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Elien Vandenbroucke
Ghent University, Belgium, elien.vandenbroucke@ugent.be

Mirjam Knockaert
Ghent University, Belgium

Deniz Ucbasaran
Warwick Business School, UK

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A LEARNING PERSPECTIVE ON OUTSIDE BOARD SERVICE EFFECTIVENESS IN EARLY STAGE HIGH TECH FIRMS

Elien Vandenbroucke, Ghent University, Belgium
Mirjam Knockaert, Ghent University, Belgium
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ABSTRACT

Outside boards have an important role to play in early stage high tech ventures. Specifically, through their engagement in the service role, they can fill important human capital gaps in the top management team (TMT). The extent to which the outside board members’ human capital and the information they bring to the board room help TMTs to bridge deficiencies within the team will, however, be largely dependent on the nature of the TMT. Taking a learning perspective, we see that TMT absorptive capacity and frequency of TMT–board interaction positively affect board service effectiveness. Moreover, the latter relationship is positively moderated by cognitive proximity. We build on a hand-collected dataset containing 80 early stage high tech companies in Belgium and discuss implications for academia and practice.

INTRODUCTION

Early stage high tech firms have the potential to contribute significantly to individual wealth and regional prosperity (Venkataraman, 2004). Yet, many of these firms experience difficulties in realizing this potential due to a number of challenges and dependencies. Specifically, these firms are faced with the liabilities of newness and smallness (Stinchcombe, 1965), which is impeding them to develop stable relationships with potential business partners. Most importantly, however, is the existence of important human resource gaps within the top management team (TMT) (Han & Benson, 2010). Ensley and Hmieleski (2005) highlight that the TMT in early stage high tech ventures is often homogeneous in terms of knowledge, education and experience. In particular, the human and social capital in these TMTs is often largely technical and the TMT lacks important commercial skills and networks (Knockaert, Ucbasaran, Wright, & Clarysse, 2011).

In such circumstances, outside boards may play an important role (Vanaelst, Clarysse, & Wright, Lockett, Moray, & S’Jegers, 2006). In addition to engaging in the monitoring function, outside boards may take on a service role. Through this service role, the outside board may enhance the company reputation, establish contacts with the external environment or give advice to the TMT (Zahra & Pearce, 1989). Specifically, by bringing relational and reputational capital, outside boards may fill important human and social capital gaps in the TMT and may help new ventures to gain legitimacy (Hillman & Dalziel, 2003), and subsequently overcome the liabilities related to newness and smallness. As such, the outside board members have often been considered complements to the TMT. Zhang, Baden-Fuller and Pool (2011) even suggest that boards and TMTs in entrepreneurial threshold firms can be seen as the same group and act as “collective entrepreneurs” and Vanaelst et al. (2006) refers to outside board members as part of “the extended TMT”, which definitely holds in an early stage high tech environment where TMT and outside board are not standalone entities (Nielsen, 2010).
Corporate governance studies have so far primarily focused on how the “usual suspects”, namely board structure and composition, impact board performance (e.g. Johnson, Daily, & Ellstrand, 1996). These studies have however produced inconclusive results, which can, according to Forbes and Milliken (1999) be attributed to the neglect of board processes which are likely to affect board performance. As such, we lack understanding of how boards can contribute to organizational value creation (Finkelstein & Mooney, 2003). Along the same lines, recent studies underlined the importance of analyzing board effectiveness through the examination of board behavior (Minichilli, Zattoni, & Zona, 2009) and call for studies examining board behavior and effectiveness, while focusing on board service roles (Huse, 2007). We argue that, while most of the research into the service role has taken a board capital perspective, hereby considering the nature of the outside board’s social and human capital as important antecedent of its engagement in the service role and subsequent effectiveness, a contingency perspective is more appropriate. Although bringing excellent outside members with complementary social and human capital to the board is an asset to the TMT and the early stage high tech venture, this will only be the case if the TMT is capable of using the complementary information and knowledge the outside board brings. Therefore, taking a learning perspective, we reason that the effectiveness of the outside board’s involvement in the service role will be contingent on the learning capabilities of the TMT or the capabilities to interpret and apply the complementary knowledge, information and resources the outside board brings. Following a learning perspective is particularly appropriate as it is well acknowledged that by accessing, developing and integrating new and existing knowledge, TMT members in these firms can reconfigure the nature of their capabilities (Lockett et al., 2005). Building upon a sample of 80 early stage high tech firms in Belgium, we study the extent to which TMT absorptive capacity, frequency of interaction between TMT and outside board, and the cognitive proximity between TMT and outside board affect the effectiveness of the outside board’s service intervention. In what follows, we first build our theoretical framework drawing from learning theory. Next, we elaborate on our research methodology and measures. We subsequently present our analysis and results and reflect on our findings, including implications for academia and practice, such as early stage high tech entrepreneurs, venture capitalists and outside board members.

