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NETWORKS AS PIPES AND PRISMS OF THE CEO: EFFECTS OF INDIVIDUAL NETWORKS OF NEWLY APPOINTED CEOs ON FIRM PERFORMANCE

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ABSTRACT

While much of the academic literature expresses scepticism about managers' direct influence on the performance of their firms, recent literature suggests that visible, celebrated and well-connected chief executive officers (CEOs) may even be stimulated to hurt their companies. To address these claims, the study examined the relationship between the individual networks of newly appointed CEOs of large corporations and the subsequent performance of these firms. Building on the conception of networks as pipes and prisms and the idea that networks of organizational members may have organizational consequences, the performance implications of two dimensions of individual networks of incoming CEOs: density of networks of ties to board members of public and private companies, and CEO prominence are addressed. The study found that network density is inconsequential for performance, while CEO prominence has negative effect on firm's stock market performance. In addition, the findings showed that large individual networks may be a mixed blessing: they are associated with positive operating performance of firms, yet contribute to a discount of the firm's stock price if the incoming CEO built them predominantly through memberships on corporate boards.
Keywords: *CEO; Individual networks; Firm performance*

1. Introduction

In this study the social networks perspective is applied to contribute to the understanding of the antecedents of chief executive officer (CEO) impact on firm performance. By doing that the paper is addressing the gap in the literature on CEO influence on organizational outcomes. Rather than studying the relationship between CEO characteristics and firm actions the study is directly addressing the relationship between CEO characteristics and firm performance. The literature on the relationship between CEOs and their firms reports that there is little evidence that CEOs directly impact performance of their firms. It may indeed be the case, as Meindl, Ehrlich, & Dukerich (1985) have noted, that leaders do not really have a direct impact on the fortunes of their organizations, but rather indirect impact by giving the followers a sense that someone is in charge. However, the social networks literature, a perspective little used in the study of CEOs, suggests that visible affiliations with visible parties have a direct influence on performance of actors, by the virtue of reduced uncertainty. It therefore seems viable to examine whether such effects are present also in the context of newly appointed CEOs. Furthermore, social networks perspective suggests that density of egocentric networks may contribute to the resolution of egocentric uncertainty faced by the actor (Podolny, 2001), so an examination of the relationship between density of individual networks of incoming CEOs and firm performance is included in the analysis. In addition to addressing the gap in the literature on CEOs the study also observe the comments made by Ibarra, Kilduff, & Tsai (2005) and Brass, Galaskiewicz, Greve, & Tsai (2004) who called for more emphasis on the cross-level social networks research. As much as outcomes at the individual level (such as job satisfaction, intention to leave etc.) may in part depend on the patterns of relationships in which their organizations are embedded, so can organizational outcomes partly depend on the relationships in which their members are embedded. Since CEOs are generally the most visible and powerful individuals in the organizations, study of the impact of their networks on their organizations may provide some interesting insights on the interrelatedness of different dimensions of networks and organizational outcomes.

Recent literature has addressed a number of antecedents of CEO activity and their impact on organizational strategies and outcomes. Micro line of research has examined how CEO personality impacts the composition of the top management team (Kaplan, Klebanov & Sorensen, 2012; Peterson, Smith, Martorana, & Owens, 2003) and how the level of CEO narcissism impacts the likelihood of CEOs taking dramatic, visible action (Chatterjee & Hambrick, 2007). The implications of this literature are that individual CEOs are disposed towards certain courses of action of their companies, will tend to persist with these courses of actions and mobilize support of their management team so that these actions are actually carried out. A related line of research has examined CEO hubris. Hayward & Hambrick (1997) have shown that CEO hubris, which they conceived of as a state of extreme confidence triggered by a combination of external stimuli and internal disposition, is highly associated with premiums paid for large acquisitions. One of the elements they considered as constituent of CEO hubris, media praise for the CEO, has been expanded upon in the literature on CEO celebrity. The notion of this literature is that the perception of the influence CEOs have on the actions of their companies gets developed on the basis of the reports about these actions. Hayward, Rindova, & Pollock (2004) developed a theoretical model that suggests that journalists will tend to celebrate CEOs whose firms take actions that are distinctive and consistent. Furthermore, due to the time and cognitive constraints, journalists will tend to ascribe such actions to the dispositions of CEOs rather than to situational factors. Such attributions may lead to belief on the part of some CEOs that they are celebrities, which will induce them to take actions which will foster their celebrity status, yet potentially be problematic for their firms.

Expanding on the notion of the evaluative role played by the media and building off the concept of certification (Rao, 1994) Wade, Porac, Pollock, & Graffin (2006) studied how media recognition of certain CEOs as "certified" impacts CEO performance (in the terms of compensation) and firm performance. They found that certification created both a blessing and a burden of celebrity for CEOs, as the certified CEOs received higher compensation than the non-certified when firm performance was high but lower compensation when the performance was low. The long-term impact of the certified CEOs on firm performance was found to be negative. Jointly this literature therefore suggests that visibility and celebration of CEOs will tend to have negative consequences for their firms, however it provides more evidence for the impact on firm strategy than on firm performance.

In contrast, social networks research suggests that prominence will generally have positive consequences. Prominent, high status actors enjoy performance enhancing benefits such as reduced costs (Podolny, 1993), or in the case of individuals, affiliation with prominent individuals confers on the focal actors reputation benefits (Kilduff & Krackhardt, 1994). Prominence benefits are especially strong in the entrepreneurial setting. As this is a setting where the uncertainty about the quality of the new firms and the individuals forming them is substantial, relevance of signals such as prominence of founders' prior employers is especially high. Burton, Sorenson, & Beckman (2002) focused on where the experience of founders comes from rather than what that experience is, and found that firms with founders affiliated with more prominent past employers were better able to pursue more innovative strategies and obtain external financing. Higgins & Gulati (2003) provided evidence that biotech start-ups whose founders have been affiliated with prominent organizations were more likely to obtain the endorsement of a prestigious investment bank (which has been shown to be one of the key factors in the success of initial public offerings (IPOs), Stuart, Hoang, & Hybels (1999)). In an elaboration of that theme Higgins & Gulati (2006) found that investor decisions at the time of the IPO were affected by the affiliations of top management with prominent organizations, however that these effects were not mediated by the prestige of the underwriter. These results suggest that there may be a direct relationship between individual prominence of top managers, as based on the prominence of past affiliates, and organizational outcomes. In this paper we examine this idea in the context of CEO succession. The paper argues that appointment of a new CEO is a situation not unlike IPO of a start-up. Both contexts entail a certain level of altercentric uncertainty, i.e. uncertainty on the part of the evaluators of the viability of the enterprise under the focal leadership. We suggest that as in the case of entrepreneurial ventures the evaluators (investors) will base at least a part of the evaluation of the likely future firm performance on the prominence of the new CEO. As Burton et al. (2002), Higgins et al. (2003) and Higgins et al. (2006), the paper considers prominence of the incoming CEO as deriving from prominence of organizations he has been affiliated with in the course of his career.

