

**MANAGEMENT INNOVATION:
UNCOVERING THE INFLUENCE OF TOP MANAGEMENT TEAMS**

Ignacio G. Vaccaro
Justin J. P. Jansen
Frans A. J. Van Den Bosch
Henk W. Volberda

Rotterdam School of Management
Erasmus University
Department of Strategic Management and Business Environment
Burg. Oudlaan 50, PO BOX 1738,
3000DR Rotterdam,
The Netherlands
Email: IVaccaro@rsm.nl
Telephone: +31 10 408 2924
Fax: +31 10 408 9013

Paper submitted to the Copenhagen Business School Management Innovation Conference

June 2009

**MANAGEMENT INNOVATION:
UNCOVERING THE INFLUENCE OF TOP MANAGEMENT TEAMS**

ABSTRACT

Recent research on management innovation, i.e. new managerial processes, practices, or structures that change the nature of managerial work, suggests a prominent role of internal and external change agents. In this study, we focus on the top management team (TMT) as a group of key internal change agents who, due to the nature of their position, are capable of fostering or discouraging management innovation. In particular we look at how TMT diversity and social integration relate to management innovation under different environmental conditions. Our results show that while TMT diversity is positively associated with management innovation, its influence is more prominent in relatively stable environments. We also contribute to the operationalization of management innovation by developing a scale that includes three key underlying dimensions.

Keywords: management innovation, social integration, diversity

INTRODUCTION

As competition and the pace of technological change accelerates, firms need to renew themselves by changing the way in which they work by adapting their organizational structures, processes, and practices to generate a valuable source of competitive advantage (Teece, 2007). Management innovation, that is, the implementation of a management practice, process, or structure that is new to the adopting organization (Birkinshaw, Hamel, & Mol, 2008; Zaltman, Duncan, & Holbek, 1973), constitutes an instance of the type of ambiguous and hard-to-replicate change organizations need in order to achieve and sustain competitiveness (Teece, 2007) .

Previous research has provided evidence that top management team (TMT) attributes influence several organizational outcomes (e.g. Cannella Jr, Park, & Lee, 2008; Hambrick & Mason, 1984; Hambrick, Geletkanycz, & Fredrickson, 1993; West & Anderson, 1996; Wiersema & Bantel, 1992), in line with this we posit that in order to understand how organizations relate to management innovation, we must direct our attention towards top executives. In articulating and employing management innovation within an organization, key individuals will have a prominent role (Birkinshaw et al., 2008). Top management teams (TMTs) have the ability and discretion to make fundamental decisions regarding the organization's future. For instance, TMTs have been reported to affect management innovation within a firm as they can influence outcomes (Haleblian & Finkelstein, 1993) and choice (Finkelstein, 1992), the ability to balance the exploitation of existing capabilities with the exploration of new ones (Jansen, George, Van den Bosch, & Volberda, 2008) . Because of this, we see TMTs as having a crucial role in the introduction of new managerial practices, processes, or structures.

This study adds to the management innovation literature in three important ways.

First, we investigate management innovation at the organizational level of analysis and consider TMT attributes as key antecedents of management innovation. Prior studies have proposed that characteristics of top managers can affect organizational outcomes such as strategic choice (Finkelstein, 1992; Hambrick & Mason, 1984), performance (Cannella Jr et al., 2008), as well as firm ambidexterity (Jansen et al., 2008). In this study, we look at how homogeneity and heterogeneity amongst TMT members relates to management innovation. Research suggests that actions taken by the TMT will, to some extent, reflect its members' values and cognition (Hambrick & Mason, 1984). Since managers within the TMT regularly face more (often complex and ambiguous) information than they can process (Cho & Hambrick, 2006), their ability to process that information –as well as the outcomes that will follow- will reflect their different experiences, preferences, and biases. Hence, TMT diversity in knowledge and experience among its members is relevant for our understanding of management innovation as that heterogeneous knowledge-base may reflect upon new practices, processes, or structures within the organization (Bantel & Jackson, 1989; Barkema & Shvyrkov, 2007). Similarly, through social integration among TMT members, a general sense of direction, collaboration and *teamness* develops (Hambrick, 1994, 1998; Smith et al., 1994), which may have and impact on how TMTs makes sense of their environment as well as the innovation process within their organizations (Pearce & Ensley, 2004). By studying the relationship between these two TMT attributes and management innovation, this study deepens our understanding on how TMT homogeneity and heterogeneity are associated with changes in practices, processes, or structures within organizations.

Second, we explore the moderating role of environmental dynamism. Environmental dynamism has been suggested as an important moderator for the relationship between TMTs and several outcomes. Studies have argued that as environmental conditions change, so does the effectiveness of different types of innovation (Jansen, Van Den Bosch, & Volberda, 2006) and team structure (Keck, 1997). For instance, it has been argued that TMTs may also need to adapt their composition (Haleblian & Finkelstein, 1993; Homburg, Krohmer, & Workman, 1999), as well as their managerial mental models (Reger & Palmer, 1996) as they cope with changes in the environment. In this sense, we explore the contingency that different levels of environmental dynamism may have an effect upon the relationship between TMT attributes and management innovation, rendering some TMTs more effective than others given different environmental conditions. Therefore, in order to provide a more robust understanding of the relation between TMT attributes and management innovation, we include the moderating effect of environmental dynamism in our model.

Third, we develop and operationalize a scale for management innovation at the organizational level which reflects three key latent constructs. We provide evidence which suggests that management innovation may be better expressed as a meta-construct consisting of three dimensions which relate to changes in practices, processes and structure.

