

# THE IMPACT OF TOP MANAGEMENT TEAM CHARACTERISTICS AND BOARD STRATEGIC INVOLVEMENT ON TEAM EFFECTIVENESS IN HIGH-TECH START-UPS

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## ABSTRACT

We unite upper echelon and conflict theories to provide deeper understanding of how top management team (TMT) characteristics, and the interplay between TMT and board characteristics, result in TMT effectiveness. We find that cohesion affects effectiveness positively, and that board strategic involvement mediates the relationship between TMT diversity and effectiveness.

## INTRODUCTION

Many authors have pointed to top management team (TMT) composition as a potential determinant for new venture success (Wright, Hmieleski, Siegel, & Ensley, 2007; Hambrick and Mason, 1984; Vanaelst, Clarysse, Wright, Lockett, Moray, & S'Jegers, 2006). The interest in TMT composition has been more pronounced in the case of high-tech start-ups, as justified by the fact that these ventures face a number of challenges, including the liabilities of smallness and newness, requiring a strong TMT (Kale and Ardit, 1998; Hannan and Freeman, 1977). While both the Upper Echelons Theory and entrepreneurial team literatures point to TMT composition as a potential determinant for new venture success, it is still unclear how TMTs in high-tech ventures should be structured in order to enhance new venture success (Knockaert, Ucbasaran, Wright, & Clarysse, 2010).

Despite increasing interest in research into the board's influence on strategic decision making (e.g. Hillmann, Cannella & Paetzold, 2000) few studies have united board perspectives and TMT characteristics. Nielsen (2010) identifies a great potential for studies exploring the independent and interacting effects of TMTs, boards of directors and CEOs.

This paper aims at filling this gap by not only studying the direct mechanisms linking TMT characteristics (cohesion and diversity) to TMT effectiveness, but by also providing an improved understanding of the mechanisms, indirect effects, and more specifically, the interplay between TMT characteristics and board strategic involvement, and its impact on TMT effectiveness in new high-tech ventures.

## CONCEPTUAL FRAMEWORK

From the upper echelon theory perspective, the success of a venture is often a reflection of the TMT's ability to meld talent and ability in a creative and coordinated fashion (Ensley et al., 2002). The use of conflict is central to efforts to meld talent and ability. Conflict plays an optimal role in teams when their diversity acts to encourage the cognitive dimension of conflict, while simultaneously discouraging the affective dimension (Ensley et al., 2002). TMT cohesion is also expected to give rise to beneficial aspects of conflict.

Even though many researchers have indicated that the decision management or mentoring role of the board may be of particular importance in smaller, entrepreneurial ventures (Daily and Dalton, 1992; Fiegeneger, Brown, Dreux, & Dennis, 2000) few studies have explored the interplay between the TMT and board. However, it may be expected that TMT characteristics will affect the extent to which the board engages in its mentoring role, which may in turn affect TMT effectiveness.

### **TMT Diversity and Effectiveness**

High-tech start-ups deal with complex and non-routine tasks, and the management of such a venture can hardly be categorised as a routine problem. Therefore, task-related (or background) diversity is expected to have a beneficial effect on team effectiveness (Stewart, 1996; Milliken and Martins, 1996; Foo, Wong & Ong, 2005). Task-related diversity has been systematically linked to TMT effectiveness (Webber and Donahue, 2001; Foo, 2011). Furthermore, both upper echelon and entrepreneurship research demonstrate that, in high velocity and turbulent environments, companies benefit from TMTs that are heterogeneous in terms of members' educational, functional and industrial backgrounds (Hambrick and Mason, 1984; Eisenhardt and Schoonhoven, 1990; Ensley and Hmieleski, 2005; Beckman, Burton & O'Reilly, 2007; Zimmerman, 2008). Therefore, we offer the following hypothesis:

*Hypothesis 1a. The higher the level of TMT diversity, the higher the TMT's effectiveness.*

### **TMT Cohesion and Effectiveness**

Ensley et al. (2002) studied whether cohesion within new venture TMTs is positively related to new venture performance, but produced inconclusive results, which may have been due to a number of factors. However, we concur with their reasoning on the relationship between TMT cohesion and effectiveness. Cohesion typically refers to the forces that bind members to each other in a group, and it is widely recognized as an important indicator of team-level processes, with implications for effectiveness (Guzzo and Shea, 1992; Ensley et al., 2002; Raver and Gelfand, 2005).

It is clear that there are several ways in which cohesive teams are likely to produce the synergies necessary for superior group effectiveness (Steiner, 1972). We therefore propose the following hypothesis:

*Hypothesis 1b. The higher the cohesion amongst venturing TMT members, the higher the TMT's effectiveness.*

## **The Interplay between TMT Diversity, Cohesion and Strategic Involvement of Boards**

Boards in technology-based threshold firms may play an important strategic role, also referred to as the decision management, service or mentoring role of the board (Daily and Dalton, 1992; Fiegenger et al., 2000; Zhang, Baden-Fuller & Pool, 2010). A board creates value through its performance of advice, counsel and strategy tasks (van den Heuvel and van Gils, 2009; Zhang et al., 2010). We argue that the extent to which the board will be involved in strategic tasks is determined by the TMT diversity and cohesion.

