypothesis where he argues that a dense network of social relations helps a group to solve social dilemmas. Following this idea, Coleman (Coleman, 2000) also explained informal control as an exchange of compliance for social rewards and exchange of approval is thereby a powerful to produce eager overcooperation.

We assume the same for the case of deal networks and operationalize the embeddedness with the clustering coefficient, usually applied as proxy measure for cooperation (Chwe, 2000; Wang et al., 2006), thus

H4: The higher the clustering coefficient amongst the consortium banks, the better the performance of the issued shares.

Note that an increasing number of agents in a clique makes dense clustered sub networks more unlikely. One can often observe a negative correlation between the clustering coefficient and the number of agents in the clique. The effectiveness of the inter-organizational collaboration, however, is supported at most by a big network gathering resources and dense as well as stable network relation (Arias, 1995). Therefore we hypothesize:

H5: The higher the absolute number of ties between the consortium banks, the better the performance of the issued shares

3 METHODOLOGY

3.1 Overview

The underlying research question as well as the hypotheses derived in the prior section induce a positivist research approach (Orlikowski & Baroudi, 1991 p 5; Chua, 1986). Analyzing the market data for IPOs and building the social network of the dealer structures, we can determine the impact of the network positions and test the hypotheses.

We use metrics from social network analysis to quantify the position of the organization within the overall network and then regress these metrics on the measures for IPO success. We introduce both, dependent and independent measures in the following sections.

3.2 Measurement of IPO success

The question for measurement of IPO success is frequently discussed in literature. Usually, the success is measured by (1) capital market effects reflected in stock price development or by (2) fundamental effect reflected in financial reporting. Depending on the intended use, some authors rely on a combination of capital market and fundamental development for a holistic evaluation of the IPO success (DeGeorge & Zeckhauser, 1993).

Though, the fundamental development of IPOs is only indirectly linked to the success of the IPO consortium, we prefer the measurement based on the capital market success, i. e. the development of stock prices after 180 days / 360 days (following e. g. Bessler & Kurth, 2007; Luca & Carola, 2007).

The success is interpreted as the abnormal returns of the specific share according to the *market adjusted returns model*. The model assumes that ex ante expected returns are the same for all securities and therefore equal in any period to the expected market return in that period (Strong, 1992 p 536). We calculate the abnormal returns therefore as “Buy-and-Hold-Abnormal-Returns” (BHAR) (Ritter, 1991) separately for two time periods (180 days, 360 days) as well as including and excluding the first day returns (from offer price to first day close).

3.3 Measurement of IPO sentiment

As the market attitude for IPOs might be of high impact for the success (Ljungqvist et al., 2006) we include an index for the IPO sentiment as control variable. As survey-based sentiment indices for the German stock market are not available for the relevant period, we draw on the IPO underpricing sentiment index (Achleitner, 2006), operationalizing the general market attitude by a weighted average of the underpricing of IPOs in previous periods.

3.4 Social network analysis

Social network analysis maps relationships between agents in social networks. Such agents are often individuals, but may also be organizations or groups. Agents are usually presented as vertices and relationships as links or ties. These two parts then constitute the social network. In an undirected network, which we assume here, the degree of a vertex is defined as number of edges which interconnect. Degree is often interpreted as a form of popularity and in the context of IPOs degree centrality is thus a measure for interoperability.

As a second measure for centrality, we introduce betweenness here: In social network analysis "betweenness" measures the degree an agent lies between diverse parts of the network (Freeman 1979). It measures the extent to which a node is directly connected only to those other agents that are not directly connected to each other. We call agents with high betweenness "intermediaries" or "bridges" since they can access and pass information from different parts of the network. Betweenness is a way of indexing how "powerful" an ego is within its own neighbourhood. In the context of IPOs, a consortium bank that bridges different parts of the financial industry might give an advantage in terms of IPO success.

Another important characteristic is the clustering within a network since it is interesting to know how well vertices are interconnected within a specified part of a network. Social networks often encompass subnetworks, so called "cliques" which is a group of very well interconnected individuals or organizations. The interconnections within a clique can be measured by the clustering coefficient (Watts & Strogatz, 1998) which accounts for the relation between existing and possible connections. If a vertex has z neighbours, a maximum of z(z-1)/2 edges is possible between them. The clustering coefficient for a vertex i is then defined as the ratio of existing edges w to possible amounts of edges between the neighbours of the vertex i:

$$C_i = \frac{2 \cdot w}{z \cdot (z-1)}$$

The characteristic stated in latter equation describes how many neighbours of a user also have direct connections between them, i.e., know each other. C_i=1 therefore describes a situation in which all neighbours of i are directly interconnected.