LITERATURE REVIEW AND HYPOTHESES

Management innovation

Management innovation has been defined in the literature as the implementation of a management practice, process, or structure aimed at furthering organizational goals (Birkinshaw et al., 2008) that is new to the adopting organization (Zaltman et al., 1973). Management

innovation addresses changes that challenge what managers do and how they do it (Hamel, 2006), which are hard to replicate, hence more likely to lead to sustainable competitive advantage and increased competitiveness (Birkinshaw & Mol, 2006; Hamel, 2007; Teece, 2007). Management practices, that is, what managers do as part of their job, are e.g., setting objectives, developing talent, and meeting different demands from stakeholders (Birkinshaw et al., 2008; Hamel, 2007). Such is the case in organizations that implement brand management, where management practice will now include setting objectives along individual brands, securing talent and resources to meet different needs within a brand portfolio, as well as meeting the demands of the organization as a whole. Management processes refer to the routines that govern the work of managers, drawing from abstract ideas and turning them into actionable tools, which typically include strategic planning, project management, and internal communications among others (Birkinshaw et al., 2008; Hamel, 2006, 2007). In adopting project management, for instance, structures, job descriptions, and communication channels will be altered in accordance to the requirements of the different projects. Additionally, the introduction of new organizational structures –such as introducing self-managed teams– can have great impact on what managers do by altering the way in which the organization aligns and harnesses effort from its members (Birkinshaw et al., 2008; Hamel, 2007).

In assessing the newness of management innovation, we consider management innovation that is new to the adopting organization, regardless of where it was developed or whether it has been adopted elsewhere (Damanpour, 1991; Gupta, Tesluk, & Taylor, 2007; Slappendel, 1996; Zaltman et al., 1973). Others have suggested that management innovation should be new to the world (e.g. Birkinshaw et al, 2008, Hamel, 2006, 2007, Knight, 1967). As a consequence, such an approach focuses on a few large and well established firms in a particular

period. We focus on a complementary approach, i.e. on newness at the organizational level as it enables us to consider a broader spectrum of instances to investigate the impact of different leadership behaviors.

Top Management Team

Since Hambrick and Mason's (1984) seminal article, scholars have turned to TMTs in order to make sense of a variety of organizational processes and outcomes. As key decision-makers within organizations, what organizations do and how they do it lies, to a large extent, with the TMT (Finkelstein & Hambrick, 1996). Given the relevance of management innovation to how managerial work is performed and the potentially systemic effects on the organization (Hamel, 2006), considering the relation between TMTs and management innovation is of particular relevance.

We consider two key TMT attributes which relate to differences in the background and experiences among members of the TMT, and congruence in their appreciation of the environment and sense of direction. Because management innovation requires the implementation of new practices, processes, or structures, team diversity may be better equipped to make sense of new management ideas. Prior studies have found evidence that supports the notion that heterogeneous TMTs (i.e. teams whose members differ with regards to their job experiences, backgrounds, and expertise) are more conducive to changes in strategy (Wiersema & Bantel, 1992), performance (Cannella Jr et al., 2008; Naranjo-Gil, Hartmann, & Maas, 2008), and innovation (Bantel & Jackson, 1989). In a similar way, shared vision is relevant for management innovation as concordance around collective goals and how to interpret different events may relate to the TMT's ability to develop an appropriate response to changes in market

trends and the environment (Pearce & Ensley, 2004; Sinkula, Baker, & Noordewier, 1997; Tsai & Ghoshal, 1998).

TMT Diversity. TMT diversity refers to the heterogeneity in knowledge and experience in different functional areas among members of the dominant coalition (Bantel & Jackson, 1989; Hambrick & Mason, 1984).

The degree to which members of the TMT share a common background has been argued to influence organizational outcome. Several studies have pointed out that a diversified TMT is desirable in order to achieve increased performance and problem solving ability within the team (e.g. Campion, Medsker, & Higgs, 1993; Hambrick & Mason, 1984; Keck, 1997), as well as innovation and strategic change (Bantel & Jackson, 1989; Barkema & Shvyrkov, 2007). The rationale followed is that increased diversity within a team will broaden the knowledge-base through different sets of expertise, which will allow members to learn from each other and come up with different ideas (Campion et al., 1993; Hambrick et al., 1993). Similarly, diversity may serve management innovation as a heterogeneous team may be able to consider new practices, processes, or structures that challenge the status quo. In particular, a diversified TMT may be able to make sense of new practices by drawing on the experiences and expertise of different members. Implementing actionable management processes may also be more efficiently done when teams can rely on a wide knowledge-base to generate new ideas and promote debate among different TMT members (Simons, Pelled, & Smith, 1999). Lastly, organizations can also benefit from diversified TMTs during the introduction of new organizational structures as the wide scanning and problem solving capabilities within the TMT may facilitate this type of change.

Hypothesis 1: Top management team diversity will be positive related to management innovation.

TMT Social Integration. Social integration refers the extent to which top management teams are cohesive in their pursuit of goals, information exchange, and collaboration amongst members (Ling, Simsek, Lubatkin, & Veiga, 2008; Magni, Proserpio, Hoegl, & Provera, 2009; Smith et al., 1994). In essence, teams with a high degree of social integration amount to more than a collection of executives, they are characterized by a fluent exchange of information and resources, and shared decision making (Hambrick, 1994, 1998).