The paper also argues that the newly appointed CEOs find themselves in a situation high on egocentric uncertainty, i.e. uncertainty about what are the appropriate courses of action in this new position. The way in which this uncertainty will be resolved will likely have consequences for firm strategies and organizational outcomes. Firms with networks rich in structural holes perform better in the context of egocentric uncertainty (Podolny, 2001). At the individual level, the individuals with networks rich in structural holes will be at a higher risk of encountering good ideas (Burt, 2004). Social networks also play a role in individual creativity: weak ties contribute to creativity, and a certain degree of ties outside of one's organization is beneficial when an individual finds himself at the centre of the existing organization (Perry-Smith, 2006). Configuration of the incoming CEOs' individual networks may therefore have implications for the effectiveness with which they will resolve their egocentric uncertainty. The paper suggests that the effectiveness of resolution of CEO's egocentric uncertainty will, in turn, have consequences for firm performance.

To address these issues we analyzed performance of S&P500 firms who have appointed a new CEO during the period January 1998-December 2003. We tracked both their stock market performance and operating performance during the two year period after the appointment, and pitted performance against CEO prominence and density of individual network at the time of the appointment. To construct the two independent variables of interest we used data provided by London-based private company BoardEx that specializes in collecting publicly available data on board members and senior managers of quoted firms in the United States, United Kingdom and Europe. We conducted an empirical analysis to test the competing predictions of the CEO celebrity/hubris and social networks literatures about the likely impact of CEO prominence on the firm's subsequent stock market performance. We also tested whether density of the individual networks of CEOs has implications for firm operational performance.

2. Literature Review

The fundamental premise of the contemporary research on social networks is that networks serve both as "pipes" and "prisms" of the market (Podolny, 2001). The "pipes" aspect refers to the property of networks to serve as the channels through which both information on exchange opportunities, as well as actual goods, such as products, services and materials, flow. This view has been adopted in the well-known studies on job search (Granovetter, 1973), information sharing between apparel manufacturers (Uzzi, 1996) and the diffusion of corporate practices (Davis, 1991). Burt (1992) has refined the view that the amount and the quality of information and goods that flow through the networks will depend on the strength of the ties, and introduced the notion of the bridging ties. He suggested that in a particular tie configuration, where two actors are both tied to a third actor, yet are not tied to each other, the flow of the information and goods through the network will be controlled by the third actor (the "broker"). The position in the network will enable a broker to reap the informational benefits, in the sense of timely and more diverse access to information than for non-brokers, and control benefits, in the sense of power arising from the potential for playing the unconnected actors off each other. The "prisms" aspect is a more novel perspective in the literature and refers to the idea that the presence (or absence) of a tie between two actors can function as an informational cue on which the observers can make inferences on the underlying quality of the two actors (Podolny, 2001). This view has been adopted in the studies of venture capital investing (Podolny, 2001), antecedents of success in initial public offerings (IPOs) (Stuart, Hoang, & Hybels, 1999), and investment bank underwriting (Podolny, 1993). These studies examined the impact of patterns of affiliations on organizational outcomes, using an underlying premise the that actors affiliated with prominent actors will be seen as legitimate or prominent themselves. They have shown that prominence transfer indeed occurs, and it results in performance benefits for the parties affiliated with prominent actors.

The informational effects of networks arise in the conditions of uncertainty. In the absence of uncertainty and incomplete information brokers would not be able to perform their role as the brokered parties would be equally well informed. Information obtained from the contacts linked through strong ties also wouldn't differ much from the information obtained from the contacts linked through weak ties. Yet uncertainty is an inherent feature of organizational life, and configurations of networks play a role in the search for and transfer of information (Hansen, 1999). Podolny (2001) pointed to another element that impacts the relative importance of the different facets of networks. He introduced the distinction between egocentric and altercentric uncertainty. Egocentric uncertainty refers to the focal actor's lack of knowledge on what kind of actions to take to most effectively convert a set of inputs into outputs. The lack of knowledge in a given situation may stem from the actor's lack of experience in such or similar situations, from the complexity of the situation itself, or from the combination of both. Altercentric uncertainty, on the other hand, refers to the uncertainty on the part of the observers of the focal actor on the latter's quality. Also altercentric uncertainty may stem from different sources; it may arise from the observers' lack of familiarity with the focal actor,

from obscurity of plausible evidence on the quality of the actor, from the inherent unavailability of such evidence, or some combination of the factors. The key distinctive characteristic of egocentric and altercentric uncertainty is who is uncertain; in the case of egocentric uncertainty the emphasis is on the focal actor, while in the case of altercentric uncertainty the focus is on the relevant observers of the focal actor. Based on the description of the "pipes" and "prisms" dimensions of the networks we can make connections of the two dimensions to egocentric and altercentric uncertainty. Feature of the network that will be salient to the focal actor is what actually flows in the network he is a part of. The focal actor will therefore likely direct his efforts to using his network position to obtain the information that would help him resolve the egocentric uncertainty, i.e. obtain the information that will help him better understand how to convert a set of given inputs into outputs. On the other hand, feature that will be salient to the observers is who is connected to whom in the network; actual flow between the network actors will likely be less salient to the observers, as many forms of flows (e.g. personal communication) are not visible or recorded. It is therefore feasible that observers will direct their efforts towards obtaining the information on who is connected to whom to infer the quality of the connected (or disconnected) actors. The primary value of networks for focal actors will therefore be in the reduction of egocentric uncertainty, while for observers it will be in the reduction of altercentric uncertainty.

Let's recall that egocentric uncertainty is the focal actor's lack of knowledge on how to best convert a given set of inputs into the required outputs. Egocentric uncertainty will therefore be reduced with the acquisition of the relevant knowledge. One of the ways of obtaining this knowledge is to source it from the connected actors (immediate egocentric network). As per Burt's (1992) arguments, the actors that will be more likely to obtain the relevant information in the timely manner will be the ones connected to other actors who are themselves not connected. The underlying logic is the one of information redundancy; actors who are connected to one another will likely possess the same information (high information redundancy). An actor that is connected to the actors who are themselves not connected to one another will be more likely to obtain non-redundant information, either by the virtue of his structural position or by the active exercising of power arising from this position (e.g. extracting information from one party by offering the information obtained from the other party). To the extent that non-redundant information contributes more to the existing knowledge than redundant information, actors with the networks spanning more structural holes will be able to more quickly and more effectively reduce their egocentric uncertainty. Altercentric uncertainty, on the other hand, is uncertainty on the part of the observers of the focal actor on the latter's quality. As mentioned, quality can be difficult to observe directly, yet is important for the observers when they are considering transactions with the focal actor (such as buying the firm's stock). Altercentric uncertainty will be reduced with the increased saliency of the cues on which observers can base their evaluations. Networks provide one of such cues as observers can see who is connected (or not connected) to whom. Identity of affiliates is important; if an actor is connected to visible affiliates, then this will make the actor more visible as well. At the same time, to the extent that observers positively value the prominent actor, under the condition of altercentric uncertainty his affiliates will also more likely be evaluated positively. The underlying logic is that the positively evaluated prominent actors have superior evaluative capabilities themselves, and affiliate only with actors who they deem good enough (Stuart et al., 1999). In an effort to reduce altercentric uncertainty, observers will therefore direct attention towards the pattern of connections of the focal actor, and will deem him prominent if he will be affiliated with the prominent actors. Furthermore, he will likely be evaluated favourably if his affiliates are evaluated favourably.