We use the different concepts for centrality to test hypotheses H1 and H3 and the clustering coefficient for the testing of H4.

4 ANALYSIS AND RESULTS

4.1 Data

The data consists of 139 German IPOs, which were introduced at Frankfurt Stock Exchange between 1999 and 2005. Static data as well as stock prices were obtained from a major financial market data provider. For every IPO, data concerning date, subscription price, stock price development (daily closing prices) and IPO consortium are available. The stock prices were adjusted against the development of the stock market index DAX.

The expertise of lead managers as well as consortium banks were operationalized as total number of transactions and total transaction volume of all investment banking transactions (IPOs and acquisitions) from 1990-01-01 till 2005-12-31. Data were obtained from the database *Thompson Financial*. The IPO underpricing sentiment index was provided by the *Center for Entrepreneurial and Financial Studies (CEFS)* at *Technische Universität München.*

We used the data of the IPOs for building the organizational networks and applied a moving-window approach to account for changes over time. We set the length of the time window to 180 days and considered thus the inter-organizational collaboration of actors in IPOs within the last 180 days. We established an undirected link between every bank in a consortium to all the rest of the consortium banks. If a link already existed, we increased the weight of this link by 1. A link between two banks with the weight 4 therefore implies that these two banks worked together in 4 different IPOs within the time window, i. e. the last 180 days. The networks were stored in matrix format and were readable with Pajek.

Figure 1 depicts the exemplary network between banks at the 1999-11-02 which was the day of going public of the SinnerSchrader AG. We omitted the names of the banks and weights of the links in order to improve the clarity of the figure.

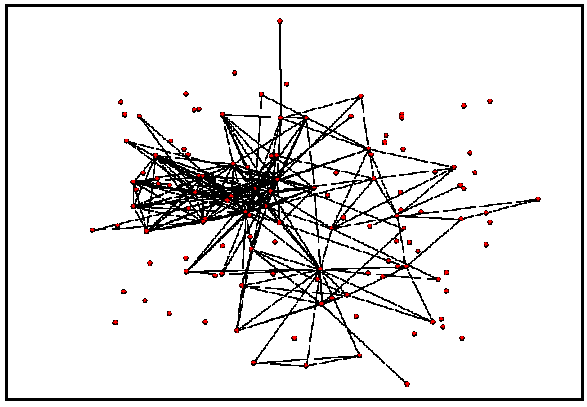

Figure 1. Network of Banks at 1999-11-02 (IPO of SinnerSchrader AG)

We then discarded all networks of IPOs before 1999-07-25 since the time window would have included times before our dataset. We generated all necessary network measures for the networks using the batch functionality of Pajek and stored them in an SPSS-file which finally allows us for testing our hypotheses.

4.2 Descriptive Results

Gathering the latter described data we obtained n=139 IPOs in the time between July 1999 and December 2005 (1999: 10.50bn EUR, 2000: 25.60bn EUR, 2001: 2.70bn EUR, 2002: 0.25 EUR, 2003: 0bn EUR, 2004: 2bn EUR, 2005: 4.7bn EUR). The majority of the IPOs were conducted in 1999 and 2000 and the number of IPOs is nearly perfectly correlated with its raised capital ($r=0.988$, $p<0.01$).

In most of the cases (n=111, 79.9%) no more than one lead manager was accountable for going public. Especially in case of large IPOs we observed more than one lead manager (two lead managers: n=25, 18%; three LM: n=2, 1.4%; four LM: n=1, 0.7%). The average number of consortium banks was 2.237 with a high standard deviation of 2.238 due to some IPOs with more than 10 consortium banks.

We operationalize the development of the stock prices after 180 days / 360 days compared to the price of issue (BHAR_Incl_FirstDayReturns) and compared to the closing price at the day of the first listing (BHAR_Excl_FirstDayReturns) as success measure. Unfortunately some of the data was missing in our data set. Table 1 depicts some descriptive data on our success measure.