Research involving TMT social integration provides evidence of its association with different organizational outcomes. For instance, Li and Zhang (2002) report a positive relationship between social integration and product innovation intensity, while Simsek, Veiga, Lubatkin and Dino (2005) argue for a similar impact of social integration upon innovation. Similarly, studies have found support for a positive relationship between social integration and organizational ambidextrous orientation (Lubatkin, Simsek, Yan, & Veiga, 2006), as well as the perceived quality of strategic decisions and organizational performance (Carmeli & Schaubroeck, 2006; Smith et al., 1994). This evidence indicates that organizations with TMTs working as a *team*, exchanging relevant resources and timely information seem to be better suited for pursuing innovation. In addition, Hambrick (1998) argues that social integration also aids implementation of change, with TMT members (“advocates for change”) disseminating information throughout the organization and supporting the need for challenging the status quo.

In line with these studies, we argue that socially integrated TMTs will be positively associated with managerially innovative firms. TMT members in organizations pursuing management innovation are expected to engage with others members of the team and possess information relevant to the introduction of the innovation, as well as accountability for achieving their goals (Birkinshaw et al., 2008). In fact, Hambrick's (1998) "advocates for change" conceptually resemble what Birkinshaw et al (2008) call "internal change agents". In both cases these are individuals who are involved in championing the development and/or adoption of management innovation across the organization.

Hypothesis 2: Top management team social integration will be positive related to management innovation.

The Moderating Role of Environmental Dynamism

Environmental dynamism has been characterized as the degree (and unpredictability) of instability present in the environment (Dess & Beard, 1984). As environments change, firms must meet the new challenges so as to avoid becoming in some way obsolete. Accordingly, TMT attributes may play different roles according to the level of environmental dynamism present at the time.

TMT diversity may play an even more prominent role in highly dynamic environments due to its ability to provide firms with a wider scan of possibilities and better overall sense making of complex situations, which may result in a broader set of potential solutions (Bantel & Jackson, 1989; Keck, 1997). In this way, faced with complex, dynamic scenarios, highly

diversified TMTs may find an innovative solution that challenges managerial work through new practices, processes or structures.

Hypothesis 3: Environmental dynamism moderates the relationship between TMT diversity and management innovation such that increased environmental dynamism strengthens the positive effect of TMT diversity upon management innovation.

TMT social integration supposes a common sense of direction, sharing of information and interpretation of the environment by members of the TMT (Hambrick, 1994, 1998). In this way, a high level of social integration within the TMT may be conducive to a better interpretation of the environment and the adoption of management innovation to better cope with the changes. Hambrick (1994; 1998) proposes that in highly dynamic environments TMT will be able to profit from social integration through their ability to disseminate and process the stimuli with which they are presented. He also shows that these teams where social integration is high will also be better equipped to collectively articulate the need to introduce strategic change and implement it. Thus, social integration is desirable in contexts of high dynamism and complexity (Magni et al., 2009) and teams which are characterized by it will be more likely to promote and implement management innovation when meeting the challenges encountered in dynamic environments.

Hypothesis 4: Environmental dynamism moderates the relationship between TMT social integration and management innovation such that increased environmental dynamism strengthens the positive effect of TMT shared vision upon management innovation.

Figure 1 depicts the our model and the hypothesised relationships.

Figure 1

METHODS

Setting and data collection

To test our hypotheses we conducted a survey among TMT members of companies registered at the Dutch chamber of commerce. Our initial sample was unstratified and included companies which employed at least 25 full-time employees. We ensured that the informants were professionally interested and committed to providing accurate data by assuring confidentiality and by offering them a summary of the results. In order to minimize the shortcomings associated with single-respondent and common method bias, we temporarily separated the measurement of our independent and dependent variables and collected data from different informants.

In 2007 surveys were sent to TMT members in 9,000 companies. We had identified these respondents as appropriate informants by means of the information available in our database. In order to increase our response rate, we followed our original mailing with a follow-up four weeks later. In both cases a cover letter and return envelope were included along with the survey. Lastly, we called those companies which had not returned their surveys two weeks after the reminders had been sent. A total of 1,102 surveys were returned, for a response rate of 12.24 percent. Approximately a year later, in 2008, a second survey was administered to TMT members of the same 1,102 companies to assess management innovation. Having followed a

similar procedure, we obtained 265 usable surveys for a 24.05% response rate, considerably better than the typical rate for mailed surveys to top executives (Hambrick et al., 1993). Respondents had an average company tenure of 9.49 years (s.d.= 2.72). The mean size of the companies in our sample was 59.28 (s.d.= 3.15) full-time employees. T-tests comparing respondents and non-respondents showed no significant differences based on number of employees. In addition, we compared early and late respondents in terms of demographics and model variables. None of these tests revealed any significant differences ($p < 0.05$).

Measures

Dependent variable. As a scale of management innovation at the organizational level is not available, the following steps were taken to develop a new measure for this construct. First of all, we reviewed relevant literatures on management innovation (Birkinshaw & Mol, 2006; Hamel, 2006; Kimberly, 1981; Mol & Birkinshaw, 2006) and generated a pool of items that address the main features of management innovation. These items tapped into different domains of management innovation. From this pool of items, unique items were selected to be included in the initial survey. During subsequent interviews, various industry representatives were invited to suggest improvements to the survey items. Finally, the phrasing of the items was further enhanced by the authors and peers, a process that resulted in a final version of the measurement.

In addition to assessing management innovation, we were also interested to see whether three different elements included in the conceptualization of management innovation (i.e. practices, processes, and structures) could be distinguished in our analysis. Therefore we included three items that referred to changes in management practices (e.g. “our organization usually implements new administrative systems”), processes (e.g. “the way in which projects are

managed is usually modified”), and structures (“we encourage groups of employees to set their own structure and functioning”).