Podolny (2001) tested these arguments in the context of venture capital industry. Venture capital firms that have in the course of their investing obtained a number of structural holes invested a greater proportion of their total investments in the early stages of start-up financing. Conversely, venture capital firms that have

obtained a network of ties to prominent co-investors invested a greater proportion of their total investments in the later stages of start-up financing. In the language introduced before, the first group of venture capital firms reduced their own uncertainty about how to invest efficiently in the start-ups who were in the early stages of their fund-raising efforts. The second group of venture capital firms, on the other hand, due to their track record of co-investing with prominent partners, enjoyed the benefit of their prominence in the form of being able to choose the firms to invest in; in other words, higher prominence of the second group enabled these firms to choose to invest only in start-ups that have already proven themselves to be good investments – the fact that these start-ups accepted the investment by these venture capital firms attests to the reduced altercentric uncertainty on the part of the relevant observers (start-ups) about the quality of the focal actors (venture capital firms). This study is one of the few that simultaneously consider how different dimensions of networks can affect behaviour and performance of actors, by the virtue of reduction in egocentric and altercentric uncertainty. Whereas the level of the analysis in Podolny's study was organizational, I suggest that described network effects may operate also in the cross-level context of the relationship between individual networks of newly appointed CEOs and subsequent firm performance.

In order to set up hypotheses on the basis of the networks as "pipes" and "prisms" of the market metaphor we first need to establish that the appointment of a new CEO is a situation high in both egocentric and altercentric uncertainty. Even though we lack a systematic examination of the egocentric uncertainty surrounding the appointment of a new CEO, anecdotal evidence suggests that this is the case. Porter, Lorsch, & Nohria (2004) presented accounts of difficulties newly appointed CEOs found in understanding the implications and limitations of their jobs. As one of the limitations the authors discussed the difficulty for a CEO to know what is really going on in his organization, as people tend to filter information in order to protect themselves in front of the leader. This suggests that CEOs will be limited in the amount of egocentric uncertainty resolving information they can obtain from within their organization. On the other hand, authors mention that many CEOs found that unbiased information, especially related to a CEO's thinking on strategic direction, could be obtained from the sources outside of the organization. One such source is individuals to which a CEO has been linked in the course of his career and who have at some point served on a board of a public company. Such individuals can help resolve newly appointed CEOs' egocentric uncertainty by providing unbiased and unfiltered information and advice, as well as a critical check on the CEO's thinking. They are also knowledgeable on the matters that are relevant to the CEO as they have observed other CEOs first-hand, approved and disapproved their decisions etc. The extent to which these individuals will be able to contribute to the reduction of CEO's egocentric uncertainty will be influenced by the scope of the non-redundant information they will be in a position to provide. A CEO will obtain less redundant information if the board members he has been linked to in the course of his career have not been linked to one another. Higher number of structural holes in a newly appointed CEO's individual network at the time of the appointment should therefore enable the CEO to better resolve his egocentric uncertainty and adopt courses of action which will result in positive firm performance. In the form of a hypothesis:

> *Hypothesis 1: Number of structural holes in the individual network of a newly appointed CEO is positively related to the subsequent firm performance.*

It can be assumed that the extent to which a CEO will be able to resolve egocentric uncertainty will depend on the number of structural holes in his individual network, however there are other influences. One of them is the experience gained in the new position; with the passage of time the newly appointed CEO will obtain experience which will help him resolve egocentric uncertainty. With lower egocentric uncertainty the influence of structural holes in the CEO's individual network on firm performance will tend to diminish; I hypothesise:

Hypothesis 1a: Strength of the positive relationship between the number of structural holes in the individual network of a newly appointed CEO and firm performance will decrease in time.

While egocentric uncertainty of the newly appointed CEOs refers to their own lack of knowledge on what actions to take and what courses of strategic direction to adopt altercentric uncertainty refers to the uncertainty of observers on the viability of the firm under the new leadership. As in the case of egocentric uncertainty evidence on altercentric uncertainty surrounding the appointment of a new CEO is scarce and largely anecdotal. Khurana (2002) wrote how boards are sometimes induced into hiring a CEO that is seen as "charismatic" by the investor community. Even though in such cases board members sometimes privately admit that they would rather go with someone else, by hiring a stock market's favourite they openly acknowledge the increasing importance of the stock market participants as the evaluators of the corporations and their leaders. In a more general sense, Khurana described how we're witnessing a transition from the managerial capitalism of the second part of the 20th century to the investor capitalism of the 21st century. This transition includes the intensifying pressures on CEOs to take into the account the requirements of the investment community. These developments suggest that it is appropriate to consider stock market participants as the relevant observers in the context of the appointment of the new CEOs. At the same time, as indicated by Khurana's discussion of the rise of "the charismatic CEO", we see that stock market participants tend to put a rather substantial emphasis on the prominence of the newly appointed CEOs. As the preceding theoretical discussion suggests, they value CEO prominence because it reduces their altercentric uncertainty. Higgins et al. (2006) have shown that higher prominence of the founders of start-ups led to the more positive evaluations by the investors. We test this relationship in the context of the appointment of a new CEO, and hypothesise that higher prominence of a newly appointed CEO will be positively related to subsequent firm performance:

Hypothesis 2a: Prominence of a newly appointed CEO is positively related with the subsequent firm stock market performance.

However, on the basis of the introductory discussion we can conceive of an alternative hypothesis. Celebrated CEOs may be inclined to take actions that will fortify their celebrity status, however may be problematic for their firms (Hayward et al., 2004). It is possible that stock market participants would expect that the more prominent incoming CEOs will more likely be celebrated once they assume their position, and eventually behave in a "celebrity" manner, at the expense of their firms. Stock market participants could therefore discount the firm's stock, in the expectation of the negative consequences of actions taken by the celebrated prominent CEOs:

Hypothesis 2b: Prominence of a newly appointed CEO is negatively related with the subsequent firm stock market performance.

As in the case of egocentric uncertainty we expect the effect of altercentric uncertainty to diminish in time. With the passage of time stock market participants will have more information on which to base their evaluations of the firm viability under the new CEO, which will reduce their altercentric uncertainty. I therefore hypothesise:

Hypothesis 2c: Strength of relationship between prominence of a newly appointed CEO and firm performance will decrease in time.

3. Methods

The sample was selected from companies who have been included in the Standard & Poor's 500 (S&P500) index throughout the period 1998-2003. We have focused on the members of the S&P500 index in order to study companies who have been under the intense scrutiny of stock market participants. As laid out in the previous section, in order for signals such as prominence of a newly appointed CEO to carry relevance, they need to be attended to by the relevant observers, and since stock market participants direct a high level of attention to the members of the S&P500 index, this condition is likely to be met. We chose to study companies who have been the members of the index throughout the period in order to control for likely reduced stock market attention that would arise if a firm is removed from the index. The sample includes all members of the S&P500 index that have appointed a new CEO in the period between January 1998 and December 2003. We tracked both stock market performance and accounting performance of each firm that appointed a new CEO for two years after the appointment. The two-year period after the appointment was selected to enable testing of the hypotheses on the declining impact of egocentric and altercentric uncertainty in time. Two years is a short period for observation of the changes in the impact of a phenomenon, yet it is feasible that both types of uncertainty get resolved rather quickly, and the difference in the residual uncertainty at the end of the first year and at the end of the second year of a CEO's tenure may be substantial. The upper bound of the time interval (December 2003) was selected to ensure that there were two years of performance data available. The lower bound of the interval (January 1998) was selected for two reasons: first, to include both firms that have appointed a new CEO before the dot-com bubble burst (the first half of 2000) and after it, and second, to include enough observations for a statistical analysis. We excluded from the sample firms whose newly appointed CEO was in that position for less than two years. We didn't exclude firms who have appointed more than one CEO in the period of study. As each incoming CEO had a different individual network at the time of the appointment I treated these observations as independent. The described procedure yielded 201 firm-CEO dyads.