**Conceptual Framework**

Given the human resource gap early stage high tech firms are confronted with, Lockett et al. (2005) argue that it is appropriate to take a knowledge based perspective when studying these firms. The knowledge based view of the firm sees access to and the development of knowledge as a means to create and preserve a sustainable competitive advantage (Grant, 1996) as competition is increasingly knowledge-based, definitely in a high tech environment (George, Zahra, Wheatley, & Khan., 2001). Specifically, knowledge-based theories suggest that firm success will depend on its existing knowledge base, the application of new knowledge and its integration within the firm (Kessler, Bierly, & Gopalakrishnan, 2000), which requires bringing together specialized expertise in many areas of knowledge (Demsetz, 1991). A firm will seek external knowledge it considers lacking but essential for the realization of its strategic objectives (Harrigan, 1985). Although new firms are particularly able to adapt and compete in novel dynamic environments, it is however difficult to acquire the necessary resources from the environment (Knockaert & Ucbasaran, 2013). Early stage high tech firms are typically resource poor and have insufficient commercial skills and knowledge (Klofsten & Jones-Evans, 1996) and therefore will be largely dependent on the successful integration of external knowledge. Moreover, operating in a high tech sector requires constant innovation due to its dynamic and competitive nature (George et al., 2001) hereby enlarging the
need for external sources of knowledge (Deeds & Hill, 1996). Hence, entrepreneurial firms do not have to develop all their knowledge internally as the needed time to respond effectively isn't readily available (Zahra, 1996). One of the parties early stage high tech firms principally rely on to gain access to new knowledge, resources and complementary capabilities is the outside board (Zahra & Filatotchev, 2004). Next to the control function which has frequently been attributed to outside boards, they perform a service role, especially in the case of early stage high tech firms (Clarysse, Knockaert, & Lockett, 2007). Outside board members engage in providing advice and counseling and in strengthening external legitimacy and networking, which are considered amongst the most valuable service tasks outside boards can carry out (Hillman & Dalziel, 2003). Concerning advice and counsel, the outside board can help the CEO and its TMT to improve decision-making processes (Donaldson & Davis, 1991) and the quality of strategic decision-making (Stiles & Taylor, 2001). Simultaneously, the outside board members assist in building the firm's external legitimacy and reputation by opening up their personal networks (Pfeffer, 1972) which will improve the firm's relationship with its environment and the most important stakeholders (Pearce & Zahra, 1991). However, as we subsequently argue, the extent to which the TMT benefits from the service activities performed by the outside board will be largely dependent on the learning capabilities of the TMT. In what follows, we build upon the main mechanisms that underlie organizational learning in developing our conceptual framework, linking TMT characteristics and TMT-outside board interactions to outside board service effectiveness, defined as the effectiveness of the outside board's interventions through its service role. Our theoretical framework is illustrated in Figure 1.