This descriptive data shows that the abnormal returns heavily depend on the market reaction at the first day. On average the investments had abnormal returns of +272% (360days: +105%) including first day returns but had on average negative abnormal returns (180days: -20.77%; 360days: -33.07%) when we exclude the first day returns.

	N	Minimum	Maximum	Mean	Standard. Dev.
BHAR_Incl_FirstDayReturns180	133	-1.05	318.17	2.7267	27.59285
BHAR_Incl_FirstDayReturns360	139	-.97	152.71	1.0585	12.98273
BHAR_Excl_FirstDayReturns180	100	-.77	1.92	-.2077	.40850
BHAR_Excl_FirstDayReturns360	105	-.79	1.15	-.3307	.39841

Table 1. Variance of Different Success Measures

Also note that the data in Table 1 is not controlled for the environmental sentiment and therefore solely provides a rough overview of the performance and heavily depends on the sentiment of the market.

To deal with the crash and the significant change in the number of IPOs after 2000, moving time windows would not be sufficient anymore and it would take more sophisticated modelling of the networks which is out of scope of this paper. Thus, we exclude all cases after the crash in September 2000 and focus on the cases with one lead manager and finally end up with n=84. Moreover, we focus on the abnormal returns including first day returns and omit the discussion of abnormal return excluding first day returns.

4.3 Test of Hypotheses

The centrality in social networks can be measured using different measures. We focus on two measures of centrality that are widely used in network analysis: degree centrality and betweenness. We check the bivariate correlations between these measures and our two measures for IPO success and list these correlations in Table 2.

	Degree	Betweenness
BHAR_Incl_FirstDayReturns180	-0.094	-0.071
BHAR_Incl_FirstDayReturns360	-0.086	-0.069

Table 2. Correlations between Success Measures and Centrality Measures of Lead Manager

The sign of the parameters indicates that a lead manager who is not central in the networks of banks might be more successful. However, we do not find any significant correlation for this counterintuitive finding. Additional regression models do not find any statistically significant influence either so this finding is rather unstable or the influence of the lead manager is thus still open to further examinations.

To test H2 we conduct a regression analysis with the number of consortium banks as independent variable and the performance as dependent variables. Table 3 illustrates that the number of consortium banks has a positive effect on the performance of the stock after the IPO. This model explains a reasonable fraction of the variation in the data and the influence of the number of consortium banks is getting weaker in a longer period. This model has thereby high face validity and the significant results *support our hypothesis H2*. We also controlled for the influence of the underpricing sentiment which was not significant. We thus eliminated the variable to have a parsimonious model.

In H3 we hypothesize that the average centrality of the consortium banks positively influences the success of the IPO. We find positive correlation for the degree centrality as expected while the sign for the betweenness measure is negative (see Table 4). However, again we have to be careful since all correlations are not significant. It thus seems that centrality of the consortium banks does not have an influence on the IPO success.

	Constant	Number of Consortium Banks	R^2
BHAR_Incl_FirstDayReturns180	-13.659	10.174**	7.3%
BHAR_Incl_FirstDayReturns360	-6.558***	4.668**	5.7%

*Table 3. Influence of Number of Consortium Banks on Performance (*** p<0.1, **p<0.05)*

	Degree	Betweenness
BHAR_Incl_FirstDayReturns180	0.084	-0.056
BHAR_Incl_FirstDayReturns360	0.079	-0.056

Table 4. Correlations between Success Measures and Average Centrality Measures of Consortium Banks

Since this work aims at finding evidence for the influence of inter-organizational collaboration on success, we now evaluate H4 in detail. We examine the clustering coefficient that quantifies how well connected the neighbours of a node in a graph are. A clustering coefficient of 1 describes a situation in which all neighbours are directly connected. Highly connected cliques that can be identified by a high clustering coefficient tend to have better local cooperation (in our context inter-organizational cooperation) and these strong links are important for fostering cooperation (overcoming the prisoners' dilemma) and coordination (Chwe, 2000). Therefore we hypothesised that well-clustered bank consortiums should be more successful in terms of IPO success than banks that are not used to work together. One could also argue that the clustering is positively correlated with the number or volume of previous IPOs. We therefore also use the number of previous managed transactions as additional variable.