3.1. Dependent Variable

***Firm performance*.** We measured firm performance using both accounting and stock market measures. On the one hand, firm operating performance, which is measured using accounting measures, is influenced by the extent to which CEOs themselves resolve their egocentric uncertainty. On the other hand, firm's stock market performance is influenced by the extent to which stock market participants resolve their altercentric uncertainty. Therefore, as the hypotheses predict that both aspects of firm performance will be impacted by the resolution of the two types of uncertainty, we included both of them in the analysis. To measure operating performance we used quarterly data on net income and equity obtained from COMPUSTAT. Net income is divided with equity to obtain return on equity measure (ROE). ROE measures how well a firm is using equity, and has been used elsewhere (Wade et al., 2006) to measure operating performance. We computed both the cumulative ROE and the average quarterly ROE for the period of one year and two years, to test the hypothesis on the declining impact of egocentric uncertainty in time. To measure stock market performance, data on monthly returns on the firm's stock for each month during the two years after the appointment are used. As a starting point we used the return in the month of the appointment. We obtained data from Center for Research in Security Prices (CRSP), accessed through Wharton Research Data Service (WRDS). We computed both the average monthly return during one year and two years after the appointment, as well as the cumulative return at the end of the first year and the second year after the appointment. Average and cumulative returns for the period of one year and two years after the appointment are computed to test the hypothesis on the declining impact of the altercentric uncertainty in time.

3.2 Independent Variables

Density of CEO's individual network. We measured number of structural holes in CEOs' individual networks by dividing the number of ties between a CEO's contacts with the maximum number of ties among them. This is an approach often used in the network theory (e.g. Burt, 2006). The standard approach takes into the account strength of ties, using either frequency of interaction (Granovetter, 1973) or closeness (Mors, 2006) as a measure of strength. We considered adopting this approach and approximating the strength of ties between CEOs and their contacts, as well as the strength of the ties among the latter using the number of years these individuals have been linked to each other through a joint board service. However, the density measure requires identification of the highest strength of ties, and in my case there was no clear way to identify such benchmark. The contacts overlapped in different time periods, and it wasn't clear whether five year overlap between two individuals ten years ago indicates a stronger tie from today's perspective than a one year overlap two years ago. So to reduce the complexity of the analysis, all ties between contacts are treated as being of equal strength. To arrive at the measure for network density we applied the following procedure: we counted the number of individuals who have been board members in organizations at the time the focal CEO was also a board member in these organizations, or held a senior management position. In this count we included both public and private for-profit organizations. These individuals formed the egocentric network of a focal CEO, and the maximum number of ties between these individuals was n*(n-1)/2. We counted the actual number of ties among them, and divided the two numbers to arrive at the density of the CEOs' individual networks. For instance, one CEO in the sample was in the course of his career linked to 22 individuals who were board members in organizations at the time this CEO was either also a board member or a senior executive in these organizations. The maximum possible number of ties between these individuals was 231 (22*(22-1)/2). Actual number of ties was 51, yielding density of this CEO's individual network of 0.22. Network density is negatively related to the number of structural holes; there is less possibility for development of structural holes in highly dense networks. As per Hypothesis 1 we therefore expect network density measure to be negatively related to firm operating performance.

CEO prominence. We measured CEO prominence at the time of the appointment using the number of boards of quoted companies that CEO has been on in the course of his career. Using such measure the approach by Burton et al. (2002) and Higgins et al. (2003) was followed, who measured prominence of an individual on the basis of number of affiliations with prominent organizations. We defined as a prominent organization a public company. At the same time, only the visible affiliations were counted. We considered appointment to a board of a public company an affiliation that passes the criteria of visibility. A dummy variable was created that had a value of 1 if a CEO has been on two or more boards of quoted companies, and a value of 0 if a CEO hasn't been on a board of a quoted company, or has been on one board. The dummy variable was created on the basis of the following reasoning: when counting number of boards an individual has been on in the course of his career we counted also membership on the board of the company of which an individual has become a CEO; therefore, if an individual has been on a board of one company, that could be a company in which he has been appointed a CEO, or another company. In contrast, if an individual has been on the board of two (or more companies), he has surely been on the board of at least one company other than the one to which he has been appointed as a CEO. So in the second case CEO can claim affiliation with at least one prominent organization other than the hiring organization, which makes him qualitatively more prominent than a CEO who can claim only affiliation with the hiring organization *or* one other prominent organization. We also used as an alternative measure a simple count measure capturing the number of boards a newly appointed CEO has been on prior to the appointment.

3.3 Control Variables

3.3.1 CEO Level Control Variables

Previously CEO. Newly appointed CEOs who have previously been CEOs of a quoted company will face lower egocentric uncertainty due to their experience in this setting. At the same time altercentric uncertainty of the observers will likely be lower as they have had an opportunity to observe the newly appointed CEO in a CEO position before. We used a dummy variable to capture the effect of the previous CEO experience, having value 1 if a newly appointed CEO has previously been a CEO of a public company.

CEO age at the time of the appointment. Older, more experienced newly appointed CEOs may find it easier to resolve their egocentric uncertainty due to their broad experience. At the same time, older CEOs may be less willing or able to learn and adapt to the requirements of the new job. I used the newly appointed CEO's age to control for these effects.

Outside CEO. CEOs who are appointed from outside of the focal firm are in a different position in terms of egocentric uncertainty than CEOs appointed from inside the firm. The latter are more familiar with the organization and face less uncertainty with respect to the processes within the organization. At the same time, however, CEOs appointed from the outside may have a perspective which allows them to be aware of certain problems and solutions that are less apparent to the insiders. To control for these effects, a dummy variable was used, having value 1 if a newly appointed CEO has never held a position at the hiring firm, and 0 otherwise. This variable is used as a control variable in the models testing the relationship between density of CEOs' individual networks and firm operating performance.

Network size. Network density tends to be negatively correlated with the size of the network (Reagans, McEvily, Zuckerman, 2004), so we included a control for network size in the models testing the relationship between density of individual networks of CEOs and firm operating performance.

Gender. I used a dummy variable, coded 1 for female CEOs and 0 otherwise, to control for potential gender effects.

3.3.2 Firm Level Control Variable

Firm size. We computed average size of the firm's assets during the first year and during the first two years of the newly appointed CEO's tenure. We used the average book value of firm's assets as the control variable. These data were obtained from COMPUSTAT.

3.3.3 Industry Level Control Variables

Industry dummies. Industry dummies are used to control for the differences in industry returns, as well as other industry-level factors that could influence firm stock market returns and ROE. We used the first two digits in the SIC code to define a firm's industry. It is a commonly used approach, as described in Wade et al. (2006). However, since some industries in the sample were represented by only one firm, we created another set of industry dummies, where industries are aggregated up to the level of the SIC division (e.g. mining, manufacturing, wholesale trade, retail trade etc.). We then ran analyses using both sets of dummies. These data were obtained from COMPUSTAT.