TMT Absorptive Capacity

The process where knowledge is created, distributed, communicated and integrated into the organization is called organizational learning and is a function of the firm's absorptive capacity (Hamel, 1991). Absorptive capacity is the firm's general ability to value, assimilate and commercialize new and external knowledge (Cohen & Levinthal, 1990). Indeed, in order for the firm to be able to successfully understand, interpret and realize the benefit of external information, it must have a nominal level of expertise in that area (Cohen & Levinthal, 1990). Similarly, West and Gallagher (2006) indicate that the existence of external knowledge provides no benefits to the firm if the firm cannot identify and deploy such knowledge. A firm's prior experience base increases the ability to recognize the importance of new information as a firm must already have understanding in a given area if it is to learn from its external partner in that area (Hamel, 1991). As a result, being able to evaluate and use external knowledge is mainly a function of the firm's prior related knowledge, or absorptive capacity (Lane & Lubatkin, 1998). Indeed, Cohen and Levinthal (1990) show that absorptive capacity is related to the level of expertise in the particular area in line with the external information. So far, absorptive capacity has mainly been used in an innovation and R&D context, and has been operationalized along the same lines. For instance, R&D expenditure, intensity or human capital (Rocha, 1999; Stocka, Greis, & Fischer, 2001; Veugelers, 1997, respectively) have been used as measures in this context and have been shown to improve a firm's ability to exploit sources of knowledge outside its boundaries. Similarly, George et al. (2001) used patents as a measure of the firm's ability to apply external technical knowledge. In a board learning context, however, TMTs are to learn from, absorb and deploy external knowledge brought to them by outside boards. TMTs can be considered the “student” whereas the outside board is the “teacher” (Audretsch & Stephan, 1996) and the TMT needs a sufficient level of absorptive capacity, relevant to the type of information being transferred. Outside boards typically bring more diverse and relevant business, commercial and sector experience (Zahra &
Filatotchev, 2004), and open up networks (Ensley & Hmieleski, 2005) which are largely missing within the high tech entrepreneurial TMT as the latter is often narrow-focussed in its knowledge base (Huber, 1991). Since a relevant measure of absorptive capacity is dependent on the learning context, we acknowledge TMT sector experience to be an important determinant for absorptive capacity in this perspective. Sector experience of the TMT is important to determine opportunities for innovation (Weterings & Koster, 2007) and individuals with greater sector-specific human capital are likely to better employ specialized knowledge, which enhances their learning capability. Therefore, TMTs with higher levels of absorptive capacity will be better able to absorb and integrate the complementary knowledge and information the outside board brings, and will subsequently experience higher levels of outside board service effectiveness. Therefore, we offer the following hypothesis:

**H1: There is a positive relationship between TMT absorptive capacity and outside board service effectiveness.**

**Frequency of Interaction**

The importance of the TMT’s absorptive capacity in order to learn from external relationships, such as the outside board, cannot be neglected. However, it is not a sufficient condition in the achievement of organizational learning. In addition, considerable *time* must be directed to the learning process as intensity of effort (Cohen & Levinthal, 1990) is critical for learning to take place. Lane and Lubatkin (1998) indicate that interactive learning is the most appropriate to understand new external knowledge as students get close enough to learn not just the objective capabilities of their teachers, but also the tacit knowledge, which is important to create a competitive advantage. This requires face-to-face interactions between student and teacher (Daft & Huber, 1987) and consequently ample frequency of interaction (Knockaert & Spithoven, 2012). Nooteboom (2006) clearly shows that building mutual understanding requires relation-specific investments, which in turn requires sufficient frequency of interaction to make it a valuable investment. In the context of collaborations in innovation projects, Kirat and Lung (1999) indicate that continuous and frequent interactions are a precondition for successful collaborations, as they lead to better integration of knowledge and thus superior innovation performance (Aoki, 1986). Indeed, Cohen and Levinthal (1990) indicate that next to recognizing new external knowledge, the firm's ability to internalize that knowledge is a source of sustainable competitive advantage. The obtained tacit knowledge can be made explicit only through communication in direct interaction (Brown & Duguid, 1996). Similarly, in a board learning context, interactions between TMT and outside board members will shape learning behaviors as it improves both the capacity of the source (outside board) to transmit the knowledge and the capacity of the receiver (TMT) to absorb it (Foss, Lauresen & Pedersen, 2011). Through such interactions, TMT and outside boards share, refine and combine task-relevant knowledge (Van Der Vegt & Bunderson, 2005), leading to higher levels of learning efficiency (van Emmerik, Jawahar, Schreurs, & de Cuyper, 2011). Indeed, previous research shows that board actions and effectiveness are improved through more frequent board meetings (Conger, Finegold, & Lawler, 1998). Applying the importance of frequency interaction in learning theory and previous board research to the outside board service role, we argue that higher levels of frequency of interaction is positively related to outside board service effectiveness. We offer the following hypothesis:

**H2: There is a positive relationship between frequency of interaction and outside board service effectiveness.**
The Interplay Between TMT Absorptive Capacity and Frequency of Interaction

While both absorptive capacity and frequency of interaction are essential elements in a learning context (Cohen & Levinthal, 1990), it is likely that these elements strengthen each other. Relevant absorptive capacity is essential, but its importance will be emphasized by continuous exposure to the external source of knowledge and information. Similarly, frequency of interaction will be particularly relevant if there is sufficient absorptive capacity to interpret and employ the information and knowledge that is transferred during such interaction. In a board learning context, we argue that, while absorptive capacity is a necessary condition for TMTs to learn from outside board service input, this absorptive capacity can be leveraged through repeated exposure to such knowledge. While frequency of interaction is an important condition for learning to take place, this will especially be the case if the TMT has the necessary absorptive capacity to interpret and employ the knowledge brought by the outside board through its service role engagement. We subsequently offer the following hypothesis:

\[ H3: \text{Frequency of interaction between TMT and outside board will positively moderate the relationship between TMT sector experience and outside board service effectiveness.} \]

The Interplay Between Frequency of Interaction and Cognitive Proximity

Next to the importance of both TMT absorptive capacity and frequency of interaction, i.e. understanding and transferring new knowledge, we need to consider the efficiency of knowledge integration, i.e. the importance of cognitive proximity between TMT and outside board. Cognitive distance may be seen as too much variation in believes and preferences concerning various goals for the organization (Miller, 1990), which may create disagreements when strategic issues are discussed (Lant, Milliken, & Batra, 1992). These disagreements may lead to communication failures and inefficient decision-making. For instance, within the TMT, cognitive diversity inhibits rather than promotes comprehensive examinations of opportunities and threats (Miller, Burke, & Glick, 1998). In order for the TMT to learn and create new knowledge, it needs to share basic perceptions and values with other collaborating partners, such as the outside board, to align competences and motives (Weick, 1995) or to limit cognitive distance (Nooteboom, et al., 2007). A large cognitive distance thus causes incomprehensiveness (Miller et al., 1998) and firms need to reduce their cognitive distance to understand each other, to achieve sufficient alignment and to use the developed capabilities (Nooteboom, 2000). The following hypothesis is presented:

\[ H4: \text{Cognitive proximity between TMT and outside board will positively moderate the relationship between frequency of interaction and outside board service effectiveness.} \]

Methodology

Sample and Data Collection

We use a data set on early stage high tech firms in Belgium constructed in 2011-2012. Three criteria for defining early stage high tech firms were applied. First, these start-up firms could not have existed for more than 10 years and were established between 2001 and 2011 (Burgel & Murray, 2000). Second, we selected new ventures from multiple high tech sectors, as classified by Burgel, Fier and Licht (2004). They use the high tech industries of Butchart (1987), complemented
by a number of high tech service sectors. Third, only early stage high tech firms with no single external shareholder holding a majority stake were selected (Burgel, et al., 2004). We identified all early stage high tech firms in Belgium meeting these three conditions by using the official public database Bel-First. Applying our selection criteria to this database resulted in a sample of 179 firms. Given the focus of our study on outside boards, those firms without an outside board member were eliminated from our sample. To qualify as an outside board member, an individual could not be part of the top management team, its associates or families, not be an employee of the firm or its subsidiaries, and not be a member of the immediate past top management group (Pearce & Zahra, 1991). We contacted all firms by phone to check whether they had at least one outside board member. As a result, our sample was reduced to 129 early stage high tech firms. Of these remaining firms, 80 firms were willing to cooperate. The data were collected during face-to-face interviews with the firms’ CEOs in 2012. While doing face-to-face interviews was time-consuming, it was necessary to retrieve often confidential and sensitive information. Further, this personal approach resulted in a high response rate (62%). Even though interviewing the CEO is relevant as he or she typically possesses the most comprehensive knowledge on the organization (Carter, Stearns, Reynolds, & Miller, 1994), we deemed it necessary to collect information from multiple sources. As such, we obtained the contact information of all TMT and outside board members through the interviewed CEOs. Consequently, every member of the TMT as well as all outside board members received a request to fill out an online survey about their personal profile and human capital. Out of the 181 TMT members in our dataset, 71 replied to our survey (39%), as well as 68 of the 244 outside board members (28%), which allowed us to validate this data provided by the CEO. Additionally, we double-checked this given human capital information through the secondary data on Linked-In (a professional social network website).