The resulting 9-item measure for management innovation captured the extent to which organizations change their management practices, processes, or structures. An overview of the items used in this scale is provided in Appendix 1. Exploratory factor analysis (EFA) of these 9 items results yielded a three-factor solution with eigenvalues larger than one and a cumulative explained variance of 68.20%, which replicated the 3 dimensions of management innovation included in our definition (i.e. practices, processes, and structures). Our measurement of management innovation showed adequate reliability ($\alpha = 0.77$). James, Demaree, and Wolf’s (1984) interrater score (r_{wg}) was .89.

Independent Variables. To measure *TMT diversity* ($\alpha = 0.79$, $r_{wg} = .83$) we adapted a measure from Campion et al (1993) which tapped into width of expertise and backgrounds across members of the team. The measure for *TMT social integration* ($\alpha = 0.86$, $r_{wg} = .89$) was adapted from Smith et al (1994) and refers to the extent to which team members exchange information, share decision making and really act like a *team*. Items for both these scales are reported in Appendix 1.

Moderating and control variables. *Environmental dynamism* ($\alpha = 0.83$, $r_{wg} = .77$) was adapted from Dill (1958) and Volberda and Van Bruggen (1997) and tapped into the rate of change and instability of the external environment. These items are reported in Appendix 1.

Control variables. In our empirical study we controlled for possible alternative explanations by including relevant control variables. *TMT size* could affect the heterogeneity of the top management team, and thus impact management innovation. We measured TMT size through the logarithm of the number of members of the top management. Because larger organizations may have more resources, yet they may lack the flexibility to introduce management innovation, we included the logarithm of the number of full time employees within the organization to account for *firm size*. Because incumbent firms may be more inclined towards exploiting existing management rather than introducing change, we included *firm age* measured by the logarithm of the number of years since the firm's founding. We also included variables to control for *industry effects*. Last, past investments in research and development may induce changes in management; therefore we included *R&D expenditure* during 2007.

ANALYSIS AND RESULTS

In order to simultaneously estimate the latent variables and the relationships between them as specified in our hypothesis, we employed structural equation modelling (SEM). Following Anderson and Gerbing (1988) we used a two-step approach through which we first estimated our measurement model through confirmatory factor analysis (CFA) and subsequently our structural model.

Measurement Model. In this step we assess the fit of the overall model using observed data. Each item is constrained to loading on their latent variables they are expected to be associated with. We included variables for TMT diversity (3 items), TMT social integration (4 items), environmental dynamism (4 items), and three sub-scales of management innovation:

management practices (3 items), management processes (3 items), and structures (3 items). All latent variables were allowed to correlate with each other.

In order to evaluate the fit of our measurement model we considered chi-square statistics as well as different fit indexes, such as the comparative fit index (CFI), the incremental fit index (IFI), and the Tucker-Lewis index (TLI). A value of .9 or higher for these indexes is typically considered to indicate adequate fit (Bollen, 1989). Results for our model ($\chi^2 = 231$, $df = 155$, CFI = .96, IFI = .96, TLI = .95) provide evidence of adequate fit. Our model also showed that all indicators loaded significantly ($p < .000$) on the intended constructs, which provides evidence of convergent validity (Hair, Anderson, Tatham, & Black, 1998) In addition, we computed an alternative measurement model in which 9 items of management innovation were constrained to load on one latent variable. This model showed a poorer fit ($\chi^2 = 588$, $df = 203$, CFI = .83, IFI = .83, TLI = .80) providing initial support specifying a second-order model.

In assessing discriminant validity Table 1, which presents means, standard deviations, and correlations among variables included in this study, can be seen as an initial indication of discriminant validity with all correlations below .5, well under the suggested cut-off point of .65 (Tabachnick, Fidell, & Osterlind, 2001). Additionally, a series of chi-square difference tests were performed comparing one-, two-, and three-factor models with our initial CFA model structure. First we evaluated our dependent variable by specifying a single-factor model in which all 9 items were constrained to load on this factor. This model showed a poor fit ($\chi^2 = 316.2$, $df = 27$, CFI = .60, IFI = .61, TLI = .47). We then specified a second-order model by specifying three latent constructs (of three items each) which loaded on management innovation. This model showed much better fit ($\chi^2 = 73.6$, $df = 24$, CFI = .93, IFI = .94, TLI = .90). The chi-square difference of 242.6 ($df = 3$) suggests that management innovation is better specified as having

three latent constructs (Bagozzi & Phillips, 1982). Additional tests between different pairs of constructs in our independent variables routinely showed that single factor models superior to two-factor models, overall providing evidence of discriminant validity.

Table 1

Structural Model. As a second step a series of nested models need to be tested using chi-square differences in order to find the model that best accounts for the observed covariance between the latent constructs (Anderson & Gerbing, 1988; Bollen, 1989). In order to evaluate our model we tested four nested models for which we obtained measures of model significance, different fit indices, as well as amount of variance explained in our dependent variable (Bollen, 1989; Jöreskog, 1993). Table 2 presents an overview of the different nested models. Results show that models 1, 2 and 3 can be rejected in favour of model 4, our hypothesized model. Model 4's fit is significantly better than that of the other nested, constrained models, as shown by the significant chi-square differences between them.

Table 2

Hypotheses Tests. We used the structural model to test our hypotheses. By considering the direction and statistical significance of the different paths we can assess which hypotheses are supported by our model. Table 3 shows the result of our tests. Hypothesis 1 suggested that TMT diversity was positively related to management innovation. The significant standardized path estimate ($\gamma = .22, p < 0.01$) provides support for our hypothesis. The test of the relationship between social integration and management innovation provides no support for hypothesis 2 ($\gamma = -.10, n.s.$), in fact the estimate indicates a (non-significant) negative relationship between these variables.