3.3.4 Economy Level Control Variable

Returns on S&P500 index. To control for the state of the stock market and the economy as a whole, the monthly returns on the S&P500 index are used. As in the case of the dependent variables, we computed both the average monthly return on the index during the one year and two years after the appointment, as well as the cumulative return on the index at the end of the first year and at the end of the second year after the appointment. These data were obtained from CRSP.

4. Methods

The independent variables used were time invariant, as we hypothesised that individual networks generated up to the time of the appointment of an individual as a CEO will influence subsequent firm performance. We therefore couldn't use a panel regression, but rather ordinary least squares regression, with adjustments as described in the results section. We ran the regression analyses by first including all control variables, and then including independent variables.

5. Results

Table 1 presents means and standard deviations of the variables used in the analysis of the relationship between density of individual networks of newly appointed CEOs and firm operating performance, along with correlations among them. To test the hypotheses we first ran OLS regressions using Stata software using cumulative ROE in one year (two years) as the dependent variable. We ran the analyses by including first all control variables, and then included the variable of interest, network density. Breusch-Pagan test indicated that there was no significant heteroskedasticity in the distribution of the residuals, so we proceeded with the OLS models with constrained constant term (as the study looks into the coefficients rather than the predicted values of the dependent variable). Scatter plot indicated that there may be curvilinear relationship between network density and firm operational performance, so the squared network density term is included in the regressions.

To test hypotheses 2a-c we first computed means, standard deviations and correlations for variables used in the analysis of the relationship between CEO prominence and firm stock market performance. These summary statistics are presented in Table 2. As in the case of the relationship between network density and firm operating performance, we first ran OLS regressions. Plot analyses revealed that homoskedasticity assumption in the case of this data was violated, so we proceeded with the analysis using robust standard errors. To test hypotheses 2a-c we ran analyses using both count variable boards and dummy variable boardsdummy as the independent variable. Regression analyses produced the same sign and a similar magnitude of the coefficients for these two variables, yet in the case of the count variable coefficients were marginally insignificant. We therefore report the results for the dummy variable, which were significant. To control for the industry effects on the firms' stock market returns we used two sets of dummies: industry dummies aggregated at the level of the two-digit SIC code, and industry dummies aggregated at the level of the division. In the case of industry dummies at the level of the two-digit SIC code Stata analysis didn't produce estimates of F statistic, so wecouldn't assess the statistical significance of the model as a whole. No such problem occurred when using industry dummies at the level of the division (which is roughly at the level of one-digit SIC code), so we proceeded with them.

	Variable	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1	Network density	0.62	0.27																						
2	Network density squared	0.45	0.34	0.98																					
3	Network size	17.19	11.79	0.46	-0.5																				
4	Cumulative ROE in one year (%)	12.26	26.01	0.02	0.03	0.06																			
5	Cumulative ROE in two years (%)	29.52	48.91	0.05	0.04	0.05	0.82																		
6	Gender (1=female)	0.01	0.12	0	-0.02	0.04	0.02	0.02																	
7	Previously CEO	0.12	0.33	-0.27	-0.26	-0.21	-0.25	-0.3	-0.05																
8	Outsider/insider (1=outsider)	0.12	0.33	0.11	0.11	0.08	0.15	0.17	0.08	0.3															
9	Age (in days)	19066.2	2259.65	-0.19	-0.17	-0.12	-0.03	-0.02	-0.1	0.27	0														
10	Average firm assets in one year (mio $)	53490.61	158709.2	0.06	0.05	0.22	0	0.02	0.03	0.17	0.05	0.13													
11	Average firm assets in two years (mio $)	55540.15	165822.5	0.06	0.05	0.21	0	0.01	0.03	0.17	0.04	0.13	1												
12	Industry dummy: Mining	0.03	0.17	-0.04	-0.04	-0.04	-0.05	-0.02	-0.02	-0.02	-0.06	-0.03	-0.05	-0.05											
13	Industry dummy: Construction	0.01	0.1	0.01	-0.01	0.1	-0.02	-0.02	-0.01	-0.04	-0.04	-0.05	-0.03	-0.03	-0.02										
14	Industry dummy: Manufacturing	0.52	0.5	-0.09	-0.07	-0.05	-0.04	-0.1	-0.03	-0.16	-0.05	-0.06	-0.23	-0.23	-0.18	0.1									
15	Industry dummy: Transportation, Communications, Electric	0.1	0.3	-0.03	-0.01	-0.02	-0.07	-0.15	-0.04	-0.16	-0.08	-0.02	-0.05	-0.05	-0.06	-0.03	-0.35								
16	Industry dummy: Wholesale trade	0.01	0.12	-0.1	-0.1	-0.05	-0.04	-0.04	-0.01	-0.05	-0.05	-0.06	-0.04	-0.04	-0.02	-0.01	-0.13	-0.04							
17	Industry dummy: Retail trade	0.08	0.27	-0.17	-0.16	-0.12	-0.03	-0.02	-0.04	-0.01	-0.15	-0.07	-0.08	-0.08	-0.05	-0.03	-0.31	0.1	-0.04						

18	Industry dummy: Finance	0.14	0.35	0.04	-0.04	0.11	-0.03	0.05	-0.05	0.01	0.01	0.02	0.48	0.48	0.07	-0.04	0.43	0.14	0.05	0.12				
19	Industry dummy: Services	0.07	0.26	0.01	-0.03	-0.04	0.04	0.01	0.12	0.06	-0.05	0.16	0.07	0.07	0.05	0.03	0.29	0.09	0.03	0.08	0.11			
20	Industry dummy: Conglomerates	0.01	0.1	0.02	-0.02	0.02	-0.02	0.02	0.01	0.04	0.11	-0.1	0.14	0.15	0.02	-0.01	-0.1	0.03	0.01	0.03	0.04	-0.03		
21	Cumulative return on S&P500 index in one year	0	0.18	0.1	0.09	-0.09	0.01	0.07	-0.02	-0.05	-0.06	-0.03	0.02	0.02	0.03	0	-0.02	-0.03	0.09	-0.03	0.14	-0.05	-0.06	
22	Cumulative return on S&P500 index in two years	-0.03	0.26	0.13	0.12	-0.01	-0.06	0.03	-0.03	0.02	-0.1	0	0.06	0.06	0.04	-0.04	-0.06	0.02	0.1	-0.02	0.07	-0.04	-0.02	0.82

N=193.