**Measures**

**Dependent variable. Outside board service effectiveness.** We used Minichilli et al. (2009)’s measure of the service role and asked the CEOs to indicate how effective the outside board is performing the service role. The questions were as follows: “How effective is the outside board in (1) contributing on management issues (2) contributing on financial issues, (3) contributing on technical issues, (4) contributing on market issues, (5) contributing on legal issues and taxation, (6) providing linkage to important external stakeholders, (7) providing the firm with external legitimacy and reputation, (8) promoting strategic initiatives, (9) long-term strategic decision-making and (10) implementing long-term strategic decision-making?” Responses were recorded using a seven-point Likert scale, ranging from 1 (highly ineffective) to 7 (highly effective). The Cronbach’s Alpha coefficient for the summated scale is .82.

**Independent variables. TMT sector experience** is the total number of years of experience the entire TMT had in the same sector as the current company. **Frequency of interaction** is measured as the number of board meetings organized on a yearly basis. While there are different kinds of communication structures, learning requires face-to-face interactions between student (TMT) and teacher (outside board) (Huber, 1991). In a scholar environment, Johnson, et al. (2000) show that students in a face-2-face course had a more positive perception about the teacher and the quality of the course. Subsequently, we operationalize the frequency of interaction as the number of board meetings that take place on a yearly basis, as this is, in a board context, the most common forum through which face-to-face interaction between TMT and outside board takes place. **Cognitive proximity between TMT and outside board.** This was measured using the definition of
cognitive diversity of Miller et al. (1998). Specifically, we asked the CEOs to indicate how strongly members of the TMT and outside board agree or disagree with each other about (1) the best way to maximize the firm's long term profitability, (2) what the firm's goal priorities should be, (3) the best way to ensure the firm's long-run survival and (4) which organizational objectives should be considered most important. All were measured using a seven-point Likert scale ranging from 1 (they strongly disagree) to 7 (they strongly agree). The Cronbach’s Alpha coefficient is .85.

Control Variables. Several other factors may affect the hypothesized relationships. Hence, we control for firm independence, firm age, firm industry, VC ownership and outside board sector experience. **Firm independence** is a dummy variable equaling 1 if the firm is an independent start-up and 0 otherwise. An independent start-up emerges from the ideas and knowledge of one or more independent entrepreneurs (Sharer & Simon, 1997), while dependent start-ups include corporate and academic spin-offs. We control for **firm age** by taking the natural log of the number of years the new venture exists, to ensure that none of the identified effects are the result of age-related processes. **Firm industry** is controlled for by introducing two dummies: ICT industry and health and life sciences industry. These variables equal 1 if the firm belongs to this industry category, and 0 otherwise. The rationale for controlling for the technological domain lies in institutional theory, which suggests that organizational practices, including those relating to the board, may be related to industry specific norms (Eisenhardt, 1988). Moreover, the ease of learning depends upon the characteristics of the knowledge upon which innovation depends in a given industry (Cohen & Levinthal, 1990). **VC ownership** is a dummy variable (0/1) indicating whether the company has raised venture capital or not. We control for VC ownership as VC-backed early stage high tech firms have been found to outperform non-VC-backed firms (Baum & Silverman, 2004). **Outside board sector experience.** The influence of outside board members with sector experience on board decision-making and board performance has been demonstrated (Johnson, Schnatterly, & Hill, 2013). Moreover, advice and counsel of an outside board with sector experience is beneficial to the performance of young entrepreneurial firms (Kroll, Walters, & Le, 2007). Therefore we control for outside board sector experience, measured as the total number of years of experience the outside board had in the same sector as the present company.

Table 1 provides the descriptive statistics for all variables used.