*TMT Diversity and Board Strategic Involvement.* Given the important role that boards play in decision making, especially in early stage ventures, we expect boards to become more involved when the TMT experiences difficulties in decision making, which seems more likely to occur in cases with higher levels of TMT diversity.

Based on the conflict theory and alternative theoretical perspectives, we argue that the board will be more involved in strategic decision making in cases of higher TMT diversity. Subsequently, greater strategic involvement by the board is expected to positively contribute to TMT effectiveness. Boards are expected to allow top managers to tap the breadth of knowledge possessed by outside directors, to complement executives' in-depth, firm-specific knowledge (Johnson, Daily & Ellstrand, 1996). We therefore offer the following hypothesis:

*Hypothesis 2. Board strategic involvement will mediate the relationship between TMT diversity and TMT effectiveness*

*TMT Cohesion and Board Strategic Involvement.* We argue that the less cohesive teams are, the more boards will become involved in strategic decision making, as the TMT is less likely to reach effective decision making through cognitive conflict. Due to this, we expect to find a negative relationship between TMT cohesion and board strategic involvement, while board strategic involvement is expected to positively affect TMT effectiveness. We offer the following hypothesis:

*Hypothesis 3. Board strategic involvement will mediate the relationship between TMT cohesion and TMT effectiveness.*

## **METHODOLOGY**

### **Data Collection**

We have built upon the FORNY database, uniting data on 300 companies originating from Norwegian universities and public research institutes. FORNY is a government program designed to foster wealth creation in Norway, by supporting the commercialisation of R&D results. The questionnaire was sent to the CEOs of academic spin-outs in autumn 2008. After personal phone calls to the CEOs, 135 academic spin-out companies returned their questionnaires, resulting in a response rate of 45%. The firms operate primarily in high-tech industries such as ICT, health, oil and gas, energy and environment, medical and biotechnology, maritime and offshore, amongst others.

## Measures

*Dependent Variable.* TMT effectiveness. Our measure for TMT effectiveness was based upon the measure developed by Pearce and Sims (2002), uniting change and general effectiveness. The scale used to assess TMT effectiveness contains six items, measuring general and change effectiveness, which are: ‘my team copes with change very well’; ‘my team changes behaviour to meet demands of the situation’; ‘my team is highly effective’; ‘my team faces new problems effectively’; ‘my team works on important problems’; and, ‘my team does very good work’. Responses were recorded using a seven-point Likert scale, ranging from 1 (completely disagree) to 7 (completely agree). The Cronbach’s alpha coefficient for the scale is .90. The average rating for the team effectiveness scale is 5.27, indicating that CEOs generally saw their teams as effective.

*Independent Variables.* TMT background diversity. The diversity scale was adapted from Huse (2007b). TMT diversity was measured by asking respondents to gauge the degree to which their TMT members represented diversity in terms of the following characteristics: functional background (sales, finance, etc.); education; industry background; founding experience; executive experience; and international experience. The Cronbach’s alpha coefficient for the scale is .80. The average rating for the diversity scale is 4.51.

TMT cohesion. In order to measure team cohesion, we employed a six-item scale developed by Chin, Salisbury, Pearson, & Stollak (1999). The items are as follows: ‘I feel a sense of belonging to the team’; ‘I feel that I am a member of the team’; ‘I do not see myself as part of the team’; ‘I am not enthusiastic about our team’; ‘I am happy to be part of this team’; and, ‘I am content to be part of this team’. Items 3 and 4 were reverse coded in order to construct a summated measure (obtained by taking the average of the 6 items). The Cronbach’s alpha coefficient for the scale is .84. The average rating for the team cohesion scale is 6.25, indicating high levels of team cohesion.

Board strategic involvement. Following Huse (2007b), we asked the respondents to what extent they agreed with the following statements: ‘board members contribute to network building’; ‘board members contribute to lobbying and legitimating’; ‘the firm and board use often board members’ networks to access advice’; ‘board members function as mentors for CEO and firm’; ‘the board is actively involved in work related to long-term strategies and overall goals’; and, ‘board members find enough time for board tasks and are very well prepared to board meetings’. The Cronbach’s Alpha coefficient for the summated scale is .90. The average rating for the board strategic involvement scale was 4.73, indicating a relatively high level of involvement.

All of these were measured using a seven-point Likert scale ranging from 1 (to very small degree or completely disagree) to 7 (to very large degree or completely agree).