	Constant	Avg. Clustering Coefficient Amongst Consortium Banks	Avg. Number of Previous IPOs	R^2
BHAR_Incl_FirstDayReturns180	-2.537	99.068**	0.001	3.4%
BHAR_Incl_FirstDayReturns360	-1.560	45.447**	0.001	3.1%

*Table 5. Influence of Clustering Amongst Consortium Banks on Performance (** p<0.05)*

Table 5 shows that the performance of the issued stocks depends on the average clustering amongst the consortium banks *supporting our hypothesis H4*. We also see that experience operationalized by the average number of previously managed IPOs is insignificant. These findings are stable even if we replace the number of previous IPOs with the volume of previously managed IPOs. Further, we test whether this effect is due to the size of the clique and include the number of consortium banks as control variable. The effect of the clustering coefficient is still positive and significant ($p<0.1$) on both, BHAR_Incl_FirstDayReturns180 and BHAR_Incl_FirstDayReturns360.

Thus, this finding is first evidence that repeated inter-organizational cooperation operationalized as network measure improves the inter-organizational effectiveness. We think that is a very interesting concept which should be researched in other contexts as well.

Although we found support for H2 and H4, it is not clear whether we can find support for H5 since an increasing number of agents in a clique makes dense clustered sub networks more unlikely and thus a negative correlation between clustering coefficient and the number of agents in the clique has been observed. We, however, find *support for H5*. The absolute number of ties between the consortium banks is a highly significant ($p<0.01$) driver for the success of the IPO. This indicates that repeated inter-organizational cooperation increases the effectiveness and finally the probability of reaching the shared goal.

Since the network measures are correlated above the critical value of 0.4 ($p<0.01$) and multicollinearity makes it difficult to assess the effect of the independent variables on the dependent variable, we omit further regression analyses with more than one explaining network measure.

5 DISCUSSION

In this paper we examined the influence of repeated collaboration of autonomous organizations on a shared goal, in our case the success of an IPO which typically exemplifies problems of social relationship interdependencies in inter-organizational collaboration and accompanying conflicts. We collected data from different sources and constructed networks where repeated collaborations reinforced the relationship between two organizations. We use these networks as independent variables explaining the success of the IPO measured as the abnormal returns of the issued shares (in line previous research). We also control for broker's transaction experience as well as the market sentiment. Although we did not find statistically significant support for the impact of the social positions in terms of centrality for neither the lead manager nor the consortium banks, we see that the clustering among the consortium bank is a significant driver for IPO success. The higher the clustering amongst the collaborating consortium banks the higher the abnormal returns of the issued share.

Our study has several limitations which can be avenues for further research: the study focussed on stocks in a German setting, where the market was driven by fast-growing technology companies which were often unknown to the public before the IPO. Therefore, IPOs could benefit strongly from the social network and reputation of the consortium banks. This might be different with other types of transactions like buy-outs of well-established corporations – and is therefore of particular interest for a comparative study. On the other hand, we see that the frequency of IPOs varies over the years with occasional accumulations. A data base consisting of several decades of transactions would allow for an (even more stable) long-term evaluation of the impact of network structures.

We hold that this paper thus contributes in two different areas: Firstly, this is an initial evidence for the influence of network structure on IPO success. We, thereby find support for Galbraith's conclusions that the selection of network partners is regarded as crucial in any networked organization (Galbraith, 1998 p 86). For an IPO, the company itself or its lead manager should thus pick consortium banks that have worked together as often as possible. The build-up of the consortium has a significant impact on the success of the IPO. Considering the high volumes of raised capital, even small changes in the build-up of the consortium could have notable impact in terms of performance. Generally, our findings indicate that repeated collaboration amongst the agents in an inter-organizational setting significantly improves the effectiveness and the propensity to reach the shared goal. Our combination of social network analysis and regression models allows for a straightforward operationalization and quantification of this cause-effect relationship.

Secondly, the construction of networks from collaboration data, here data from previous IPOs, might be useful for other contexts as well. After the construction of networks, network metrics can easily be calculated and can then be used as dependent or independent variable. This approach might help to shed light on various questions in the domain of inter-organizational collaboration.

References

Achleitner, A.-K. (2006) The IPO sentiment indicator: An innovative method for forecasting IPO activity while allowing for the underpricing effect. In *Annual report of the swiss stock exchange group 2006*.