Table 1. Means, standard deviations and correlations – network density

	Variable	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	Boards dummy	0.40	0.49																				
2	Cumulative return on the firm's stock in one year	0.12	0.42	-0.18																			
3	Cumulative return of the firm's stock in two years	0.25	0.64	-0.16	0.74																		
4	Average ROE in one year (%)	5.88	56.37	-0.08	0.01	0.09																	
5	Average ROE in two years (%)	1.53	54.52	0	0.05	0.11	0.57																
6	Previously CEO	0.12	0.33	0.28	-0.05	-0.05	-0.09	-0.05															
7	Age (in days)	19038.86	2261.65	0.28	-0.06	-0.05	0	0.03	0.27														
8	Average firm assets in one year (mio $)	52602.34	157000.00	0.14	-0.08	-0.09	-0.01	0.01	0.17	0.13													
9	Average firm assets in two years (mio $)	54618.60	164000.00	0.14	-0.08	-0.09	-0.01	0.01	0.17	0.13	1												
10	Industry dummy: Mining	0.03	0.17	-0.02	-0.01	0.02	-0.01	0	0.02	0.04	-0.05	-0.05											
11	Industry dummy: Construction	0.01	0.10	-0.08	0.08	0.21	0	0.01	-0.04	-0.05	-0.03	-0.03	-0.02										
12	Industry dummy: Manufacturing	0.53	0.50	-0.04	-0.01	0.08	0.06	-0.01	-0.16	0.06	-0.23	-0.23	-0.18	-0.1									

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13	Industry dummy: Transportation, Communications, Electric	0.10	0.30	-0.02	-0.09	-0.05	-0.03	-0.01	0.17	0.02	-0.05	-0.05	-0.06	-0.03	-0.35							
14	Industry dummy: Wholesale trade	0.01	0.12	-0.02	0.07	0.07	0	0.01	-0.04	0.06	-0.04	-0.04	-0.02	-0.01	-0.13	-0.04						
15	Industry dummy: Retail trade	0.09	0.28	-0.01	0.22	0.07	-0.02	0	-0.01	-0.08	-0.08	-0.08	-0.05	-0.03	-0.32	-0.1	-0.04					
16	Industry dummy: Finance	0.14	0.35	0.02	-0.03	-0.08	-0.02	0.01	0.01	0.02	0.49	0.48	-0.07	-0.04	-0.43	-0.13	-0.05	-0.12				
17	Industry dummy: Services	0.07	0.26	0.04	-0.13	-0.18	-0.01	0.01	0.07	-0.16	-0.07	-0.07	-0.05	-0.03	-0.29	-0.09	-0.03	-0.08	-0.11			
18	Industry dummy: Conglomerates	0.01	0.10	0.12	-0.01	0.06	-0.01	0	-0.04	-0.1	0.14	0.15	-0.02	-0.01	-0.1	-0.03	-0.01	-0.03	-0.04	-0.03		
19	Cumulative return on S&P500 index in one year	0.00	0.18	-0.12	0.26	0.27	0.11	0.1	-0.05	-0.02	0.02	0.02	0.03	0	-0.02	-0.03	0.09	-0.04	0.14	-0.05	-0.06	
20	Cumulative return on S&P500 index in two years	-0.04	0.26	-0.05	0.19	0.29	0.12	0.13	0.02	0.02	0.06	0.06	0.04	0.04	-0.06	0.02	0.1	-0.03	0.07	-0.04	0.02	0.82

N=201.

Table 2. Means, standard deviations and correlations – boards dummy

5.1 Cumulative ROE

Table 3 presents the results of the analysis of the relationship between the density of individual network of a newly appointed CEO and subsequent firm operating performance. Models 1 and 2 include results of the regressions using cumulative ROE in the first year of the new CEO's tenure as the dependent variable. We ran the analyses using both the cumulative and the average measures, and the results for the average measures were highly dependent on the extreme values, so we are reporting the cumulative measure. Model 1 reports regression coefficients for the control variables. As expected, there is a positive relationship between size of the newly appointed CEO's network and firm ROE – the coefficient for the cumulative ROE during the first year of the new CEO's tenure is positive and significant at 10%. The only other significant control variable was dummy variable capturing CEO's prior experience with running a public company – the coefficient was, rather surprisingly, negative. In model 2 we included the variable of interest, network density, along with the squared term, to capture potential curvilinear relationship. The coefficient on both was insignificant, not lending support to Hypothesis 1. The procedure was repeated using the cumulative ROE two years after the appointment of a new CEO as the dependent variable. In model 3 the control variables are included. Coefficient on network size became marginally insignificant, while the coefficient on the prior CEO experience dummy variable remained negative and significant. The independent variable, network density, along with the squared term, is included in the model 4. Again the coefficient was insignificant. On the basis of these results neither Hypothesis 1 (on the positive relationship between the number of structural holes in the CEO's individual network and firm performance) nor Hypothesis 1a (on the temporally declining positive impact of the number of structural holes on firm performance) were supported.

Table 3. Cumulative Return on Equity (ROE) as the Dependent Variable

	One year after the appointment		Two years after the appointment	
Variable	**Model 1**	**Model 2**	**Model 3**	**Model 4**
Predictor				
Network density		-29.917		-3.669
		(32.576)		(56.817)
Network density squared		26.527		7.373
		(26.657)		(46.489)
Control variables				
Network size	0.269 †	0.381 *	0.442	0.569 †
	(0.155)	(0.182)	(0.270)	(0.315)
Gender (female=1)	0.361	1.622	2.000	2.312
	(14.361)	(14.457)	(25.121)	(25.234)
Previously CEO	-19.061 **	-19.467 **	-40.501 **	-39.965 **
	(6.000)	(6.190)	(10.499)	(10.818)
Outside CEO (outsider=1)	-3.608	-2.911	-5.731	-4.977
	(5.673)	(5.715)	(9.973)	(10.026)
CEO age (in days)	0.000	0.000	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)
Average firm assets in	0.000	0.000	0.000	0.000
one year (two years)	(0.000)	(0.000)	(0.000)	(0.000)
Industry dummy: Mining	-0.914	1.195	3.792	1.908
	(14.469)	(15.267)	(25.172)	(26.542)
Industry dummy:	12.244	18.741	19.347	25.251
Construction	(19.743)	(26.593)	(34.530)	(46.321)
Industry dummy:	4.308	5.806	6.349	3.510
Manufacturing	(10.818)	(11.715)	(18.784)	(20.360)
Industry dummy:	6.700	9.385	0.643	-0.958
Transportation,	(11.175)	(12.322)	(19.481)	(21.464)
Communications, Electric				
Industry dummy:	8.266	9.703	12.968	9.929
Wholesale trade	(20.247)	(21.030)	(35.253)	(36.509)
Industry dummy: Retail	10.040	12.239	15.179	12.869
trade	(11.680)	(13.015)	(20.342)	(22.661)
Industry dummy: Finance	-.317	1.693	-3.011	-4.710
	(11.281)	(12.109)	(19.431)	(20.899)
Industry dummy: Services	13.558	16.607	19.950	18.401
	(11.692)	(12.846)	(20.379)	(22.389)
Industry dummy:	-4.557	-1.897	-8.618	-10.418
Conglomerates	(19.834)	(20.443)	(34.740)	(35.712)
Cumulative return on	3.294	5.001	10.872	12.228
S&P500 index in one year	(9.766)	(9.892)	(11.817)	(11.956)
(two years)				
Adjusted R^2	0.215	0.205	0.328	0.3181
F-statistic	4.38 **	3.76 **	7.05 **	6.00 **

N=193. OLS with suppressed constant term. Standard errors are in parentheses.
** p<0.01, * p<0.05, † p<0.10. All test are two-tailed.