*Control Variables.* Firm age, stage and size. Firm age and size are controlled for, as the skills required by a TMT and board strategic involvement may vary between younger and older firms (Hambrick and Mason, 1984; Huse, 2007a). Firm age is calculated as the number of years since the business was formally incorporated. The average age of the firms studied is 7.33 years. Firm size is calculated based on full time employment equivalents. The average size of the firms

studied is 12.86 full time employment equivalents. We also control for the stage of growth each firm is at (Kazanjian, 1998).

Further, we control for team size (Carpenter, Geletkanycz, & Sanders, 2004), board size and insiders: members of both the TMT and board (Zahra and Pearce, 1989; Huse, 2007a).

## RESULTS

Due to some missing values, only 103 cases were included in the analysis. The hypotheses were tested using hierarchical multiple regression analysis. In the first block, control variables were entered. In the second block, we added the cohesion and diversity variables. In the last block, we added the board strategic involvement variable. Our three step model is presented in Table 1.

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Model 1 only contains the control variables and was found to be marginally statistically significant (adjusted  $R^2$  of 6.3%,  $p < .10$ ). The model contains a significantly negative coefficient for stage 4, indicating that firms in the stability stage score significantly lower on team effectiveness. This may be related to the fact that, during this stage, a team of managers may be replacing or supporting the original founding team (Kazanjian, 1998). Model 2 is statistically significant at the  $p < .001$ -level, with an adjusted  $R^2$  of 35.2% ( $R^2$  change significant at the  $p < .001$  level), and statistically significant coefficients for TMT diversity ( $\beta = .19$ ;  $p < .10$ ) and TMT cohesion ( $\beta = .51$ ;  $p < .001$ ). When introducing board strategic involvement in Model 3, the adjusted  $R^2$  increases to 41.3% ( $R^2$  change significant at the  $p < .01$  level), with statistically significant coefficients for team cohesion ( $\beta = .48$ ,  $p < .001$ ) and board strategic involvement ( $\beta = .29$ ;  $p < .01$ ). Therefore, we conclude that **hypothesis 1a is not supported**, whereas **hypothesis 1b is supported** by these results.

The previously observed effect of diversity on team effectiveness disappears in the third model, providing an initial indication that board strategic involvement generates a mediating effect. The Sobel t-test (1982) provided additional support for the mediating effects of board strategic involvement ( $t = 2.77$ ,  $p < .01$ ). Additionally, we followed the framework outlined by Baron and Kenny (1986) to determine whether full or partial mediation occurred. We tested the robustness of our results by using a Sobel test with bootstrap procedures. Based on this, the findings **support hypothesis 2**. We do not find any indication of board strategic involvement mediating the relation between TMT cohesion and effectiveness, and therefore do **not find support** for **hypothesis 3**. Testing for interaction effects between team diversity and cohesion does not provide any additional insights.

## CONCLUSIONS

This study set out to provide a better understanding of how TMT characteristics and board involvement can affect TMT effectiveness.

Our findings provide insights into the optimal structure of venturing TMTs. First, we do not find that higher levels of TMT background diversity lead directly to higher levels of TMT effectiveness: the relationship between TMT background diversity and effectiveness is mediated

by board strategic involvement. Higher levels of team diversity are positively related to higher levels of board strategic involvement, in turn generating higher levels of team effectiveness. This suggests that when there are disagreements within the diverse team, even of a task nature, the board is more likely to provide their views and to be more engaged. This greater engagement in turn translates into greater TMT effectiveness. In this way, the findings shed new light on the ongoing discussion about the benefits and disadvantages of heterogeneous versus homogeneous teams, indicating that mediating effects of team diversity may be more important than direct effects, and may provide an explanation for the contradictory results found in previous research. Second, the findings show that it is beneficial to build cohesive teams, in line with the expected relationship described in previous research (e.g. Ensley et al., 2002), but which had not been conclusively supported. Cohesive teams are better at integrating a wider range of information, before the negative effects of information overload such as confusion and disagreements come into play (Foo, Sin, & Yiong, 2006).

This research leads to a number of practical and theoretical implications. This study has also a number of limitations that may lead to future research avenues.

## REFERENCES AVAILABLE FROM THE AUTHOR(S)

**TABLE 1**  
**Results from the Hierarchical Regression Analysis**

<i>Dependent variable = TMT effectiveness</i>	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>
Standardized Beta Coefficients			
<b>Control variables</b>			
Firm age	-.05	.03	.03
Stage 1	.03	.06	.02
Stage 2	.10	.11	.13
Stage 4	-.25**	-.11	-.03
Firm size	.09	.04	.04
TMT size	.14	.07	.08
Board size	.05	-.03	-.02
Board insiders	-.14	-.06	-.04
<b>Independent variables</b>			
TMT diversity		.19*	.12
TMT cohesion		.51****	.48****
Board strategic involvement			.29***
R <sup>2</sup>	.136	.415	.476
Adjusted R <sup>2</sup>	.063	.352	.413
F-statistic	1.851*	6.540***	7.529****

N = 103; \*\*\*\* p<.001, \*\*\*p<.01, \*\*p<.05, \*p<.10