Ackermann, F., Franco, L. A., Gallupe, B. and Parent, M. (2005) GSS for multi-organizational collaboration: Reflections on process and content. *Group Decision and Negotiation* 14 (4), 307-332.

Arias, J. T. G. (1995) Do networks really foster innovation? *Management Decision* 33 (9), 52.

Baker, W. E. (1984) The social structure of a national securities market. *American Journal of Sociology* 89, 775-811.
Baker, W. E. (1990) Market networks and corporate behavior. *American Journal of Sociology* 96 (3), 589.
Bakos, J. Y. and Treacy, M. E. (1986) Information technology and corporate strategy: A research perspective. *MIS Quarterly* 10 (2), 106.
Bessler, W. and Kurth, A. (2007) Agency problems and the performance of venture-backed ipos in germany: Exit strategies, lock-up periods, and bank ownership. *European Journal of Finance* 13 (1), 29-63.
Bignoux, S. (2006) Short-term strategic alliances: A social exchange perspective. *Management Decision* 44 (5), 615-627.
Brau, J. C. and Fawcett, S. E. (2006) Initial public offerings: An analysis of theory and practice. *Journal of Finance* 61 (1), 399-436.
Carter, R. B., Dark, F. H. and Singh, A. K. (1998) Underwriter reputation, initial returns, and the long-run performance of IPO stocks. *Journal of Finance* 53 (1), 285-311.
Chua, W. F. (1986) Radical developments in accounting thought. *Accounting Review* 61 (4), 601.
Chwe, M. S.-Y. (2000) Communication and coordination in social networks. *Review of Economic Studies* 67 (230), 1-16.
Coleman, J. S. (2000) *Foundations of social theory.* Belknap Press, Cambridge
Corwin, S. A. and Schultz, P. (2005) The role of IPO underwriting syndicates: Pricing, information production, and underwriter competition. *Journal of Finance* 60 (1), 443-486.
Degeorge, F. and Zeckhauser, R. (1993) The reverse LBO decision and firm performance: Theory and evidence. *Journal of Finance* 48 (4), 1323-1348.
Dyer, J. H. and Singh, H. (1998) The relational view: Cooperative strategy and sources of interorganizational competitive advantage. *Academy of Management Review* 23 (4), 660-679.
Fischer, H. M. and Pollock, T. G. (2004) Effects of social capital and power on surviving transformational change: The case of initial public offerings. *Academy of Management Journal* 47 (4), 463-481.
Galbraith, J. R. (1998) Designing the networked organization. In *Tomorrow's organization : Crafting winning capabilities in a dynamic world* (Mohrman, S. A. and Galbraith, J. R. and Lawler, E. E., Eds), pp 76-102, Jossey-Bass, San Francisco.
Granovetter, M. (1985) Economic action and social structure: The problem of embeddedness. *American Journal of Sociology* 91 (3), 481-510.
Gulati, R. (1998) Alliances and networks. *Strategic Management Journal* 19 (4), 293.
Gulati, R. and Higgins, M. C. (2003) Which ties matter when? The contingent effects of interorganizational partnerships on ipo success. *Strategic Management Journal* 24 (2), 127.
Gulati, R., Nohria, N. and Zaheer, A. (2000) Strategic networks. *Strategic Management Journal* 21 (3), 203-216.
Gulati, R. and Westphal, J. D. (1999) Cooperative or controlling? The effects of CEO-board relations and the content of interlocks on the formation of joint ventures. *Administrative Science Quarterly* 44 (3), 473-506.
Håkansson, H. (1987) *Industrial technological development : A network approach.* Croom Helm, London ; Dover, N.H.
Håkansson, H. and Ostberg, C. (1975) Industrial marketing: An organizational problem? *Industrial Marketing Management* 4 (2/3), 113-123.
Hardy, C., Phillips, E. and Lawrence, T. B. (2003) Resources, knowledge and influence: The organizational effects of interorganizational collaboration. *Journal of Management Studies* 40 (2), 321-347.
Homans, G. C. (1974) *Social behavior : Its elementary forms.* Harcourt, New York.
Kumar, K. and Van Dissel, H. G. (1996) Sustainable collaboration: Managing conflict and cooperation in interorganizational systems. *MIS Quarterly* 20 (3), 279-300.
Larson, A. (1992) Network dyads in entrepreneurial settings: A study of the governance of exchange relationships. *Administrative Science Quarterly* 37 (1), 76-104.