**Results**

The results are presented in Table 2. The hypotheses were tested using hierarchical multiple regression analysis. In the first model, we only included the control variables. In the second model, we added the variables related to our set of direct hypotheses, namely TMT sector experience and frequency of interaction. The interaction variables are added in the third model, where mean centered observations of the independent variables are used to avoid multicollinearity problems, a common and standard practice in multiple regression analysis (Kutner, Nachtsheim, Neter, & Li, 2005). Moreover, Variance Inflation Factors were all below 2.53, indicating that multicollinearity indeed was no issue (Hair, Black, Babin, Anderson, & Tatham, 2006). All three models are statistically significant.

Model 1 shows that outside boards operating in an ICT industry and having VC ownership are perceived less effective in the service role. Adding the independent variables (Model 2) led to significant model improvements. The impact of TMT sector experience (B=.019, p<.001) on
outside board service effectiveness is significantly positive. Furthermore, a higher frequency of interaction (B=.122, p<.01) relates positively to a higher service effectiveness of the outside board. As such, we find support for H1 and H2. Finally, model 3 presents the full model including the interaction terms. We do not find frequency of interaction to positively moderate the relationship between TMT sector experience and outside board service effectiveness. Therefore, we cannot accept H3. However, cognitive proximity between TMT and outside board positively moderates the relationship between frequency of interaction and outside board service effectiveness. Thus, our evidence supports H4. We visualize this significant moderation effect in Figure 2.

As Figure 2 indicates, higher frequency of interaction leads to higher levels of outside board service effectiveness, both at low and high levels of cognitive proximity. However, when there is high frequency of interaction between TMT and outside board, this latter will generate higher levels of service effectiveness if there is high cognitive proximity, whereas there is no effect of this cognitive proximity on outside board service effectiveness when there is low frequency of interaction. We discuss our findings and implications in what follows.

**DISCUSSION AND IMPLICATIONS**

An important premise of our study is that outside board members who perform a service role can be considered part of the “extended TMT” and TMTs can learn from outside board members’ interventions in this role. As such, building on learning theory, we studied the relationship between antecedents of learning capacities, namely absorptive capacity at TMT level and frequency of interaction between TMT and outside board, on outside board service effectiveness. We further studied the moderating effect between these antecedents, and included cognitive proximity as an important moderator in the model.

First, we argued that absorptive capacity is key for the TMT to understand and value the external information provided by the outside board. The TMT needs a basic level of expertise in order to learn from its outside board. Indeed, our results show a positive relationship between TMT sector experience and outside board service effectiveness. Sector experience is key in an early stage high tech environment and is often missing in the human capital base of these firms (Colombo & Grilli, 2010). As such, outside boards with sector experience will be highly valuable in advising the TMT (Kor & Misangyi, 2008), but the relatively homogeneous TMT can only learn from the additional experience the outside board brings if it possesses sufficient absorptive capacity. Second, we found that frequency of interaction between TMT and outside board plays an important role in the learning process. Through these interactions outside boards and TMTs are able to share relevant knowledge, leading to higher levels of outside board effectiveness. However, while both absorptive capacity and frequency of interaction are important, these elements do not reinforce each other. Frequency of interaction matters less if the TMT holds sufficient sector experience. Additional analyses show that, in case of low TMT sector experience, TMTs interacting more frequently with the outside board report higher levels of outside board service effectiveness. In cases of higher levels of TMT sector experience, however, the frequency of interaction does not have a significant impact on this effectiveness. This may be related to the fact that, in case of higher levels of TMT absorptive capacity, face-to-face interaction is less of a requirement as TMTs can more easily absorb the knowledge and information that outside boards transfer. As such, these TMTs may learn through other types of communication the outside board members engage in (Huse, 1998).
Finally, TMT and outside board need to have adequate levels of cognitive proximity in order to learn, create new knowledge, achieve sufficient alignment and being able to use the developed capabilities, as supported by our results.