In hypotheses 3 and 4 we proposed that the direct effects of TMT diversity and TMT social integration on management innovation would be exacerbated by environmental dynamism. The significant standardized path estimate ($\gamma = -.14, p < 0.05$) lends no support to our hypothesis as it suggests a significant and negative moderation of environmental dynamism on the relationship between TMT diversity and management innovation. Finally, we found no evidence to support hypothesis 4 ($\gamma = -.15, p < .05$) but rather a negative and significant moderation of environmental dynamism on the relationship between TMT social integration and management innovation.

Table 3

DISCUSSION AND CONCLUSION

By applying management innovation to the organizational level of analysis, and focussing on TMT attributes as well as environmental dynamism, this study begins to unfold how key change agents (Birkinshaw et al., 2008) relate to management innovation through

different attributes. Additionally, we provide evidence of how differences in environmental dynamism may affect those relations.

Our analysis shows that high levels of TMT diversity are conducive to management innovation. This is in line with previous studies which showed similar associations with innovation (Bantel & Jackson, 1989), performance (Campion et al., 1993), and problem solving (Keck, 1997). Diverse TMTs encapsulate differences in expertise and background that may help the team as a whole to consider a broader spectrum of potential solutions, and enhance creativity (Amabile, 1998), which may ultimately contribute to implementing new practices, processes, or structures. Interestingly, we did not find a positive relation between TMT social integration and management innovation, but rather a negative –yet non-significant– association.

Regarding the potential moderating role of environmental dynamism, we found environmental dynamism to be a negative and significant moderator for the relationship between TMT diversity and management innovation. Our results suggest that the relationship between TMT diversity and management innovation becomes more positive under less dynamic environments. Conversely, in highly dynamic environments, increases in TMT diversity are associated with a lower level of management innovation. This seem to indicate that as the external environment become more dynamic, and thus influence the priorities of key change agents (Birkinshaw et al., 2008), a high degree of diversity could prove an obstacle in advancing management innovation within the organization. Analogously, in relatively stable environments, increase diversity may be welcome into the TMT as a way of including additional variance into the team in order to stimulate new ways of thinking, and reduce the possibility of groupthink.

We also found evidence of a negative and significant moderation of environmental dynamism on the relationship between TMT social integration and management innovation. If the relationship between TMT social integration and management innovation was indeed negative, this moderation would imply that in highly dynamic environments a higher degree of social integration within the TMT would be more conducive to management innovation. Overall, the moderation effect of environmental dynamism seems to indicate that, in environments characterized by uncertainty and change, highly integrated homogeneous TMTs would be more strongly associated with management innovation.

In addition to the insights presented following the testing of different hypotheses, we also set out to explore the operationalization of the relatively new concept of management innovation (Birkinshaw et al., 2008). We developed a scale that reflected three pillars of management innovation: new practices, new processes and new structures. Our analysis provides evidence for conceiving of management innovation as a meta-construct consisting of these three dimensions. We can expect that, while companies may not necessarily introduce changes in all three dimensions simultaneously, management innovating companies may introduce change in one of them and subsequently that change may trigger change in other areas. For instance, a company may first introduce changes in production objectives are determined (process) by allowing teams of operators to determine their own production output. This may trigger new ways in which teams and individuals operate (practice), which in turn may affect the formal hierarchy within the organization (structure), for instance, to do away with positions whose function is now performed by the teams themselves.

Limitation and Future Research Suggestions

Our study constitutes the first step towards uncovering the relationship between top management teams, environmental dynamism, and management innovation. Limitations to our study suggest the need to additional research in this topic. First, future studies may include additional TMT attributes as well as demographic characteristics of TMT members. Second, while we look at the moderation of environmental dynamism, future studies may examine the potential effects of R&D intensity, as firms may engage in management innovation in response to the development of new technologies that require new practices, processes, or structures. Daft's (1978) work on the dual-core organization could serve as a starting point. Third, in measuring management innovation at the organizational level we constructed a new scale. While we took steps to assess the validity of our measure, other studies may seek to enhance this measure and test its validity by applying it to different datasets. In particular, researchers may consider replicating the measurement of management innovation as consisting of three latent constructs. Fourth, although we took great care in separating collection of data on the independent and dependent variables as well as the use of multiple respondents, future longitudinal research is necessary to investigate how management innovation develops over time. Last, different research methodologies, such as case studies, may enrich our understanding of management innovation by providing a more fine-grained account of how managers introduce management innovation into their organizations.

In conclusion, our study adds to the emerging literature on management innovation by empirically assessing management innovation at the organizational level through a newly developed, multi-dimensional scale. It also links management innovation to the upper-echelons

literature. This link is of particular importance since it allows us to involve key change agents within organizations that, due to their position, have the ability to make management innovation flourish within their companies. As we have shown, however, the nature of this influence will depend on the prevailing environmental dynamism.