Ljungqvist, A., Nanda, V. and Singh, R. (2006) Hot markets, investor sentiment, and ipo pricing. *Journal of Business* 79 (4), 1667-1702.
Luca, B. and Carola, S. (2007) Conflict of interest and certification in the U.S. IPO market. *Working Paper Series*, Federal Reserve Bank of Chicago.
Mäkipää, M. (2006) Inter-organizational information systems in cooperative inter-organizational relationships: Study of the factors influencing to success. In *Project e-society: Building bricks* (Suomi, R., Ed), pp 68-81, Springer, Boston.
Marco, B. and Umit, S. B. (2006) Collaborative performance management: Present gaps and future research. *International Journal of Productivity & Performance Management* 55 (1), 7-25.
Mattessich, P. W., Murray-Close, M. and Monsey, B. R. (2001) *Collaboration -- what makes it work.* Amherst H. Wilder Foundation, Saint Paul, Minn.
Melville, N., Kraemer, K. and Gurbaxani, V. (2004) Review: Information technology and organizational performance: An integrative model of it business value. *MIS Quarterly* 28 (2), 283-322.
Miles, R. E. and Snow, C. C. (1986) Organizations: New concepts for new forms. *California Management Review* 28 (3), 62.
Orlikowski, W. J. and Barley, S. R. (2001) Technology and institutions: What can research on information technology and research on organizations learn from each other? *MIS Quarterly* 25 (2), 145-165.
Orlikowski, W. J. and Baroudi, J. J. (1991) Studying information technology in organizations: Research approaches and assumptions. *Information Systems Research* 2 (1), 1-28.
Pfeffer, J. and Salancik, G. R. (2003) *The external control of organizations : A resource dependence perspective.* Stanford Business Books, Stanford.
Pollock, T. G., Porac, J. F. and Wade, J. B. (2004) Constructing deal networks: Brokers as network "Architects" In the U.S. IPO market and other examples. *Academy of Management Review* 29 (1), 50-72.
Poulin, R., Boily, M. C. and Mâsse, B. R. (2000) Dynamical systems to define centrality in social networks. *Social Networks* 22 (3), 187-220.
Provan, K. G. and Milward, H. B. (1995) A preliminary theory of interorganizational network effectiveness: A comparative study of four community mental health systems. *Administrative Science Quarterly* 40 (1), 1-33.
Ritter, J. R. (1991) The long-run performance of initial public offerings. *Journal of Finance* 46 (1), 3-27.
Ritter, T. and Gemünden, H. G. (2003) Network competence: Its impact on innovation success and its antecedents. *Journal of Business Research* 56 (9), 745.
Scott, W. R. (2003) *Organizations : Rational, natural, and open systems.* Prentice-Hall, Englewood Cliffs.
Strong, N. (1992) Modelling abnormal returns: A review article. *Journal of Business Finance & Accounting* 19 (4), 533-553.
Stuart, T. E., Ha, H. and Hybels, R. C. (1999) Interorganizational endorsements and the performance of entrepreneurial ventures. *Administrative Science Quarterly* 44 (2), 315-349.
Sydow, J. (2004) Network development by means of network evaluation? Explorative insights from a case in the financial services industry. *Human Relations* 57 (2), 201-220.
Uzzi, B. (1996) The sources and consequences of embeddedness for the economic performance of organizations: The network effect. *American Sociological Review* 61 (4), 674-698.
Wang, H., Du, Z., Wu, L., Zhu, S. and Shang, E. (2006) A market-oriented model for grid service management. In *Advances in grid and pervasive computing*, pp 137-146.
Watts, D. J. and Strogatz, S. H. (1998) Collective dynamics of 'small-world' networks. *Nature* 393 (6684), 440-442.
Windeler, A. and Sydow, J. (2001) Project networks and changing industry practices -- collaborative content production in the german television industry. *Organization Studies* 22 (6), 1035.
Zack, M. H. (2000) Researching organizational systems using social network analysis. *Proceedings of the 33rd Hawaii International Conference on System Sciences*, IEEE Computer Society.