5.2 Cumulative Returns on the Firm's Stock

Table 4 presents the results of the analysis of the relationship between the newly appointed CEO's prominence and subsequent firm performance. Models 1 and 2 include results of the regressions using cumulative returns on the firm's stock in the first year of the new CEO's tenure as the dependent variable. The analyses is run using both the cumulative and the average measures, and results didn't change: the cumulative measure are reported as it better captures the extent of the shareholder value generated under the new CEO than the average measure. Model 1 reports regression coefficients for the control variables. As expected, there is a positive relationship between the returns on the S&P500 index and the returns on the stocks of its members – the coefficient for the cumulative return on the S&P500 index during the first year of the new CEO's tenure was positive and highly significant. The only other significant control variable was industry dummy for services. In model 2 the variable of interest, boardsdummy is included. The coefficient was negative and significant, lending support to the Hypothesis 2b. Holding all other factors constant, stock returns of firms who have in the previous year appointed a prominent new CEO will be lower than stock returns of firms who have appointed a non-prominent CEO. We repeated the procedure using the cumulative return on the firm's stock two years after the appointment of a new CEO as a dependent variable. In model 3 the control variables are included. As in model 1, cumulative return on S&P500 index during the two year period positively and significantly influenced cumulative returns on the firms' stocks during that period. In contrast to the period of one year, in the period of two years variable capturing operating performance (average ROE in two years) was positively and significantly associated with the cumulative returns on the firms' stocks. We included the independent variable, boardsdummy, in the model 4. Again the coefficient was negative and significant, lending further support to the Hypothesis 2b. At the same time, the results didn't lend support for the hypothesis 2c. Absolute value of the coefficient for boarddummy was higher in the model 4 (-0.179) than in the model 2 (-0.133). We ran seemingly unrelated regression using Stata's sureg command to test the statistical difference between the two coefficients. The test reported insignificant difference, thereby not lending support to a decreasing impact of CEO prominence predicted by the Hypothesis 2c[1]. Jointly these results give some limited support to the CEO celebrity/hubris story (Hayward et al., 1997; Hayward et al., 2004) rather than the social networks story of performance benefits arising from prominence.

[1] The hypothesis was set up to address the issue of a decreasing impact of prominence, which amounts to a decreasing effect of ties an individual has with the organizations on which he served as a board member. The decreasing effect may be a result of a lesser visibility of more distant ties (with tie strength remaining constant), tie decay or a combination of both. In this study we implied only the first issue. Tie decay issue could be addressed by weighing number of boards with the time since an individual has left the board.

Table 4. Cumulative Return on the Firm's Stock as the Dependent Variable

	One year after the appointment		Two years after the appointment	
Variable	**Model 1**	**Model 2**	**Model 3**	**Model 4**
Predictor				
Boards dummy		-0.133 *		-0.179 *
		(0.059)		(0.084)
Control variables				
Previously CEO	-0.010	0.026	0.027	0.078
	(0.079)	(0.078)	(0.096)	(0.093)
Age	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Average ROE in one year (two years)	-0.000	-0.000	0.001 **	0.001 **
	(0.000)	(0.000)	(0.000)	(0.000)
Average firm assets in one year (two years)	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Industry dummy: Mining	-0.258	-0.319	0.176	0.098
	(0.165)	(0.170)	(0.217)	(0.221)
Industry dummy: Construction	0.099	0.017	1.383 **	1.269 **
	(0.160)	(0.172)	(0.098)	(0.133)
Industry dummy: Manufacturing	-0.213	-0.254	0.200 *	0.138
	(0.140)	(0.136)	(0.096)	(0.109)
Industry dummy: Transportation, Communications, Electric	-0.289	-0.337 *	0.065	-0.003
	(0.148)	(0.148)	(0.102)	(0.123)
Industry dummy: Wholesale trade	-0.053	-0.101	0.386	0.313
	(0.209)	(0.189)	(0.238)	(0.223)
Industry dummy: Retail trade	0.983	0.056	0.275	0.218
	(0.194)	(0.192)	(0.154)	(0.163)
Industry dummy: Finance	-0.232	-0.276	0.040	-0.026
	(0.157)	(0.152)	(0.104)	(0.122)
Industry dummy: Services	-0.403 *	-0.429 *	-0.285	-0.327 *
	(0.179)	(0.174)	(0.148)	(0.165)
Industry dummy: Conglomerates	-0.168	-0.117	0.516	0.582
	(0.227)	(0.229)	(0.518)	(0.528)
Cumulative return on S&P500 index in one year (two years)	0.633 **	0.602 **	0.670 **	0.653 **
	(0.153)	(0.150)	(0.186)	(0.180)
R^2	0.158	0.179	0.190	0.205
F-statistic	4.11 **	3.83 **	117.57 **	100.77 **

N=201. Robust standard errors are in parentheses.

** p<0.01, * p<0.05. All test are two-tailed.

6. Discussion

First decade of the 21st century has seen an increase in the interest in CEOs, especially in the ways in which they can harm their companies, and the antecedents to such behaviour. Researchers have documented external factors, such as media celebration (Hayward et al., 2004), media certification (Wade et al., 2006), institutional logics held by the circle of board directors (Khurana, 2002), as well as internal factors, such as CEO hubris (Hayward et al., 1997) and CEO narcissism (Chatterjee et al., 2007) that may contribute to CEOs' taking actions that may be endangering firms' long term performance and survival. In this paper we have adopted the social networks perspective to study the relationship between the individual networks of newly appointed CEOs and subsequent firm performance. Two facets of these networks are studied: density of individual networks of CEOs and CEO prominence, to simultaneously capture both "piping" and "prismatic" dimensions of networks. We argued that in the context of the newly appointed CEOs the "piping" dimension will be especially relevant to CEOs themselves, as they may turn to individuals they have been linked to in the course of their careers for advice on how to proceed in their new, rather uncertain situation (Porter et al. (2004). In addition, we argued that the more structural holes there will be in the egocentric networks around newly appointed CEOs (i.e. the lower the density of the egocentric networks), the more likely will CEOs obtain non-redundant information, either by the virtue of their position at the intersection of ties between corporate directors, or by actively exercising their brokerage role in these networks.

The analysis didn't find evidence to support these arguments, as the coefficients on the network density variable were insignificant. However, coefficient for network size, which we included as a control variable, was positive and significant in 3 out of 4 models. This indicates that there may be performance-enhancing benefits arising from CEOs' networks, yet they don't depend on the structure of the formal relationships (joint service on the board or acquaintanceship via employment in the upper echelons of the same organization). Positive effect of network size on firm performance partially captures effects of number of boards the CEO has been on in the course of his career, and it could capture many other variables that were not included (e.g. size of CEOs previous employers, number of organizations the CEO has been employed in etc.). As such it remains a topic of future research. Still, combination of positive relationship between network size and firm performance, and negative relationship between CEO prominence, measured by the number of boards, and firm stock market performance yields an interesting insight. Large CEO egocentric networks are beneficial for firm performance to the extent that the CEO hasn't built them through memberships in many corporate boards. In other words, a CEO may have a large individual network because he has established links to many individuals who were members of the same boards as he was. In that case operating performance of CEO's firm will be higher, and stock market performance (due to high prominence of the CEO) lower. On the other hand a CEO may have a large individual network that he has created through other means than memberships on corporate boards. In that case operating performance of his firm will be higher, and stock market performance (due to his low prominence) higher as well. Another potential area of further research is the issue of the influence of time on the impact of structural holes and other dimensions of networks. Soda, Usai, & Zaheer (2004) found that the performance-enhancing capacity of structural holes tends to deteriorate in time. Burt (2002), in addition, found that bridging ties (ties that connect actors at the opposite sides of the structural hole) have a much faster rate of decay than ordinary ties. We didn't formally test the impact of time however we did run some additional tests using network size at the time of the appointment as the independent variable. Two variants of this variable are used: one that included all board members the CEO was affiliated to in the year before the appointment, and one that included only board members of companies other than the one to which the focal CEO was appointed. Analyses using either variant produced insignificant coefficients. More detailed analyses could shed some light on the issue of time and networks.