REFERENCES

- Amabile, T. M. 1998. How to Kill Creativity. *Harvard Business Review*, 76(5): 76-87.
- Anderson, J. C., & Gerbing, D. W. 1988. Structural Equation Modeling in Practice: A Review and Recommended Two-Step Approach. *Psychological Bulletin*, 103(3): 411-423.
- Bagozzi, R. P., & Phillips, L. W. 1982. Representing and Testing Organizational Theories: A Holistic Construal. *Administrative Science Quarterly*, 27(3): 459-489.
- Bantel, K. A., & Jackson, S. E. 1989. Top Management and Innovations in Banking: Does the Composition of the Top Team Make a Difference? *Strategic Management Journal*, 10: 107-124.
- Barkema, H. A., & Shvyrkov, O. 2007. Does Top Management Team Diversity Promote or Hamper Foreign Expansion? *Strategic Management Journal*, 28: 663-680.
- Birkinshaw, J., Hamel, G., & Mol, M. J. 2008. Management Innovation. *Academy of Management Review*, 33(4): 825-845.
- Birkinshaw, J., & Mol, M. J. 2006. How Management Innovation Happens. *MIT Sloan Management Review*, 47(4): 81.
- Bollen, K. A. 1989. *Structural Equations with Latent Variables*. New York: Wiley.
- Campion, M. A., Medsker, G. J., & Higgs, A. C. 1993. Relations between Work Group Characteristics and Effectiveness: Implications for Designing Effective Work Groups. *Personnel Psychology*, 46(4): 823-850.
- Cannella Jr, A. A., Park, J.-H., & Lee, H.-U. 2008. Top Management Team Functional Background Diversity and Firm Performance: Examining the Roles of Team Member Colocation and Environmental Uncertainty. *Academy of Management Journal*, 51(4): 768-784.

- Carmeli, A., & Schaubroeck, J. 2006. Top Management Team Behavioral Integration, Decision Quality, and Organizational Decline. *Leadership Quarterly*, 17(5): 441-453.
- Cho, T. S., & Hambrick, D. C. 2006. Attention as the Mediator between Top Management Team Characteristics and Strategic Change: The Case of Airline Deregulation. *Organization Science*, 17(4): 453-469.
- Daft, R. L. 1978. A Dual-Core Model of Organizational Innovation. *Academy of Management Journal*, 21(2): 193-210.
- Damanpour, F. 1991. Organizational Innovation: A Meta-Analysis of Effects of Determinants and Moderators. *Academy of Management Journal*, 34(3): 555-590.
- Dess, G. G., & Beard, D. W. 1984. Dimensions of Organizational Task Environments. *Administrative Science Quarterly*, 29(1): 52-73.
- Finkelstein, S. 1992. Power in Top Management Teams: Dimensions, Measurement, and Validation. *Academy of Management Journal*, 35(3): 505-538.
- Finkelstein, S., & Hambrick, D. C. 1996. *Strategic Leadership: Top Executives and Their Effects on Organizations*: West Pub. Co.
- Gupta, A., K, Tesluk, P., E , & Taylor, M. S. 2007. Innovation at and across Multiple Levels of Analysis. *Organization Science*, 18(6): 885-897.
- Hair, J. F., Anderson, R. E., Tatham, R. L., & Black, W. C. 1998. *Multivariate Data Analysis*: Prentice Hall Upper Saddle River, NJ.
- Haleblian, J., & Finkelstein, S. 1993. Top Management Team Size, Ceo Dominance, and Firm Performance: The Moderating Roles Of. *Academy of Management Journal*, 36(4): 844.

- Hambrick, D. C. 1994. Top Management Groups: A Conceptual Integration and Reconsideration of The " Team " Label. In B. M. Staw, & L. L. Cummings (Eds.), *Research in Organizational Behavior*, Vol. 16: 171-213. London: JAI Press Ltd.
- Hambrick, D. C. 1998. Corporate Coherence and the Top Management Group. In D. C. Hambrick, D. A. Nadler, & M. L. Tushman (Eds.), *Navigating Change*: 123-140. Boston, Massachusetts: Harvard Business School Press.
- Hambrick, D. C., & Mason, P. A. 1984. Upper Echelons: The Organization as a Reflection of Its Top Managers. *Academy of Management Review*, 9(2): 193-206.
- Hambrick, R. C., Geletkanycz, M. A., & Fredrickson, J. W. 1993. Top Executive Commitment to the Status Quo: Some Tests of Its Determinants. *Strategic Management Journal*, 14(6): 401-418.
- Hamel, G. 2006. The Why, What, and How of Management Innovation. *Harvard Business Review*, 84(2): 72-84.
- Hamel, G. 2007. *The Future of Management*. Boston, Massachusetts: Harvard Business School Press.
- Homburg, C., Krohmer, H., & Workman, J. P. 1999. Strategic Consensus and Performance: The Role of Strategy Type and Market-Related Dynamism. *Strategic Management Journal*, 20(4): 339-357.
- James, L. R., Demaree, R. G., & Wolf, G. 1984. Estimating within-Group Interrater Reliability with and without Response Bias. *Journal of Applied Psychology*, 69(1): 85-98.
- Jansen, J. J. P., George, G., Van den Bosch, F., & Volberda, H. W. 2008. Senior Team Attributes and Organizational Ambidexterity: The Moderating Role of Transformational Leadership. *Journal of Management Studies*, 45(5): 982-1007.

- Jansen, J. J. P., Van Den Bosch, F. A. J., & Volberda, H. W. 2006. Exploratory Innovation, Exploitative Innovation, and Performance: Effects of Organizational Antecedents and Environmental Moderators. *Management Science*, 52(11): 1661-1674.
- Jöreskog, K. G. 1993. Testing Structural Equation Models. In K. A. Bollen, & J. S. Long (Eds.), *Testing Structural Equations Models*: 294-316. New York: Wiley.
- Keck, S. L. 1997. Top Management Team Structure: Differential Effects by Environmental Context. *Organization Science*, 8(2): 143-156.
- Kimberly, J. R. 1981. Managerial Innovation. In P. C. Nystrom, & W. H. Starbuck (Eds.), *Handbook of Organizational Design*, Vol. 1: 84-104. New York: Oxford University Press.
- Li, H., & Zhang, Y. 2002. Founding Team Comprehension and Behavioral Integration: Evidence from New Technology Ventures in China. *Academy of Management Proceedings*: B1-B6.
- Ling, Y. A. N., Simsek, Z., Lubatkin, M. H., & Veiga, J. F. 2008. Transformational Leadership's Role in Promoting Corporate Entrepreneurship: Examining the Ceo-Tmt Interface. *Academy of Management Journal*, 51(3): 557-576.
- Lubatkin, M. H., Simsek, Z., Yan, L., & Veiga, J. F. 2006. Ambidexterity and Performance in Small- to Medium-Sized Firms: The Pivotal Role of Top Management Team Behavioral Integration. *Journal of Management*, 32(5): 646-672.
- Magni, M., Proserpio, L., Hoegl, M., & Provera, B. 2009. The Role of Team Behavioral Integration and Cohesion in Shaping Individual Improvisation. *Research Policy*, 38(6): 1044-1053.