Our research has important implications for academia, (high tech) entrepreneurs, and their stakeholders and policy makers. First, for academia, our paper contributes to both entrepreneurship and corporate governance research that has primarily focused on the monitoring role of the board, often in large corporations (e.g. Conyon & Peck, 1998). Next to performing the control role, the outside board pays attention to the service role in early stage high tech companies as these firms need advice, counsel, strategic input and network access (Huse, 2007) given the gaps in their human capital base and the rapidly changing environment (Zahra & George, 2002). Further, while researchers have started to recognize the importance of this service role (e.g. Johnson, et al., 1996), studies typically look at board structure and composition, applying a board capital perspective to study the service role. Our research contributes by integrating the TMT into this board approach. We show that, in order to understand outside board service effectiveness, TMT and interaction characteristics are important. Therefore, since knowledge acquisition is especially important in high tech environments (Zahra & George, 2002) and TMTs and outside boards in these settings may not be seen as standalone entities (Nielsen, 2010), it is important to consider the outside board as part of the extended TMT. As such, we respond to earlier calls by Machold, Huse, Minichilli and Nordqvist (2011) to study TMTs and outside boards together. Second, our study has implications for (high tech) entrepreneurs and their stakeholders. Specifically, our results show that outside board service effectiveness is not necessarily reinforced by bringing high levels of board capital to the outside board, but that firms are also required to build TMTs which have the necessary human capital to operate in demanding environments. Further, our findings point to the importance of face-to-face interaction between TMT and outside boards. Third, our results are also relevant to policy makers. Although many governments have built schemes to assist firms in attracting outside board members (Conyon & Peck, 1998), our research emphasizes the need for a more tailored approach when supporting high tech entrepreneurs: the process of attaining new outside board members should take into account the learning capabilities of TMT in order for outside board interventions to reach their full potential.

**Limitations And Directions For Future Research**

Although our research has a number of implications, it also has limitations which may lead to further research directions. First, our research design was cross-sectional. Further research could adopt a longitudinal design to shed light on how outside board service effectiveness evolves over time and how TMT and outside board changes affect this effectiveness. Second, our findings build on a sample of companies established in a specific country, Belgium. While exclusively focusing on Belgium had the advantage that face-to-face interviews with the CEO could be organized and a large percentage of the population could be surveyed, it has the disadvantage that the results could be more difficult to generalize to other regions. Future studies could therefore analyze the extent to which our results hold in other contexts. Third, our results indicated that face-to-face interaction is less of a requirement in case of higher levels of TMT absorptive capacity. As we argued, this may be caused by the fact that TMTs with high levels of absorptive capacity may learn through other communication mechanisms than face-to-face interaction. Hence, other ways of communication can be studied in further research, most desirable through action research or...
participant observations. Nevertheless, we have extended prior research that has mainly studied the (control) function of boards in large companies, and that has so far provided little insight into the antecedents of board (service) effectiveness in early stage high tech companies.

**Conclusion**

In this study, we examine the relationship between antecedents of learning capacities, namely TMT absorptive capacity and frequency of interaction, on outside board service effectiveness. We further looked at the moderating effects between these antecedents and included cognitive proximity as an important moderator in the model. Our findings show that outside board service effectiveness was positively influenced by TMT sector experience and frequency of interaction between TMT and outside board. Additionally, cognitive proximity between TMT and outside board positively moderates the relationship between frequency of interaction and outside board service effectiveness. Our study’s findings suggest that early stage (high tech) companies and their stakeholders need to be aware of the learning processes taking place in the TMT in order for outside board service effectiveness to occur.

**CONTACT:** Elien Vandenbroucke; elien.vandenbroucke@ugent.be; (T): +32 9 264 35 37; Ghent University, Tweekerkenstraat 2, 9000 Gent, Belgium.

**References**


FIGURE 1 - Theoretical Framework

FIGURE 2 - Moderation Effect of Cognitive Proximity
### TABLE 1

**Means, Standard Deviations, and Correlations**

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<td>4. ICT industry</td>
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<td>5. health and life sciences industry</td>
<td>.21</td>
<td>.41</td>
<td>.22</td>
<td>-.08</td>
<td>-.29**</td>
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<td>8. TMT sector experience</td>
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<td>26.45</td>
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<td>10. cognitive proximity between TMT and board</td>
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*p<0.05, **p<0.01, ***p<0.001. Variables 3, 4, 5 and 6 are binary and thus their correlations should be interpreted with care.

### TABLE 2

**Regression analysis**

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<thead>
<tr>
<th>Outside Board Service Effectiveness</th>
<th>Unstandardized coefficients</th>
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<td>frequency of interaction (H2)</td>
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<td>frequency of interaction x TMT-BoD cognitive proximity (H4)</td>
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*p<0.05, **p<0.01, ***p<0.001