Stock market participants have become rather vary of prominent members of corporate elite who hold or held multiple board memberships (Davis, Yoo, & Baker, 2003), so it is possible that they would penalize firms who appoint prominent members of corporate elite to the top post. The social networks literature, on the other hand, has consistently suggested that prominence, stemming from affiliation with prominent actors, has positive performance implications arising from reduction in altercentric uncertainty (Higgins et al., 2006; Podolny, 2001; Stuart et al., 1999). We have assumed in this study that appointment of a new CEO is a context amenable to the study of impact of social networks on altercentric uncertainty, as stock market participants form today's prices on the basis of expectations about future actions and performance of firms. We tested whether they take prominence of the newly appointed CEO into account when forming these expectations. Some limited evidence is found, that they do, however rather than interpreting this reduced uncertainty as something beneficial, they seem to interpret it as a signal of potential future celebrity and corresponding behaviour. The reasoning behind this interpretation is that CEOs who have been successful in their careers in the past and became prominent members of corporate elite may become overconfident and take some overly risky decisions, which eventually backfire. Our results are also in line with findings of Wade et al. (2006). These authors examined what happens to firm's stock market performance after its CEO becomes certified, i.e. obtains a medal that magazine *Financial World* awards to CEOs voted as outstanding by the business analysts and peer CEOs. They found that after initial positive abnormal returns (immediately after the awarding) the trend reverses and firms with certified CEOs perform worse than they did before the certification (they don't, however, perform worse than the market in general). Our results complement those of Wade et al. (2006) by showing that only possibility that a newly appointed CEO will be conceived of as a celebrity leads the stock market participants to discount the stock price of his firm. According to Wade et al.'s (2006) study the award creates a burden of celebrity and many CEOs are not able to carry this burden without detrimental effects on the performance of their firms. Our results suggest that it may be that a formal certification is not the real device that creates celebrity; it may be that it is only the recognition of CEO's celebrity. Just an expectation of future celebrity may exert a drag on the firm performance long before the granting of the award, perhaps from the moment that person is appointed as a CEO.

The results lead us to think that prominent CEOs may be viewed in a suspicious light, as the stock market discounts returns on the stocks of firms of prominent CEOs, possibly in the expectation of overconfident behaviour by these CEOs. Whether these CEOs actually engage in such actions and whether stock market responds to them remains a topic for further investigation. Chatterjee et al. (2007) have recently raised another interesting point pertaining to this discussion. They have shown that CEOs with more pronounced narcissist tendencies engage in more grandiose actions and lead their firms to greater strategic dynamism. They have, however, left open the questions where do these narcissist CEOs come from. As they claim that narcissism is a trait, and also one developed in early childhood, it is likely that these individuals had narcissist tendencies before they became CEOs. It is therefore possible that there is a certain overlap in identities of narcissist and prominent newly appointed CEOs. Prominent newly appointed CEOs may become prominent because they actively seek prominence, or at least not shy away from the spotlight. Prominence-seeking behaviour may be propelled by the narcissist tendencies, and once these prominent members of the corporate elite become CEOs they may take actions in line with Chatterjee's and Hambrick's predictions. Stock market participants may quickly detect such tendencies and in expectation of further dramatic actions discount the stock price.

7. Limitations and Future Research

This study is an early effort to test predictions of the CEO celebrity and social networks literatures on the relationship between different dimensions of CEOs' individual networks and firm outcomes, and as such has its limitations. First limitation is that it doesn't address how strategies incoming CEOs adopt mediate between structural dimensions and firm performance. Performance will depend on the strategies adopted by the CEO rather than simply on the configuration of his individual network. It was outside of the scope of this study to collect data on strategies for each of more than 200 firm-CEO dyads, as well as to conceive of an appropriate basis for comparison of strategies adopted by firms in more than 30 different industries. However, the lack of understanding of how strategies mediate the examined relationship remains a limitation and an interesting area for extension of this research. The second limitation is that we didn't compare firm's performance to its past performance. In this paper we endeavoured to test whether there is significant association between firm performance and different dimensions of CEOs' individual networks. Since our study have found some evidence on the significance of this association, the next step could be to compare individual networks of preceding and incoming CEO and examine whether differences in firm performance could be attributed to differences in their individual networks. It may be for instance the case, as Khurana (2002) suggested, that troubled companies are more likely to bring in a prominent CEO in order to "save" them. While this study doesn't address this issue, it provides some evidence that whatever previous performance of the company, more prominent CEOs are not likely to be associated with positive stock market returns. Still such aggregate result might mask a countervailing influence of positive performance of previously under-performing firms who have hired prominent CEOs, and negative performance of previously out-performing firms who have hired less prominent CEOs (or a reverse situation). Clearly inclusion of performance prior to the appointment of a focal CEO would help untangle some of the effects that might be taking place. An accompanying limitation is that we don't directly compare performance of firms who have appointed a new CEO during the period of study to the performance of firms who haven't appointed a new CEO. However, we do so indirectly by including the returns on the S&P500 index as a control variable; majority of the firms in the index haven't appointed a new CEO during that period.

The third limitation refers to the test of the mechanism underlying relationship between density of CEOs' individual networks and firm performance. We have theorized that the mechanism underlying this relationship is the one of information benefits arising from the spanning of structural holes. Another mechanism potentially at work is the mechanism of power (Burt, 1992). CEOs with networks rich in structural holes are also in a position to act as brokers with respect to their contacts, which contributes to their power in the corporate elite of board directors, and more broadly, inter-organizational domain. This power could, in turn, have consequences for the relationships between CEOs and their boards. Westphal & Fredrickson (2001) have shown that even when it seems that strategic direction is set by the CEO, it may be actually set by the board members and only implemented by the like-minded CEO who is brought in for the execution of the conceived strategy. It is possible, however, that the board would bring in a CEO who would, upon the appointment, insist on setting his own course of strategic action. Extent to which they he would be able to do so would at least in part depend on the resolution of the power struggle, in which the newly appointed CEO might use his external brokered relationships as a source of power in this struggle. The examination of the described and other potential mechanisms that underlie the relationship between density of the CEOs' individual networks and firm performance is another potentially fruitful area for research. Another limitation is the measurement of the prominence variable. The measure that we used doesn't capture the difference in prominence between quoted companies. Burton et al. (2002) suggested that the most appropriate measure that would take into the account differences in prominence between individual

companies would be one based on the external sources. In the context of this study such measure could be Fortune magazine's America's Most Admired Companies list. This list is generated on the basis of responses of stock market analysts and managers, and it ranks companies on a single reputation dimension, as well as on several sub-dimensions (innovation capacity, quality of management, use of corporate assets etc.). Using this list in the future research could give us a more fine-grained understanding of the relevance of prominence of past affiliates on the subsequent prominence of newly appointed CEOs.

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