- Mol, M. J., & Birkinshaw, J. 2006. Against the Flow: Reaping the Rewards of Management Innovation. *European Business Forum*(27): 24-29.
- Naranjo-Gil, D., Hartmann, F., & Maas, V. S. 2008. Top Management Team Heterogeneity, Strategic Change and Operational Performance. *British Journal of Management*, 19(3): 222-234.
- Pearce, C. L., & Ensley, M. D. 2004. A Reciprocal and Longitudinal Investigation of the Innovation Process: The Central Role of Shared Vision in Products and Process Teams (Ppits). *Journal of Organizational Behavior*, 25: 259-278.
- Reger, R. K., & Palmer, T. B. 1996. Managerial Categorization of Competitors: Using Old Maps to Navigate New Environments. *Organization Science*, 7(1): 22-39.
- Simons, T., Pelled, L. H., & Smith, K. A. 1999. Making Use of Difference: Diversity, Debate, and Decision Comprehensiveness in Top Management Teams. *Academy of Management Journal*, 42(6): 662-673.
- Simsek, Z., Veiga, J. F., Lubatkin, M. H., & Dino, R. N. 2005. Modeling the Multilevel Determinants of Top Management Team Behavioral Integration. *Academy of Management Journal*, 48(1): 69-84.
- Sinkula, J. M., Baker, W. E., & Noordewier, T. 1997. A Framework for Market-Based Organizational Learning: Linking Values, Knowledge, and Behavior. *Journal of the Academy of Marketing Science*, 25(4): 305-318.
- Slappendel, C. 1996. Perspectives on Innovation in Organization. *Organization Studies*, 17(1): 107.

- Smith, K. G., Smith, K. A., Sims Jr, H. P., O'Bannon, D. P., Scully, J. A., & Olian, J. D. 1994. Top Management Team Demography and Process: The Role of Social Integration and Communication. *Administrative Science Quarterly*, 39(3): 412-438.
- Tabachnick, B. G., Fidell, L. S., & Osterlind, S. J. 2001. *Using Multivariate Statistics*. Boston, MA: Allyn and Bacon
- Teece, D. J. 2007. Explicating Dynamic Capabilities: The Nature and Microfoundations of (Sustainable) Enterprise Performance. *Strategic Management Journal*, 28(13): 1319-1350.
- Tsai, W., & Ghoshal, S. 1998. Social Capital and Value Creation: The Role of Intrafirm Networks. *Academy of Management Journal*, 41(4): 464-476.
- Volberda, H. W., & Van Bruggen, G. H. 1997. Environmental Turbulence: A Look into Its Dimensionality. In M. T. A. Bemelmans (Ed.), *Dynamiek in Bedrijfsvoering*. Enschede: NOBO.
- West, M. A., & Anderson, N. R. 1996. Innovation in Top Management Teams. *Journal of Applied Psychology*, 81(6): 680-693.
- Wiersema, M. F., & Bantel, K. A. 1992. Top Management Team Demography and Corporate Strategic Change. *Academy of Management Journal*, 35(1): 91-121.
- Zaltman, G., Duncan, R., & Holbek, J. 1973. *Innovations and Organizations*. New York: John Wiley & Sons Inc.

TABLE 1

Descriptive Statistics, Standard Deviations, and Correlations

	Mean	s.d.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1 Management Innovation	4.22	0.84	1											
2 TMT diversity	5.55	0.86	.201**	1										
3 Environment dynamism	4.51	1.28	.242**	.089	1									
4 Firm age (log)	1.42	0.41	-.093	-.065	-.089	1								
5 TMT size (log)	0.67	0.23	.073	.076	-.040	.089	1							
6 R&D expenditure (log)	0.49	0.47	.001	.030	.168**	-.199**	-.099	1						
7 Firm size (log)	1.77	0.50	.110	-.016	-.044	.236**	.285**	-.163**	1					
8 TMT social integration	5.46	0.87	.079	.311**	.079	-.113	-.128*	.099	-.039	1				
9 TMT tenure (log)	0.98	0.43	-.052	.002	.068	.153*	.010	-.027	-.109	.089	1			
10 Other industry	0.03	0.18	-.076	-.042	-.144*	-.036	-.045	.120	-.074	-.057	.029	1		
11 Manufacturing industry	0.42	0.49	-.038	.101	-.096	.288**	-.024	-.031	.099	-.121*	.008	-.158*	1	
12 Wholesale industry	0.09	0.28	.044	.043	-.002	.094	.063	-.082	-.017	.052	.065	-.058	-.260**	1
13 Construction industry	0.15	0.35	-.013	-.116	.088	.030	.025	-.210**	.080	-.020	-.051	-.078	-.350**	.128*

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

N=265

FIGURE 1

Conceptual Model and Hypothesized Relationships

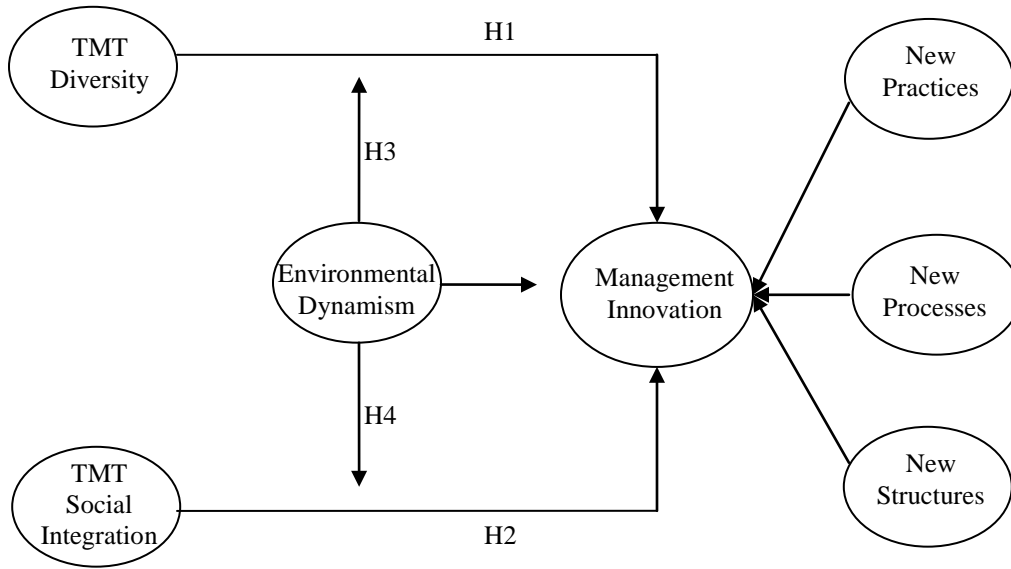


TABLE 2

Summary of fit indices for Chi-square difference tests between nested models

Model	<i>df</i>	χ^2	CFI	IFI	TLI	RMSEA	Model Comparison	$\Delta\chi^2$	Δdf	Management Innovation R²
<i>Model 1</i> Null latent model	396	608.8	0.91	0.91	0.89	0.045				
<i>Model 2</i> Covariates only	398	635.2	0.91	0.90	0.88	0.048	2 vs 1	26.4***	2	0.07
<i>Model 3</i> Covariates, TMT diversity, TMT social integration	395	615.9	0.90	0.91	0.89	0.046	3 vs 2	19.3**	3	0.13
<i>Model 4</i> Covariates, TMT diversity, TMT social integration, moderation	388	583.8	0.91	0.92	0.90	0.044	4 vs 4	32.1***	7	0.29

N = 265

** $p < .01$

*** $p < .001$

TABLE 3

Structural Equation Modelling Results

	Path description	Hypothesized direction	Unstandardized estimates	Standardized estimates
H1	TMT Diversity → Management Innovation	+	.22**	.19
H2	TMT Social Integration → Management Innovation	+	-.10	-.06
H3	TMT Diversity*Environmental Dynamism → Management Innovation	+	-.14*	-.12
H4	TMT Social Integration*Environmental Dynamism → Management Innovation	+	-.15*	-.13
	Management Innovation → Practices		.52***	.68
	Management Innovation → Processes		1.00	.85
	Management Innovation → Structures		.16**	.25
Moderator	Environmental Dynamism → Management Innovation		.38***	.32
Controls	Firm Age(log) → Management Innovation		-.48*	-.15
	TMT Size(log) → Management Innovation		.02	.00
	R&D expenditure(log) → Management Innovation		-.17	-.06
	Firm Size(log) → Management Innovation		.57***	.23
	TMT Tenure → Management Innovation		-.10	-.04
	Manufacturing industry → Management Innovation		.34	.13
	Construction industry → Management Innovation		-.10	-.03
	Wholesale industry → Management Innovation		.69*	.15
	Other industry → Management Innovation		1.00	.14

*p < 0.05; ** p < 0.01; ***p < 0.000

n = 265

APPENDIX 1

Scales and Items All items were measured on a seven-point scale, anchored by 1 = strongly disagree and 7 = strongly agree.

	Component*						
	Reliability	1	2	3	4	5	6
Management Innovation	0.77						
We usually introduce new management systems							0.82
We usually renew our remuneration policy				0.32			0.75
The rules and procedures within our organization are usually modified					0.32		0.51
We usually alter the way in which we set our objectives				0.78			
The way in which projects are managed is usually modified				0.84			
We usually introduce changes to the way activities are organized				0.84			
We regularly invest in developing our structure so as to make the most of our staff					0.76		
Our organization allows employees to pursue different roles within its structure					0.85		
We encourage groups of employees to set their own structure and functioning					0.83		
TMT Diversity	0.79						
The members of my team vary widely in their areas of expertise							0.80
The members of my team have a variety of different backgrounds							0.86
The members of my team have a variety of different experiences							0.82
TMT Social Integration	0.86						
The members of the top management team are quick to defend each other from criticism by outsiders							0.74
The members of the top management team get along together very well							0.88
The members of the top management team are always ready to cooperate and help each other							0.86
The members of the top management team really stick together							0.84
Environmental Dynamism	0.83						
Environmental changes in our local market are intense							0.82
Our clients regularly ask for new products and services							0.78
In our local market, changes are taking place continuously							0.86
In our market, the volume of products and services to be delivered change fast and often							0.76
Eigenvalue		4.01	2.88	2.27	1.99	1.6	1.1
Percentage of variance explained		20.39	14.40	11.34	9.94	8	5.43

* Principal Component Analysis – Varimax rotation (only scores above 0.3 are presented). N=265